

CITY OF ORANGE



MANUAL OF GRADING

**DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION**

2012

MANUAL OF GRADING

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1. SCOPE AND PURPOSE

1.1 SCOPE

This Manual of Grading sets forth the rules and regulations to control excavation, grading and earthwork construction, including cuts and fills. It establishes the administrative procedure for issuance of permits, sets requirements for approval of plans and inspection of grading construction, and provides guidelines for enforcement of grading violations.

1.2 PURPOSE

The purpose of this chapter is to safeguard life, limb, property, and public welfare by establishing minimum requirements for regulating grading and earthwork and also to control the quality of drainage and runoff within the City's jurisdiction.

This Manual of Grading combined with Planning and Development Guidelines for Land Form Grading and Planting, Public Works Standard Plans and Specifications, and Local Implementation Plan constitute the elements of the City Grading Ordinance:

- (1) The Manual of Grading is this Manual.
- (2) The Planning and Development Guidelines for Landform Grading and Planting provides hillside development site planning techniques. It encourages the use of contour grading, variable slope concepts and innovative landscaping technology to promote aesthetically pleasing concepts in the design of hillside grading, and construction.
- (3) The City Standard Plans and Specifications provides specific construction details of items associated with grading of the project, such as erosion control devices, terrace drains, etc..
- (4) The Local Implementation Plan provides specific construction and long-term site maintenance items associated with water quality and storm runoff, such as erosion control measures, sediment control measures, and best management practice (BMP) methods.

These four elements provide the necessary guidelines for developers and engineers to plan, design and construct the grading phase of their project.

2. DEFINITIONS

Approval shall mean a written engineering or geological opinion by the responsible engineer, geologist of record or responsible principal of the engineering company concerning the progress and completion of the work unless it specifically refers to the city official.

Approved Plans shall mean the current grading plans which bear the signature of approval of the City Engineer.

Approved Testing Agency shall mean a facility whose testing operations are controlled and monitored by a registered civil engineer and which is equipped to perform and certify the tests required by the Manual of Grading, as determined by the City Official.

As-Graded is the surface conditions extent upon completion of grading.

Bedrock is relatively unweathered, consolidated or relatively hard formation that underlies the soil and other unconsolidated material.

Bench is a relatively level step excavated into earth material on which fill is to be placed.

Best Management Practices (BMPs) means any program, technology, process, siting criteria, operating method, measure, or device which controls, prevents, removes, or reduces pollutants in storm water and non-storm water runoff.

Borrow is earth material acquired from an off-site location for use in grading on a site.

Building Official shall mean the Building Official of the City of Orange.

City Engineer shall mean the City Engineer of the City of Orange, who, or his duly delegated representative, is the designated authority charged with the administration and enforcement of this code.

City Inspector shall mean an inspector duly authorized by the City Engineer to perform inspection of grading, concrete placement and related constructed work or other grading-related work approved by the City Engineer.

City Official is the City Engineer of the City of Orange or his duly delegated representative.

City Manager shall mean the City Manager of the City of Orange.

Civil Engineer shall mean a professional engineer registered in the State of California to practice in the field of Civil Engineering.

Civil Engineering shall mean the application of the knowledge of the forces of nature, principles of mechanics and the properties of materials for the evaluation, design, and construction of civil works for the beneficial use of Mankind.

Clearing, Brushing, and Grubbing shall mean the removal of vegetation (grass, brush, trees, and

similar plant types) by mechanical means.

Compaction is the densification of a fill by mechanical means.

Commercial Coach is a vehicle with or without motive power, designed and equipped for human occupancy for industrial, professional or commercial purposes, and shall include a trailer coach.

Contour Grading is the transitional use of variable slopes and the blending of these slopes into contours compatible with the natural terrain with the toe or top of the slope varying from a straight line

DAMP means Drainage Area Management Plan. It is a document approved by the Santa Ana Regional Water Quality Control Board. The DAMP and the LIP serve as the principal policy and guidance documents for the City NPDES Storm Water Program.

Deputy Inspector is an inspector authorized by the City Engineer to perform inspection services as a consultant or temporary employee.

Earth Material is any rock, natural soil or fill and/or any combination thereof.

Engineered Grading is that grading requiring professional supervision and/or certification by soils experts including special placement and compaction techniques.

Engineering Geologist shall mean a geologist certified in the State of California to practice engineering geology.

Engineering Geology shall mean the application of geologic knowledge and principles in the investigation and evaluation of naturally occurring rock and soil for use in the design of civil works.

Erosion is the wearing away of the ground surface as a result of the movement of wind, water, or ice.

Erosion Control means protecting exposed surfaces against the dislodging of soil particle by wind and water, which includes effective planting or other protection to protect adjacent private property, watercourses, public facilities and receiving waters from deposition of sediment or dust.

Erosion and Sediment Control Plan is a plan (including drawings, specifications, or other requirements) detailing the methods of implementing an erosion and sediment control system.

Excavation is the mechanical removal of earth material.

Fault is a fracture in the earth's crust along which movement has occurred. A Fault is defined by the Alquist-Priolo Fault Zoning Act to be active if it has had surface displacement during Holocene time (11,000 years).

Fill is a deposit of earth material placed by artificial means.

Flatland Site is any site that does not fit the definition of a hillside site.

General Construction Permit means NPDES General Permit for Storm Water Discharges Associated with Construction Activity issued by the State Water Resources Control Board for construction projects that exceed a specific threshold.

Geotechnical Engineer (Soil Engineer) is an engineer experienced and knowledgeable in the practice of Soil Engineering (Geotechnical Engineering).

Geotechnical Engineering (Soil Engineering) shall mean the application of the principles of soil mechanics in the investigation, evaluation and design of civil works involving the use of earth materials and the inspection and testing of the construction thereof.

Grade shall mean the vertical location of the ground surface.

Natural Grade is the ground surface unaltered by artificial means.

Existing Grade is the ground surface prior to grading.

Rough Grade is the stage at which the grade approximately conforms to the approved plan.

Finish Grade is the final grade of the site that conforms to the approved plan.

Grading is any excavating or filling or combination thereof.

Grading Contractor is a contractor licensed and regulated by the State of California who specializes in grading work or is otherwise licensed to do grading work.

Grading Permit is an official document or certificate issued by the City Official authorizing grading activity as specified by approved plans and specifications.

Rough Grading Permit means a permit that is issued prior to issuance of Precise Grading Permit on the basis of approved Rough Grading Plan. Type of grading activities may include rough grading, clearing and grubbing, stockpiling, and other preliminary works.

Precise Grading Permit means a permit that is issued on the basis of approved Precise Grading Plan.

Greenbook (“The Greenbook”), “*Standard Specifications for Public Works Construction*” is a standardized public works plans and specifications publication commonly referenced by public agencies for establishing public works construction standards.

