

SECTION 6

GRADING & STORM WATER MANAGEMENT

Regulations for grading and storm water management on privately owned land in Sonoma County are included in Chapter 11 of the Sonoma County Code. A copy of this chapter can be viewed at the Permit and Resource Management Department, at most public libraries or online at <http://library.municode.com/HTML/16331/book.html> .

Grading regulations have evolved over the years and started off being directed towards earth moving as it related to building pads and the modification of slopes above and below buildings. These regulations also covered dams, roads, golf courses, landscaping, parking lots, and so on. Grading regulations today also address reducing soil loss or soil erosion and preventing other pollutants from entering local streams and waterways both during and after construction.

Storm water management has evolved as well. Starting with flood control projects to prevent or control large scale flooding (levees and dams), followed by the review of localized drainage systems to prevent nuisance and/or localized flooding by moving the storm water off the project as fast as possible. Most recently, storm water management included the environmental aspects of storm water carrying pollutants to streams and excess storm water created by projects altering the runoff patterns, impacting streams.

This section presents the five main aspects of earth moving: grading, setbacks, drainage, flooding, and storm water quality. These aspects are inter-related to the project as a whole, but need to be discussed separately.

GRADING

Grading is the movement of earthen material (soil, rock or combination), generally by mechanical means, either as a cut (removal of the earthen material) or as a fill (placement of earthen material). Commonly, a cut is made into a hillside to make a flat area. The cut material or spoils are then either removed from the site or placed on-site just below the cut area making a larger flat area – typically the building site. Cut and fills might also be done to create a road to a subdivision or to a building site.

In addition to flat areas being created, cuts and fills also create graded slopes. Once a graded slope is created, it must be stable, protective of structures, and secure from slides, erosion, and adverse drainage/storm water impacts. There is the real need to protect the slope from flowing water. Water may infiltrate into a graded area making the soil heavier and more likely to slide. Water may also flow across a slope's surface or face, potentially causing erosion which may create a stability issue or discharge soil into a local drainage or stream. Chapter 11 requires drainage control at the top of graded (cut and fill) slopes to prevent erosion and slope failures.

There is a distinction between natural and graded slopes. Grading regulations do not apply to natural slopes even if they contain natural land slides or soil movement. Proposed repairs or work on natural slopes is subject to Chapter 11. A land owner may

allow a natural land slide to remain, however, once the owner chooses to repair the slide in any fashion, the work is regulated by Chapter 11 and the resulting slope is considered a graded slope and not a natural slope.

In residential construction a grading permit is not always required. Often the amount of earth moved is below the grading thresholds and is exempt from needing a grading permit. The grading permit exemptions are detailed in Chapter 11; a partial list of these exemptions, those applicable to residential development, can be found starting on page 6.5. Please be aware that the provisions and standards contained in Chapter 11 apply to all grading and that an exemption merely eliminates the need for a grading permit.

If a grading permit is required, a grading application is required. The application consists of the PRMD standard application form, grading plans, and any required reports or studies, which might include a hydrology study, hydraulic analysis, compaction report, geotechnical or soils report, liquefaction study, wetlands assessment, wetlands delineation or stream setback determination, depending on the project and/or location. Certain types of grading are classified as engineered grading – see Table 11-1 of Chapter 11. In this case the plans must be prepared by a registered civil engineer.

The grading plans must reflect the site both before the work is begun and also show the site in its proposed form. A list of plan requirements is available at the PRMD. While individual conditions often vary, grading plans must always be clear and completely show the proposed work. The existing drainage and proposed drainage patterns must be indicated. All grading permits must be reviewed by the Engineering Division.

After the initial site evaluation, the grading plans and permit application are checked for compliance with the code requirements; just as plans for any new building are processed. If the grading permit includes a road, access for emergency and fire vehicles is also checked. If any road establishes a new entry onto a public road, an encroachment permit will be required. If access to the project is by an existing road or driveway and the entry onto the public road is not up to current standards, the applicant will likely be required to improve the entry and obtain an encroachment permit to do so. If the project is complex, the PRMD staff may add a list of required inspections to the approved plans to clarify which inspections are required during construction.