Haul Permit is a transportation permit to allow a person, firm, association, or corporation to transport earth material in excess of an amount as specified in Orange Municipal Code Chapter 10.67.

Hillside Site is a site which entails cut and/or fill grading; a combination of which is equal to or greater than 5 feet in vertical height; or where the natural existing grade is 20 percent or greater; and which may be adversely affected by drainage and/or stability conditions within or from outside the site, or which may cause an adverse affect on adjacent property.

Key is a designed compacted fill placed in a trench excavated in earth material beneath the toe of a

proposed fill slope.

Keyway is an excavated trench into competent earth material beneath the toe of a proposed fill slope.

LIP means the City of Orange Local Implementation Plan, including all appendices, together with any amendments or revisions. The Local Implementation Plan is the document detailing the City's local implementation of the County of Orange DAMP.

Mobile Home means a structure, transportable in one or more sections, designed and equipped to contain not more than two dwelling units to be used with or without a foundation system. Mobile home does not include recreational vehicle, commercial coach, or factory-built housing.

Natural State is the natural environment that existed prior to any grading and includes but is not limited to undisturbed soil, native plants, and natural undulating slopes.

Non-Storm Water means any runoff or discharge not composed entirely of storm water.

Notice of Intent (NOI) is an application submitted by the owner/operator of a project that constitutes his intent to be authorized by an NPDES permit issued for storm water discharges associated with the construction activity indicated.

Notice of Violation is an official notice by the City to the owner or contractor who is in violation of City grading code.

Notice of Termination is a form to discontinue coverage under an NPDES general permit for storm water discharges associated with construction activity.

NPDES means National Pollutant Discharge Elimination System.

Owner is any person, agency, firm or corporation having a legal or equitable interest in a given real property.

Precise Grading Plan is an approved plan that shows the precise structure location, finish elevations, and all on-site improvements.

Planning and Development Guidelines for Landform Grading and Planting is a policy document by the City Council and the Planning Commission to improve the aesthetic quality of hillside development projects by promoting the projects to reflect the hillside environment as closely as possible.

Rainy Season is predetermined by the City and at the time of this printing is established as from October 1 through April 30.

Regional Board means Santa Ana Regional Water Quality Control Board which administers water quality requirements within a watershed region, and City of Orange is a part of this region.

Reinforced Earth refers to the use of plastic, metal, or synthetic materials placed in the earth fill to provide increased stability of the soil.

Retaining Wall is a wall designed to resist the lateral displacement of soil or other materials.

Rough Grading Plan is an approved plan showing less precise detail. It needs not show structure locations, but must show interim building pad drainage to the degree required by the City Engineer.

Sediment Control is any practice that traps the soil particles after they have been detached and moved by wind or water. Sediment control measures are systems that rely on filtering or settling the particles out of the water or wind that is transporting them.

Site is any lot or parcel of land or contiguous combination thereof, under the same ownership, where grading is performed or permitted.

Slope is an inclined ground surface, the inclination of which is expressed as a ratio of horizontal distance to vertical distance.

Slope Stability

Gross Slope Stability is the stability of slope material in depth below a plane approximately 3 to 4 feet deep measured from and perpendicular to the slope face.

Surface Slope Stability is the stability of the surficial 3 to 4 feet of slope material measured from and perpendicular to the slope face.

Soil is a naturally occurring surficial deposits overlying bedrock.

Soil Engineer (See Geotechnical Engineer)

Soil Engineering (See Geotechnical Engineering)

Standard Plans and Specifications is a document of City of Orange Department of Public Works which defines the engineering standards for public works constructions.

Stockpiling shall mean imported compactable earth greater than 50 cubic yards temporarily placed for future fill on or off site (no deleterious material).

Stop Work Order is an official notice by the City to a contractor to cease or suspend work on a construction or grading project.

Storm Water means storm water runoff and snow melt runoff

Storm Water Permits are any permits issued by a regional, state or federal agency regulating storm water flow over and from any project subject to this division, including, but not limited to National Pollutant Discharge Elimination System (NPDES) permits for Municipal Separate Storm Sewer Systems (MS4) permits and state General Permits.

Structure is any man made improvement, such as a house, garage, patio cover, spa, swimming pool, etc., or other construction which requires issuance of a Building Permit.

Sulfate (SO₄) is a chemical compound occurring in some soils which, at above certain levels of

concentration, has a corrosive effect on ordinary Portland cement concrete and some metals.

Subdrain is a pipe or other structure placed in the earth fill to provide drainage to the earth subgrade and improve slope stability.

SWRCB means the State Water Resources Control Board. It is the California agency that implements and enforces water quality and NPDES permit requirements and oversees the Regional Boards.

Terrace is a relatively level step constructed in the face of a graded slope surface for drainage and maintenance purposes.

Transportation Permit is a permit for regulating the movement of trucks with excessive weight or truck that is hauling dirt. See O.M.C. Section 10.67.

WDID (Waste Discharge Identification Number) is an identification number assigned by the State Water Resources Control Board (SWRCB) upon receipt of a completed NOI, payment of fees, and any required project document.

WQMP (Water Quality Management Plan) means a post construction precise plan of development designed to minimize pollutant discharges through the combination of site design, source control, structural and nonstructural BMPs and treatment controls.

Water Quality Requirements are the requirements relevant to activities that are subject to this article found in Orange Municipal Code, Chapter 7.01 Water Quality and Storm Water Discharges and all guidance documents described within.

Well Permit is a permit issued by the City of Orange Water Division for the drilling of certain water well, exploratory well, monitor well, and soil borings that requires such a permit.

Work Correction Order is an official notice by the City to a contractor to correct work being done contrary to the approved grading plan.

3. PERMITS REQUIRED

3.1 GRADING PERMIT

No person shall conduct any grading, including clearing, brushing, or grubbing, on natural or existing grade that is preparatory to grading, without first having obtained a grading permit from the City Engineer.

Specifically, a Grading Permit shall be required for the followings:

- A. Movement of more than 50 cubic yards of earth material on any one site.
- B. Any grading with a depth of excavation greater than or equal to 2 feet.
- C. Any grading with a fill greater than or equal to 1 foot, or any grading with fill greater than or equal to 3 feet on land not intended to support structures.
- D. Any grading that creates a slope greater than or equal to 5 feet in vertical height or a slope steeper than two horizontal to one vertical (2:1).
- E. Any grading within a slope setback zone as described in Chapter 10, Setback, of this Manual.
- F. Any development site requiring a Priority Water Quality Management Plan (Priority WQMP).
- G. Any grading with a potential of obstructing a drainage course.
- H. Any grading in a property within the Special Flood Hazard Area as defined by the National Flood Insurance Program (NFIP) Rate Map.

3.2 EXCEPTIONS TO GRADING PERMIT REQUIREMENT

Exceptions to this Grading Permit requirement are as follows or as otherwise determined by the City Engineer.

- A. An excavation below finished grade for basements and footings of a building, mobile home, retaining wall, or other structure authorized by a valid building permit or construction permit. This shall not exempt any fill made with the material from such excavation or exempt any excavation having an unsupported height greater than 5 feet after the completion of such structure. This shall not prohibit a minimum fee grading permit or a geotechnical report from being required for foundation design and inspection purposes when, in the opinion of the City Engineer, soil stability or flooding considerations warrant such inspection.
- B. Cemetery graves.

- C. Refuse disposal sites controlled by other regulations.
- D. Earthwork construction regulated by the Federal, State, County or City governments, or by any local agency as defined by Government code sections 53090 through 53095 (special districts). Pipeline or conduit excavation and backfill conducted by local agencies or public utilities. Earthwork construction performed by railway companies on their operating property. This exemption, however, shall apply only when the earthwork construction takes place on the property, or dedicated rights-of-way or easements of the above agencies.
- E. Shallow soil exploration drillings, provided that the borehole is permanently sealed after completion of the soil exploration, and provided that the depth of the drilling is within the limit as established by City Well Permit requirements.
- F. Exploratory excavations performed under the direction of geotechnical engineers or engineering geologists, provided all excavations are properly backfilled. All such excavations and trenches are subject to the applicable sections of Title 8 of the State Orders, Division of Industrial Safety.
- G. Excavation and backfill for installation of underground utilities by public utilities or companies operating under the authority of a franchise or public property encroachment permit.
- H. Mining, quarrying, excavation, processing, stockpiling of rock, sand, gravel, aggregated, or clay controlled by other regulations and authorized by a valid permit issued by another regulatory agency, provided such operations do not affect the lateral support or significantly increase the stresses in soil on adjoining properties.

3.3 GRADING PERMIT, PAVING AND HARD SURFACE

No person shall construct pavement surfacing in excess of 1,000 square feet on natural ground or existing grade for the purpose of private road or commercial, industrial, or residential parking lot or travel way without a valid grading permit unless waived by the City Engineer. Resurfacing or maintenance of existing paved surfaces shall be exempt from this requirement.

3.4 GRADING PERMIT, WATERCOURSE ALTERATION

No person shall alter an existing watercourse, channel, or revetment by excavating, or placing fill, rock protection or structural improvements without a valid grading permit unless waived by the City Engineer or performed as interim protection under emergency flood fighting conditions.

3.5 GRADING PERMIT, STOCKPILING AND BORROW PITS

A grading permit is required to stockpile soil or to excavate borrow pits over 50 cubic yards on a lot or parcel. No one shall temporarily store or stockpile loose earth, rock or fill material without first obtaining a permit for such purpose. Stockpile plans showing proper storage, temporary drainage, and source of material shall be submitted for review and to be approved by the City Engineer. An erosion control and sediment control plan shall also be included. The excavation of soil, rock or native material from a site for commercial use without an approved grading plan and permit is prohibited.

The placement of the stockpile shall not adversely effect the safety, use, or stability of any structure, nor create a nuisance because of dust or erosion therefrom, nor block a public way or drainage course; nor shall such placement of stockpile material constitute a hazard to public welfare or endanger property. Stockpiling in a residential zone may be permitted under this Section for purposes of providing fill material to be used on-site only. Stockpiling in residential zones for purposes of selling of material shall be prohibited.

The grading permit for stockpiling shall expire one year after issuance thereof. A new permit shall be required annually.

3.6 GRADING PERMIT, WATER QUALITY BMP

No person shall install water quality BMP without a valid grading permit unless waived by the City Engineer. An approved WQMP shall be required prior to permit issuance.

3.7 EXCAVATION BLASTING PERMIT

The necessity to employ blasting agents and techniques during the course of grading shall be identified by the Geotechnical Engineer during the preliminary geology report phase of the project. No person shall possess, store, sell, transport or use explosives and blasting agents to do any excavation without a permit from the Orange City Fire Department and conform to Orange Municipal Code Chapter 15.34

3.8 ROCK CRUSHING OPERATION

The use of a temporary rock crusher on the grading site shall conform to Orange Municipal Code Section 17.12.060.

3.9 WELL PERMIT

A Well Permit is required for the drilling of permanent or long-term ground condition

monitoring well, water quality monitoring wells, or any other test wells to be capped and remain in service. Most of the soil exploratory drillings may also be subjected to a Well Permit. The need depends on the depth of drilling and other factors.

The Well Permit is regulated by Orange Municipal Code Section 13.40. The Well Permit is reviewed and issued by the City of Orange Water Division.

3.10 SOIL EXPLORATORY DRILLINGS

Soil exploratory drillings may also be subjected to a Well Permit. The need depends on the depth of drilling and other factors. No Grading Permit is required.

3.11 TYPES OF GRADING PERMITS.

Either a Rough Grading Permit or a Precise Grading Permit may be issued for grading work upon completion of an application in accordance with the Manual of Grading and approval by the City Engineer.

A single Grading Permit may be issued for the combined purpose of Rough Grading and Precise Grading when deemed practical by the City Engineer. All required inspections for both rough grading and precise grading must be satisfied.

Grading Permit may also be issued for a specific purpose only, such as for stockpiling, for implementing water quality BMPs, and for clearing, brushing, and grubbing.

3.12 UNAUTHORIZED GRADING

Any unauthorized grading without a valid City of Orange Grading Permit shall be subjected to enforcement provisions stated in Chapter 4, Enforcement, of this Manual.

4. ENFORCEMENT

4.1 POWERS AND DUTIES OF THE CITY ENGINEER

The City Engineer shall be responsible for the inspection, enforcement and interpretation of all matters related to grading requirements in the City of Orange.

4.2 ENFORCEMENT ORDERS

Prior to initiating any Violations and Penalties process described in the subsequent sections, the City Engineer may elect to apply any of the following enforcement orders to correct the grading violations.

A. Work Correction Orders

Whenever any grading work is being done contrary to the provisions of this Manual of Grading or inconsistent to the approved Grading Permit, the City Engineer may order the work corrected by issuing a Work Correction Order in writing served on any persons engaged in the doing or causing such work to be done. Failure to make proper corrections within the specified time period may result in further enforcement actions by the City Engineer.

B. Stop Work Orders

Whenever the severity of the grading violation requires immediate stoppage of grading operation, or when the Work Correction Order fails to cause the work to be corrected, the City Engineer may order the work to be immediately stopped by a Stop Work Order in writing served on any persons engaged in the doing or causing such work to be done. Any such persons shall forthwith stop such work until authorized by the City Engineer to proceed with the work.