SETBACKS

Grading activities must be set back from streams, ponds, lakes and wetlands. The grading setback from streams is dependent on the slope of the terrain being graded and the erodibility of the soil. The setback is either 25 feet or 50 feet based on these two factors. The grading setback from lakes and ponds is 50 feet unless the graded area slopes away from the lake or pond. The setback from wetlands is either 50 feet or 100 feet. Details regarding the grading setbacks can be found in Chapter 11, sections 11.16.120, 11.16.130, and 11.16.140, respectively.

LOCALIZED DRAINAGE

Drainage review is one component of storm water management which addresses the collection and conveyance of storm water and the design of drainage facilities to prevent localized flooding and nuisance conditions. Storm water runoff is calculated as a flow

rate which is then used for the design of storm drain systems, sizing of culverts or storm drain pipes, stream crossings using bridges, constructed V-ditches and drainage swales. Hydrology maps and calculations are developed to determine the amount of water anticipated at a specific location or locations. Hydraulic calculations are performed to ensure the amount of water can flow through the pipe or system being specified. Drainage review overlaps into such areas as grading, building, erosion prevention, flood prone areas, above grade septic systems, or any development that obstructs or redirects storm water runoff.

Installations of most drainage systems require a drainage (DRN) permit, unless exempt. The drainage permit exemptions are detailed in Chapter 11; a partial list of the exemptions, those applicable to residential development, can be found starting on page 6.6. Please be aware that the provisions and standards contained in Chapter 11 apply to all drainage work and that an exemption merely eliminates the need for a drainage permit.

All grading, building and above grade septic permits require drainage review and clearance. Building permits that require drainage review are those in a floodway (new construction is not allowed in a floodway), in a flood plain or in the flood prone urban area, and buildings relatively close waterways. Drainage review is also required if the proposed development prompts a drainage or erosion concern.

FLOODING

Grading in special flood hazard areas or flood plains needs special attention. The placement of fill within a flood plain displaces flood waters and shifts the flooding to a different location. This has the potential to create flooding impacts to structures that did not or would not have been impacted prior to a proposed project bringing fill into a flood plain. The County is charged with ensuring that development within the flood plains does not increase the risk of flooding to neighboring parcels or communities. This is achieved through provisions of Chapter 11 which requires there be no decrease in the flood carrying capacity of the flood plains. Simply stated, if you place fill in a flood plain, you need to have an equal amount removed. This is the concept of no net fill. Of course, it's not that simple. The project must also allow the water to flood and recede as naturally as possible. Simply balancing the cut and fill volumes, alone, might still impact the flood event. How one balances the cut and fills also matters.

The Federal Emergency Management Agency (FEMA) has produced a Flood Insurance Study that defines special flood hazard areas. These areas are depicted on flood maps known as the Flood Insurance Rate Maps (FIRMs) and it is these defined areas that are subject to the no net fill provision. Other provisions in the Sonoma County Code pertain to protecting structures placed in the flood plain such as elevating the structures above the flood level and flood proofing the structures (non-living areas) below the flood level.

The County has defined an area known as the Flood Prone Urban Area (FPUA). In general is this the Santa Rosa plain and is bounded by River Road to the north, the Laguna de Santa Rosa/Hwy 116 on the west, Hwy 116/E. Cotati Ave to the south and Petaluma Hill Road/Hwy 101 on the east. Localized flooding is a high concern in this area. The terrain is so flat that drainage courses are not well defined or easily observed and the placement of small amounts of fill material can easily obstruct the natural

drainage patterns and create local drainage or nuisance flooding conditions. To address this ongoing concern, Chapter 11 requires any fill placement within the FPUA be evaluated and demonstrated that no adverse impact to drainage will result.