Unpermitted Grading. Whenever grading work is being done without a valid Grading Permit, the City Engineer may order the work stopped by a Stop Work Order. Upon examining the state of the unpermitted work, the City Engineer may require (1) the site to be restored to its original condition, or (2) filing of a grading permit in accordance to this Manual before continuing with the work.

Hazardous Condition. When a permitted or unpermitted grading resulted in a Hazardous Condition, the City Engineer may also choose to issue a Notice of Hazardous Condition in addition to a Stop Work Order.

C. Water Quality Violations

Whenever any grading work is being done contrary to the provisions of the Water Quality Requirements stated in Chapter 13, Erosion & Sediment Control and Landscaping, of this Manual, the City Engineer may utilize any enforcement provision specified in Orange Municipal Code, Chapter 7.01

4.3 VIOLATIONS AND PENALTIES

It shall be unlawful for any person, firm or corporation to do grading in the City of Orange, or cause the same to be done, contrary to or in violation of any of the provisions of this Manual.

Any person, firm, or corporation violating any of the provisions of this Manual shall be deemed guilty of a misdemeanor, and each such person shall be deemed guilty of a separate offense for each and every day or portion thereof during which any violation of any of the provisions of this Code is committed, continued, or permitted, and upon conviction of any such violation such person shall be punishable by a fine of not more than \$1,000.00 or by imprisonment for not more than 6 months, or by both such fine and imprisonment. In addition to any such fine or imprisonment, the court may also require such party to correct or mitigate the grading violation to the satisfaction of the City Engineer.

The City Engineer may request any other development processes to be withheld for property on which a violation of the provisions of this Manual exist until such violation has been corrected or mitigated to the satisfaction of the City Engineer. These may include (1) issuance of building permits, performance of building permit inspections, and issuance of certificate of use or occupancy; (2) review and approval of subdivision maps; and (3) review and approval of any application or permit per City of Orange Zoning Ordinance.

4.4 NOTICE OF VIOLATION

When Enforcement Orders cannot resolve a grading violation, a Notice of Violation of this Code may be recorded in the Orange County Clerk-Recorder's office in accordance with the following procedures:

- A. Notice of Intent. A written notice of intent to record a Notice of Violation shall be served on the current owner of record of the property. Such notice shall describe the property, the violation and the action necessary to correct or mitigate the violation. The notice shall inform the owner that a Notice of Violation will be recorded if the owner does not, within 20 days of receipt thereof, either correct the violation or request a meeting with the City Engineer as set forth below. The notice shall include a copy of this subsection and be substantially as follows:

*Notice of Continuing Violation
of the City of Orange
Grading Ordinance (O.M.C. 16.40)*

Notice is hereby given that the City of Orange has determined that a violation of the above Ordinance exists on the following described property (description). The violation consists of (description).

While a violation of the above Ordinance exists, the City of Orange may refuse to approve building or occupancy permits, subdivision maps, use permits, and other discretionary permits and development approvals.

- B. Correction of Violation. If, within 20 days of receipt of a notice of intent, the owner corrects the violation, no Notice of Violation shall be recorded. The City Engineer may grant extensions of time for good cause.
- C. Meeting. If the owner requests a meeting, the City Engineer shall schedule a meeting. Notice of the meeting shall be served on the owner not less than 15 days prior thereto. The City Engineer may reschedule the meeting from time to time for a good cause with adequate notice to the landowner. At the meeting, the owner may be represented by counsel and may present any relevant evidence that violations do not exist.
- D. Decision. Within 30 days following completion of the meeting, the City Engineer shall issue and serve on the owner his determination as to whether or not a Notice of Violation will be recorded. This determination shall be supported by appropriate findings on all material issues raised at the meeting. The decision of the City Engineer shall be final with respect to recordation of a Notice of Violation, but shall not affect other proceedings under this section.
- E. Recordation. If the City Engineer determines that a notice will be recorded, such notice shall be recorded 15 or more days after service of notice of the decision.
- F. Release of Notice. When a violation is corrected or mitigated to the satisfaction of the City Engineer, if a Notice of Violation had been recorded, the City Engineer shall cause a release to be recorded. Said release shall refer to the Notice of Violation and shall state that the violation described therein has been corrected.

4.5 HAZARDOUS CONDITIONS

A Hazardous Condition exists when the state of any natural ground, natural slope, excavation, fill or drainage device is a menace to life or limb, or a danger to public safety, or endangers or adversely affects the safety, usability or stability of adjacent property, structures, or public facilities. A Hazardous Condition may be man-made from permitted or unpermitted grading; or it may occur from non-man-made events not caused by any grading work.

- A. Notification. In any case where a hazardous condition is found, the City Engineer shall give notice to the owner, authorized representative of the owner, or a permittee under any

active Grading Permit, hereafter referred to as “owner”, of such hazardous condition. The notice shall describe the hazardous conditions and request corrective work to be completed or reports to be submitted.

- B. Meeting. A meeting may be scheduled by the City Engineer to further review the evidence with the owner concerning the hazardous conditions and demand for corrective work or submission of reports. If a hazardous condition is determined to exist, the City Engineer shall determine whether such hazard is subject to corrective work and/or needs more analysis through the preparation of reports, and shall order such work or reports and specify a completion time. The owner shall, following the finality of the determination and order of the City Engineer, commence the corrective action ordered or preparation of reports and such work or submission shall be completed within the specified time.
- C. Finality of Order. The determination and order may be made orally by the City Engineer in the meeting and shall be written and transmitted to the owner within a reasonable time. The determination shall be final. If the owner declined to meet with the City Engineer, then, the determination and order given in the Notification shall become final.
- D. Failure to Complete Work. If the owner or permittee neglects or fails to complete the corrective work or submit the reports ordered by the City Engineer within the specified time, the City Engineer may: (1) cause the work to be performed or reports to be prepared, or (2) advise the owner of the need for corrective work and that in the absence of such corrective work subsequent future hazards may occur which could result in further actions by the City. Nothing in this subsection shall be construed to limit the type of remedy or relief which the City Engineer may have under any other provision of law.
- E. Cost. The cost incurred by the City to perform any corrective work or prepare reports shall be charged to the owner.

5. GRADING PERMIT REQUIREMENTS

5.1 PERMITS REQUIRED

Except as exempted in this Manual, no person shall conduct any grading, clearing, brushing, or grubbing, or constructing water quality BMPs on natural grade or existing grade that is preparatory to grading, without first obtaining a grading permit from the City Engineer. A separate permit shall be required for each site and may cover both excavations and fills.

Any grading work without a valid grading permit is in violation of this Manual and is subjected for corrective actions described under Chapter 4, Enforcement.

5.2 GRADING PERMIT REVIEW AND APPROVAL PROCESS

A. Before Submitting the Grading Plan

The applicant should discuss the project with a member of the Engineering, Planning, and Building Divisions prior to preparing the Grading Plan so to become familiar with City criteria and resolve any special problems that may be associated with the project.

The City of Orange Manual of Grading is available at nominal cost at Public Works front counter or can be downloaded from the City website.

The applicant should also check with the Engineering staff regarding the requirement for submittal of geotechnical report, engineering geology report, hydrology study, and water quality management plan (WQMP).

B. Initial Submittal

A grading permit application shall consist of the following items and forms completed and signed by the applicant or his representative unless otherwise specified by the City Engineer:

- (1) Application Form.
- (2) Three sets of grading plan in full D-size dimension of 24 inches by 36 inches, with one inch margin on all sides. (Four sets if WQMP is required).
- (3) Two copies of Preliminary Geotechnical Report, one original wet signed and one copy. (if required).
- (4) Two copies of Preliminary Engineering Geology Report, one original wet signed and one copy. (if required).
- (5) Two copies of Drainage Report (Hydrology Report), with hydrology and hydraulic calculations (if required).

- (6) Two copies of Water Quality Management Plan (WQMP) (if required)
- (7) A copy of the NOI application to the SWRCB and a copy of the letter from the SWRCB showing the WDID number for the project (if required)
- (8) Payment of plan check and inspection deposit. The amount of the deposit depends on the project size. Plans will not be checked without the advanced plan check deposit.

C. Final Approval

Grading Plan originals shall be submitted on “D” size 24" x 36" .004 high quality Mylar after plan check has been completed. The originals shall be approved by the Department of Public Works and once approved will be kept on file. After obtaining approval signatures, 2 print sets of the approved plans and a digital scanned copy shall be submitted before a grading permit will be issued.

D. Grading Permit

- (1) No construction shall start without a valid Grading Permit. This includes stockpiling, clearing and grubbing and installation of any water quality BMP systems.
- (2) Two printed copies and a digital scanned copy of the approved grading plan are required for the issuance of Grading Permit.
- (3) Digital copies of all preliminary soil and geology reports are required prior to issuance of Grading Permit.
- (4) An approved WQMP is required prior to issuance of Grading Permit.
- (5) Pay Grading Permit fee.
- (6) No construction shall start prior to holding a preconstruction meeting.

Failure to comply with any of the above conditions may result in issuance of a Stop Work Order.

5.3 GRADING PLAN

All grading activity within the City is subject to preparation of a plan. Plans submitted for plan check shall be drawn to scale upon 24” by 36” sheets. The plans shall be of sufficient clarity to indicate the nature and extent of the work proposed and show in detail that they will conform to the provisions of this Manual of Grading, the Standard Plans and Specifications, Local Implementation Plan, and relevant laws, ordinances, rules and regulations.

A Grading Plan shall include, but not limited to, the followings: Title Sheet, Detail Sheet, Grading

Sheets, and Erosion and Sediment Control Sheets. For relatively small projects, some of the sheets may be combined or shown on the same page, as approved by the City Engineer.

A. Title Sheet

The following items shall be included on the Title Sheet.

- 1 Grading Notes. Include all notes relevant to the grading construction. See separate document for standard notes that may be included in the Grading Notes.
- 2 Erosion Control, Sediment Control, and Water Quality Notes. Include all notes relevant to erosion control, sediment control, and water quality requirements for the grading construction. See separate document for standard notes that may be included in the Erosion Control, Sediment Control, and Water Quality Notes.
- 3 Vicinity Map. Show tract vicinity map. For a single lot development give dimension to the nearest street intersection. Show and label all property lines.
- 4 Site Address.
- 5 Contact Information. Show name, address and phone number of the Owner/Developer, Design Engineer and Geotechnical Engineer.
- 6 Benchmark. Use County of Orange benchmark to determine grade elevations.
- 7 Engineers' Signature. The plan shall be wet-signed and bear the original seal of the Registered Civil Engineer that prepared the plan, as well as the Geotechnical Engineer of Record.
- 8 Project Acreage. Total acres of grading area.
- 9 WDID. Show Waste Discharge Identification Number (WDID) issued by the State Water Resources Control Board for the project. The WDID is required by the State General Construction Permit for projects exceeding 1 acre, or as specified in the latest Permit.
- 10 Quantity Estimate.
 - (a) Earthwork - cut and fill.
 - (b) Import and export of earth material.
 - (c) Construction within public right-of-way (if street improvement plans not required).
 - (1) Drive approach.

- (2) Curb & gutter.
- (3) Parkway trees.
- (4) Streetlights, traffic signs, etc.
- (5) Sidewalk

- 11 City Approval Block. Show City approval signature block.
- 12 Revision Block.

B. Detail Sheet

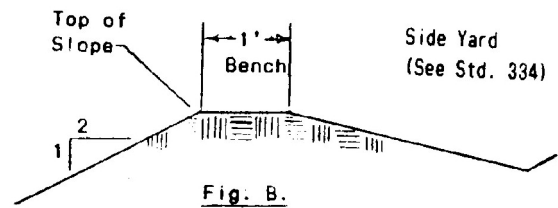
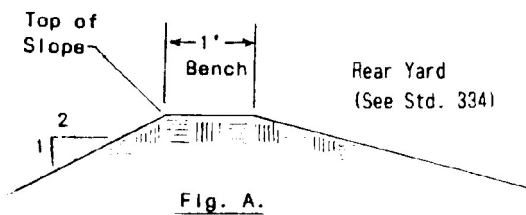
- 1 Show construction details, standard plans and specifications, and other construction standards on detail sheet. Additional construction notes from Title Sheet may also be continued on this sheet.
- 2 For small projects, this sheet may be optionally combined on other sheets.

C. Grading Sheets

- 1 Show all existing and proposed structures above and below grade. Show all trees and indicate which ones are to be removed.
- 2 Show contours indicating the topography of the site. Extend contour lines onto adjacent properties to show grade transitions and any grade differentials along property lines.
- 3 Show finished grade using contours or spot elevations. These must be sufficient to indicate drainage control. Call out finish floor and pad elevations of proposed structures.
- 4 Use arrows to indicate flow patterns.
- 5 Show existing and proposed street improvements. Minor street improvements may be shown on grading plan; i.e. minor curb & gutter work, drive approach, sidewalk, etc. Major street improvements must be shown on a separate Street Improvement Plan and MUST be prepared by a Registered Civil Engineer.
- 6 Show location of and provide details of all drainage structures, catch basins, gutters, and structural and treatment BMPs, etc.
- 7 Show existing and proposed block walls and retaining walls include wall heights and elevations on either side of the wall. Draw cross section at various wall locations to

show grade differentials. Do not show structural details of retaining wall on grading plan.