STORM WATER QUALITY

Storm water quality is a major concern in Sonoma County. Many waterways in our area are impaired due to excessive amounts of sediment, nutrients and/or fecal coliform. The land disturbing activity common to grading is associated with soil loss. Soil discharges adversely affects or impairs the streams by several methods: covering the spawning habitat for aquatic species; creating stream bank erosion; creating wider, shallower and hotter streams; and brings additional nutrients to the streams.

The main method of soil erosion is through rain events. Unprotected areas are easily eroded and storm water runoff carries the soil and nutrients to local drainage systems and/or directly to local streams. Additional pollutants such as oil, diesel, gasoline, lime, and construction debris are also present at construction sites and can be discharged as well.

After construction, the new impervious surfaces change the runoff patterns which can have adverse impacts on local waterways as well. Rainfall is not allowed to infiltrate as it would have prior to the project and runs off. This creates more “channel forming discharges” than would have occurred and increasing the frequency of these events adversely affect the stream channels.

As such, there are many regulatory efforts to reduce and/or eliminate the discharge of soil from land disturbing activities and to mimic the natural drainage patterns. These include the federal National Pollutant Discharge Elimination System permits, the state’s municipal storm water permit issued to the County of Sonoma, as well as local regulations contained in Chapter 11 of the Sonoma County Code. These regulations are all intended to prevent and/or minimize the discharge of pollutants or waste from the project site during and after construction.

The County implements these regulations by requiring construction plans to include structural and non-structural best management practices (BMPs) prior to permit issuance. The BMPs must be on the construction plans before a grading permit is issued. There are many BMPs that can be used in endless combinations to accomplish this goal. The BMPs include, but are not limited to, silt fencing; straw wattles; erosion blankets/fabrics; check dams; rip-rap; construction entrances to control soil discharges; primary and secondary containment for petroleum products; paints; lime and other materials of concern; permanent measures such as infiltration galleries, rain gardens and storm water treatment systems that address post-construction storm water runoff.

The County does not dictate one BMP over another; however, there must be an effective combination of BMPs to meet the intent of preventing and/or minimizing the discharge of pollutants. There are several BMP manuals approved for use in Sonoma County.

These are listed on our web site at

<http://www.sonomacounty.org/prmd/docs/grdord/bmpguide.htm>.

Timing is critical when dealing with storm related discharges. Mitigation measures or BMPs must be installed per approved plans and specifications, and working properly prior to each rainy season (October 15 each year) and remain functional throughout the rainy season. PRMD will verify BMP installation and functionality, through inspections, throughout the life of the construction permit(s). We do not prohibit work during the rainy season; however, it should be avoided when possible and if conducted will be scrutinized more closely.

SONOMA COUNTY CODE CHAPTER 11 EXEMPTIONS APPLICABLE TO RESIDENTIAL DEVELOPMENT

Section 11.04.020. Exemptions from grading permit requirements (partial list).

The following grading activities are exempt from the provisions of Section 11.04.010 and may be conducted without obtaining a grading permit; provided that exempt grading shall still be subject to the standards in this chapter.

- B. Emergency grading. Grading necessary to protect life or property, or to implement erosion prevention measures, where a situation exists that requires immediate action; provided that only the volume of grading necessary to abate an imminent hazard may be performed prior to obtaining a grading permit. The person performing the emergency grading or the property owner shall notify the permit authority and provide evidence acceptable to the permit authority of the scope and necessity of the grading on or before the next business day after the onset of the emergency situation. The person performing the emergency grading or the property owner shall apply for a grading permit within ten (10) days after the commencement of grading. The permit authority may order grading to be stopped or restricted in scope based upon the nature of the emergency.

- D. Excavations below finished grade subject to valid building permit. Excavations below finished grade for basements, tanks, vaults, swimming pools, and footings of a building, retaining wall, or other structure, where authorized by a valid building permit. This shall not exempt any excavation with an unsupported height greater than five (5) feet after the completion of the structure, or any fill using material from the excavation, except where the material is placed on-site and the placement is shown on the approved building plans.

- E. Exploratory excavations. Exploratory excavations to investigate subsurface soil conditions and geology, affecting or disturbing an area of less than ten thousand (10,000) square feet and involving the movement of less than fifty (50) cubic yards, under the direction of a civil engineer, soils engineer, engineering geologist, or registered environmental health specialist, where the ground surface is restored to its previous topographic condition within sixty (60) days after the completion of the work.

- F. Grading subject to valid encroachment permit. Grading within a public right-of-way, where authorized by a valid encroachment permit.

- H. Maintenance, repair, or resurfacing of private roads. Maintenance, repair, or resurfacing of existing, lawfully constructed private roads, where the length, width, and design capacity are not changed. This shall not exempt any fill in the flood-prone urban area or any special flood hazard area.
- I. Minor cut. A cut that does not exceed fifty (50) cubic yards, and:
 - 1. Is no greater than two (2) feet in depth; or
 - 2. Does not create a cut slope greater than five (5) feet in height and steeper than two (2) units horizontal to one (1) unit vertical (fifty (50) percent).
- J. Minor fill outside flood-prone urban area and special flood hazard areas. A fill outside the flood-prone urban area and any special flood hazard area that does not exceed fifty (50) cubic yards or alter or obstruct a watercourse, and:
 - 1. Is intended to support structures or surcharges and is no greater than one (1) foot in depth and placed on terrain with a natural slope no steeper than fifteen (15) percent; or
 - 2. Is not intended to support structures or surcharges and is no greater than three (3) feet in depth.
- N. Soil profiling test pits. Excavations for soil profiling test pits, where the ground surface is restored to its previous topographic condition within sixty (60) days after the completion of the work.
- P. Water lines, pipelines, and utilities. Excavations and fills for water lines; routine pipeline maintenance practices; or installation, testing, maintenance, or replacement of utility connections, distribution or transmission systems, and facilities for utilities regulated by the California Public Utilities Commission, including electrical, water, or natural gas, on a single site or within a public right-of-way; where the ground surface is restored to its previous topographic condition within sixty (60) days after the completion of the work.
- Q. Wells and on-site sewage disposal systems subject to valid well or septic permit. Excavations and fills for wells and on-site sewage disposal systems, where authorized by a valid well or septic permit and the fill material is placed on-site and the placement is shown on the approved well or septic plans.

Section 11.06.020. Exemptions from drainage permit requirements (partial list).

The following drainage improvement activities are exempt from the provisions of Section 11.06.010 and may be conducted without obtaining a drainage permit; provided that exempt drainage improvement shall still be subject to the standards in this chapter.

- A. Drainage improvement subject to valid grading, building, septic, vineyard and orchard site development, or encroachment permit. Drainage improvement for grading, buildings or structures, septic systems, vineyard or orchard site development, or within a public right-of-way, where authorized by a valid grading, building, septic, vineyard and orchard site development, or encroachment permit.

- B. Maintenance, repair, or replacement of existing private drainage improvements. Maintenance, repair, or replacement of existing, lawfully constructed private drainage improvements, where the location and design capacity are not changed.

- C. Minor pipe and vee-ditch swale systems. Construction or installation of pipe and vee-ditch swale systems that meet all of the following criteria:
 - 1. The drainage area is less than one-half ($\frac{1}{2}$) acre for a smooth-walled pipe and/or vee-ditch swale system, or less than one-quarter ($\frac{1}{4}$) acre for a corrugated pipe system.
 - 2. The pipe or vee-ditch swale system is not located in the flood-prone urban area.
 - 3. The pipe system is a single run, with minimum diameter of eight (8) inches and installed slopes between two (2) percent and four (4) percent, or the vee-ditch swale system is made of earth, grass, or rock, with side slopes no steeper than two (2) units horizontal to one (1) unit vertical (fifty (50) percent), maximum depth of nine (9) inches, and installed slopes between two (2) percent and four (4) percent.