- 8 Retaining Walls. When retaining walls are required, a separate permit must be obtained from the Building Division. Submit required drawings and calculations to Building Division for plan check and permit.
- 9 Show access and utility easements.
- 10 For side and rear yards, provide a berm with a one foot bench at the top of all slopes before descending down slopes (Figures A and B). Refer to Standard Plan No. 334 for design criteria.



- 11 Show any other information that may be necessary for the construction of the project or staff's interpretation of the plans.

D. Rough Grading Plan Sheets

In addition to the above requirements, the Rough Grading Plan shall include, but not be limited to, the following information:

1. Property limits clearly labeled or otherwise identified.
2. Accurate contours of existing ground at 5 foot contour intervals and details of terrain and area drainage a minimum of 15 feet beyond property limits (spot elevations may be used on flatland sites).
3. Prominent existing or natural terrain features.
4. Limiting dimensions including setbacks between property lines and top and toe of slopes, elevations of finish contours to be achieved by the grading, proposed drainage devices and related construction.
5. Location of proposed building pads with pad elevations.
6. Details (plan and cross-section) of all surface and subsurface drainage devices, walls, cribbing, dams and other protective devices to be constructed with, or as a part of, the

proposed work, together with a map showing the drainage area and estimated runoff from the area served by any drains.

7. Details (plan and cross-section) of all structural and treatment water quality BMPs as detailed in the Water Quality Management Plan (WQMP).
8. Location of any existing buildings or structures on the property where the work is to be performed and the location of any buildings or structures on land of adjacent owners which are within 15 feet of the property, or which may be adversely affected by the proposed grading operations.
9. Additional plans, drawings, calculations, or other reports required by the City Engineer.

E. Precise Grading Plan Sheets

The plans shall include the following in addition to the above items listed for Rough Grading Plan:

1. The footprint or allowable building area of all proposed structures, including appurtenances.
2. Setback distances between structures and top and toe of slopes.
3. Detailed finish grade and finish floor elevations.
4. Flow-lines for lot drainage.
5. Details for building footing and side-yard swale relationship, including extra-height of footing and deepened footing.
6. All proposed paving including, but not limited to, sidewalks, driveways and parking lots.

The Precise Grading Plan shall identify all previous Rough Grading Permits issued for the project site. It may include sheets from the rough grading plan which show original topography in lieu of reproducing original contours on the precise plan.

F. Erosion and Sediment Control Sheets

Erosion and Sediment Control sheets shall be included in the Grading Plan. These sheets shall describe the erosion and sediment control measures to be taken during various stages of the grading phases, including initial site condition. See Section 10 of this Manual of Grading for further details.

G. Changes To Plan

Any substantial changes to the approved grading plan occurred by field conditions, site plan changes, etc. shall be accomplished prior to final grading and shall be approved by the City Engineer prior to implementing changes in the field.

5.4 GEOTECHNICAL REPORT AND ENGINEERING GEOLOGY REPORT

Recommendations contained in the approved reports shall be incorporated into the grading plans and specifications and shall become a part of the grading permit. Also see Section 12 for required items to be included in final geotechnical report that are necessary for Building Official's analysis for issuance of building permits. The City Engineer shall retain the right to obtain third party review of the geotechnical and engineering geology reports and recommendations.

A. Preliminary Geotechnical Report

Geotechnical Reports shall be required for all residential, commercial, industrial, and institutional subdivisions and similar developments involving structures and/or earthwork for which a grading permit is required. Geotechnical Reports shall also be required for grading or building permits on single lot projects when specified by the City Engineer.

The Preliminary (Initial) Geotechnical Reports shall include information and data regarding the nature, distribution, and the physical and chemical properties of existing soils; conclusions as to adequacy of the site for the proposed grading and structures; recommendations for general and corrective grading procedures; foundation and pavement design criteria; and shall provide other recommendations, as necessary, commensurate with the project grading and development.

B. Preliminary Engineering Geology Report

Engineering Geology Reports shall be required for all developments on hillside sites if indicated by the Preliminary Geotechnical Report or required by the City Engineer and where geologic conditions are considered to have a substantial effect on existing and/or future site stability. This requirement may be extended to other sites suspected of being adversely affected by faulting.

The Preliminary (Initial) Engineering Geology Report shall include a comprehensive description of the site topography and geology; an opinion as to the adequacy of the proposed development from an engineering geologic standpoint; and an opinion as to the extent that instability on adjacent properties may adversely affect the project; a description of the field investigation and findings; conclusions regarding the effect of geologic conditions on the proposed development; and specific recommendations for plan modification, correction grading and/or special techniques and systems to facilitate a safe and stable development; and shall provide other recommendations as necessary, commensurate with the

project grading and development. The preliminary engineering geology report may be combined with the geotechnical engineering report.

C. Seismic Hazard Study

A seismic hazard study shall be required as a condition for issuance of a Grading Permit and/or Building Permit for all subdivisions; and all sites for critical structures (fire stations, nursing homes, etc.) and major structures, as determined by the City Engineer. Additionally, sites containing earthquake sensitive earth materials and/or sites located on or near potentially active or active faults shall also require a seismicity report, as determined by the City Engineer.

The study shall be prepared by an engineering geologist, geophysicist, or civil engineer with expertise in earthquake technology and its application to buildings and other civil engineering works. The scope of the study shall be commensurate with the proposed development and shall reflect the state of the art. The Seismic Hazard Study may be included within the Geotechnical Report or the Engineering Geology Report.

D. Final Reports

The Rough Grade Report and the Final Geotechnical Report shall be submitted in accordance with Section 12 of this Manual of Grading.

5.5 HYDROLOGY STUDY

A hydrology study is required for all projects which potentially alters the on-site drainage condition, including adding drainage structures, adding water quality BMP systems, and accepting runoff from adjacent properties.

The hydrology study shall examine the pre- and post-development drainage conditions, and shall include the followings:

- A. Hydrology maps showing the drainage basins and any proposed drainage structures, including water quality BMP systems.
- B. A summary of the hydrology analysis and any proposed drainage structures.
- C. Hydrology calculations based on the latest edition of the Orange County Hydrology Manual.
- D. Hydraulic calculations for all drainage facilities.

5.6 WATER QUALITY MANAGEMENT PLAN (WQMP)

Applicant shall submit a Water Quality Management Plan (WQMP) for all new developments

and all redevelopments, unless waived by the City Engineer. A WQMP shall be submitted at the same time, or prior to, grading plan submittal. All diagrams, plans, sections and details for structural and treatment BMPs specified in the WQMP shall be incorporated into the grading plan.

The WQMP must be approved prior to issuance of Precise or Rough Grading Permit as determined by the City Engineer.

5.7 PERMIT ISSUANCE, EXPIRATION, AND RENEWAL

A. Permit Issuance

Every Grading Permit issued shall be valid for a period of 2 years from the date of issuance.

B. Time Extension

If the permittee is unable to complete the work by the end of a 2 year period, the City Engineer may extend the grading permit for a period of one year. Additional one-year extensions may be granted for a total permit duration of no more than 5 years. Permit extension may be granted provided no changes have been made in the original plans and specifications for such work.

Permit extension must be filed no later than the 60th day following the permit expiration date, otherwise the permit is expired.

The permittee shall pay permit extension fee for each permit extension.

Once the permit is expired, the permittee shall be required to re-apply for a new grading permit.

C. Delay of Work

Every Grading Permit issued shall expire by limitation and become null and void if the work authorized by such grading permit is not commenced within 6 months from the date of permit issuance. "Work commenced" shall mean that in addition to conducting a pre-construction meeting, actual earth movement activities has commenced on site.

The Grading Permit shall also expire if the work authorized by such grading permit becomes inactive for a period of 6 months at any time after the work is commenced. "Inactive" shall mean work is abandoned, suspended, or showing no progress leading toward completion.

Upon written request by the applicant showing that circumstances beyond the control of the applicant have prevented action from being taken, the City Engineer may extend the expiration date of an inactive grading permit for a period of 6 months, but not exceeding the expiration date of the original permit. Upon receiving satisfactory reasons, the City Engineer may grant the extension of time provided that no changes have been made in the original plans and specifications for such work. Such an extension may be granted for no more than 2 successive periods of 6 months each up to the original permit expiration date. A written request for extension must be submitted no later than the 60th day following the permit expiration date, otherwise the permit is expired.

The City Engineer may require that grading operations and project designs be modified if the delays have incurred additional problems not considered at the time the grading permit was issued, and further subject to the provisions “Denial of Permit” of this Manual.

D. Change of Owner

A grading permit issued hereunder shall expire upon a change of ownership if the grading work for which said grading permit was issued for has not been completed. A new grading permit shall be required for the completion of the work. The new owner shall pay new Plan Check and Inspection Deposit and Permit Fee. The deposit account for the former owner will be terminated.

E. Site Restoration

The City Engineer may require an unfinished project site restored back to its original Natural State. A new grading permit shall be required for restoration of a site to a Natural State. Such a new grading permit is subjected to all grading permit processes outlined in this Grading Manual.

Any person who commences grading operations and fails to obtain a grading permit shall be required to return the property to a Natural State and shall procure a permit to do so and pay all fees required.

5.8 DENIAL OF PERMIT

The City Engineer shall not issue a grading permit in any case where the City Engineer finds that the work as proposed by the applicant is liable to constitute a hazard to property or result in the deposition of debris on any public way or interfere with any existing drainage course. If it can be shown to the satisfaction of the City Engineer that the hazard can be essentially eliminated by the construction of retaining structures, buttress fills, drainage devices or by other mitigation measures or means, the City Engineer may issue the grading permit with the condition that such work be performed.

If, in the opinion of the City Engineer, the land area for which grading is proposed is subject to geological or flood hazard to the extent that no reasonable amount of corrective work can eliminate or sufficiently reduce the hazard to human life or property, the grading permit and the building permits for habitable structures shall be denied.

The City Engineer may require plans and specifications to be modified in order to mitigate anticipated adverse environmental effects of proposed grading projects. The City Engineer may, under circumstances where the significant adverse environmental effects of a proposed grading project cannot be mitigated, deny the issuance of a grading permit.

The City Engineer may require plans and specifications to be modified in order to make them consistent with the City of Orange General Plan, Specific Plans, Zoning Code, water quality requirements, or other rules, regulations, or conditions applicable to the project, the City Engineer may deny the grading permit if the proposed project cannot be designed in accordance with these rules, regulations or conditions.

5.9 TIME OF GRADING OPERATIONS

Grading and equipment operations shall not be conducted between the hours of 8:00 p.m. and 7:00 a.m. nor on Sundays and Federal Holidays. The City Engineer may, however, permit grading or equipment operations during specific hours after 8:00 p.m. or before 7:00 a.m. or on Sundays and Federal Holidays if it is determined that such operations are not detrimental to the health, safety, or welfare of the area residents. Permitted hours of operation may be shortened by the City Engineer's finding of a previously unforeseen effect on the health, safety, or welfare of the surrounding community. However, neither the approved Grading Permit nor any provision of this section shall be construed to be a waiver of the applicability of the provisions set forth in Chapter 8.24 of the Orange Municipal Code relating to noise.

5.10 IMPORT OR EXPORT OF EARTH MATERIAL

Importing or exporting of earth material shall conform with Orange Municipal Code Section 10.67.030 and any other permits required by other City, County, and State agencies. A Transportation Permit may be required for hauling earth material.

6. FEES

6.1 PERMIT FEE

A permit issuance fee shall be paid to the City at the time permit is issued. The fee shall be in accordance with City of Orange Master Schedule of Fees and Charges (O.M.C. 3.10).

Time extension for the grading permit shall be for a fee of one-half of the permit issuance fee.

Unauthorized works performed without first obtaining a valid City of Orange Grading Permit shall be subject to permit fees two times of the fees approved in the Master Schedule of Fees and Charges.

6.2 PLAN CHECK AND INSPECTION DEPOSIT

A Plan Check and Inspection Deposit shall be required at the time plans are submitted for the first check.

- A. Actual time will be charged for plan checking and inspection and will be billed at full burden rates. The types of charges may include time spent reviewing grading plan, improvement plan, traffic control plan, and water quality management plan, and time spent inspecting the construction. If a consultant is hired by the City to check plans or perform inspections, the consultant fees will be charged to the deposit as well as City administration costs.
- B. If the final plan check and inspection charge equals an amount less than the deposit, the applicant will be refunded the remainder.
- C. If the deposit was depleted during the course of the project, the Applicant may be required to increase the deposit amount.
- D. If the final charges exceed the deposit, the applicant will be billed for the remainder, which must be paid prior to acceptance of final certification letter. The Grading Bond will not be released until all payments are made.

7. SECURITY

7.1 BONDS REQUIRED

No grading permit shall be issued without first posting with the City of Orange a bond executed by the owner and a corporate surety authorized to do business in the State of California as a surety in an amount sufficient to cover the cost of the project including the construction of drainage and protective devices and any corrective work necessary to remove and eliminate engineering and geological hazards. The bond may also include various street and public infrastructure improvements and water quality features of the project.

The bond amount shall be determined by applicant's engineer and subject to review and approval of the City. In lieu of a surety bond the applicant may post security in a form acceptable to the City Engineer and approved by the City Attorney.

7.2 EXCEPTIONS

- A. The City Engineer may waive or reduce the amount of the bond if it is determined that the hazard or danger created by the work does not justify the full amount.
- B. No bond shall be required when the City Engineer determines that the proposed grading will not adversely affect the subject property or adjacent property, existing or proposed structures thereon, or any public infrastructures.

7.3 CONDITIONS

Every bond shall include the conditions that the permittee shall:

- A. Comply with all of the provisions of this Manual, applicable laws, and ordinances.
- B. Comply with all of the terms and conditions of the permit for excavation or fill to the satisfaction of the City Engineer.
- C. Complete all of the work contemplated under the permit, or complete the work to a safe condition satisfactory to the City Engineer.

7.4 FAILURE TO COMPLETE WORK

The term of each bond shall begin upon the date of filing and shall remain in effect until the completion of the work to the satisfaction of the City Engineer. In the event of failure to complete the work and failure to comply with all of the conditions to his satisfaction, the surety

executing such bond or deposit shall continue to be firmly bound under a continuing obligation for the payment of all necessary costs and expenses that may be incurred or expended by the City in causing any and all such required work to be done. In the case of a cash deposit, said deposit will be used, and any unused portion thereof shall be refunded to the permittee.

7.5 DEFAULT IN PERFORMANCE OF CONDITIONS

Whenever the City Engineer finds or determines that a default has occurred in the performance of any requirement of a condition of a permit issued hereunder, written notice thereof shall be given to the applicant and to the surety on the bond. Such notice shall specify the work to be done, the estimated cost thereof and the period of time deemed by the City Engineer to be reasonably necessary for the completion of such work.

After receipt of such notice, the surety shall within the time therein specified cause or require the work to be performed, or failing therein, shall pay over to the City of Orange the estimated cost of doing the work as set forth in the notice. Upon receipt of such monies, the City Engineer shall cause the required work to be performed and completed.

8. CUTS

8.1 CUT SLOPES

Cut slopes shall be no steeper than two horizontal to one vertical (2:1). In special circumstances where no evidence of previous instability exists and when recommended in the geotechnical engineering or engineering geology report and approved by the City Engineer, slopes may be constructed steeper than 2:1. In no case shall slopes steeper than 2:1 be approved if 2:1 or flatter slopes are required as a condition of approval by the City Council, Planning Commission, Zoning Administrator, or the Design Review Committee without appropriate revision of said condition by the approving body.

Recommendations in the geotechnical engineering and/or engineering geology report for cut slopes to be steeper than 2:1 shall be accompanied by a slope stability analysis for all slopes greater than 5 feet in height. The Geotechnical Engineer shall consider both gross and surficial stability of the slope and provide a written statement approving the slope stability.

All cut slopes shall be rounded into existing terrain to produce a contoured effect from the cut face to natural ground. In addition, varying slope ratios are to be used when feasible to produce an aesthetically pleasing contoured effect.

8.2 LANDFORM GRADING

The use of contour grading is required for cut slopes in accordance with Council Policy. Developers and Project Engineers shall refer to "The Planning and Development Guidelines for Landform Grading and Planting" prior to beginning a hillside project design.

9. FILLS

9.1 FILL LOCATION

Fill slopes shall not be constructed on natural slopes steeper than 2 horizontal to 1 vertical (2:1) or where the fill slope toe is within 12 feet measured horizontally from the top of an existing or planned cut slope outside the permit area boundary, except in the case of slopes of minor height when recommended by the Geotechnical Engineer and approved by the City Engineer.

9.2 PREPARATION OF GROUND

The ground surface shall be prepared to receive fill by removing vegetation, non-complying fill, topsoil and other unsuitable materials, and by scarifying to provide a bond with the new fill. Where existing slopes exceed 5 feet in height and/or are steeper than five horizontal to one vertical (5:1), the ground surface at the toe of fill shall be prepared by benching into sound bedrock or other competent material, as determined by the Geotechnical Engineer and/or Engineering Geologist and approved by the City Engineer. The lowermost bench beneath the toe of a fill slope shall be a minimum 10 feet in width. The ground surface at the toe of the fill shall be prepared for sheet flow runoff, or a paved drain shall be provided.

When an existing fill is to be widened or a new fill is to be made, the new material shall be bonded to the old by plowing deep longitudinal furrows or other method approved by the City Engineer.

Where fill is to be placed over a cut slope, the bench under the toe of the fill shall be at least fifteen (15) feet wide, but the cut slope must be made before placing fill and shall meet the approval of the Geotechnical Engineer and/or engineering geologist as suitable foundation for fill.

Unsuitable soil is soil which is not dense, firm or unyielding, is highly fractured or has a high organic content and in the opinion of the Civil Engineer, Geotechnical Engineer, or Engineering Geologist is not competent to support other soil or fill, to support structures, or to satisfactorily perform other functions for which the soil is intended.

9.3 FILL MATERIALS

Detrimental amounts of organic material shall not be permitted in fills. No rock or similar irreducible material with a maximum dimension greater than 12 inches shall be buried or placed in fills except as outlined below,

The City Inspector may permit placement of larger rock when the Geotechnical Engineer properly devises a method of placement, continuously inspects placement, and approves the fill stability and competency. The following conditions shall also apply:

A. Prior to issuance of the grading permit, potential rock disposal areas shall be delineated on

the grading plan.

- B. Rock sizes greater than 12 inches in maximum dimension shall be placed 10 feet or more below grade, measured vertically. This depth may be reduced upon recommendation of the Geotechnical Engineer and approval of the City Engineer providing that the permitted use of the property will not be impaired.
- C. Rocks greater than 12 inches shall be placed as recommended by the Geotechnical Engineer and approved by the City so as to be completely surrounded by soils. Rocks must be placed in a manner that insures that voids in the fill are eliminated.

9.4 COMPACTION

All structural fills, including utility trench backfill, shall be compacted to a minimum of 90 percent of maximum density as determined by test method ASTM D1557, Modified Proctor, in lifts not exceeding 12 inches, or as approved by the City Engineer.

Locations of field density tests shall be determined by the Geotechnical Engineer or approved testing agency and shall be sufficient in both horizontal and vertical placement to provide representative testing of all fill placed. Testing in areas of a critical nature or special emphasis shall be in addition to the normal representative samplings.

Fill slopes shall be compacted and tested to the finish slope face as specified above. The Geotechnical Engineer shall provide specifications for the method of placement and compaction of the soil within the zone of the slope face.

Sufficient maximum density determinations by test method ASTM D1557 or approved equivalent shall be performed during the grading operations to verify that the maximum density curves used are representative of the material placed throughout the fill.

9.5 FILL SLOPES

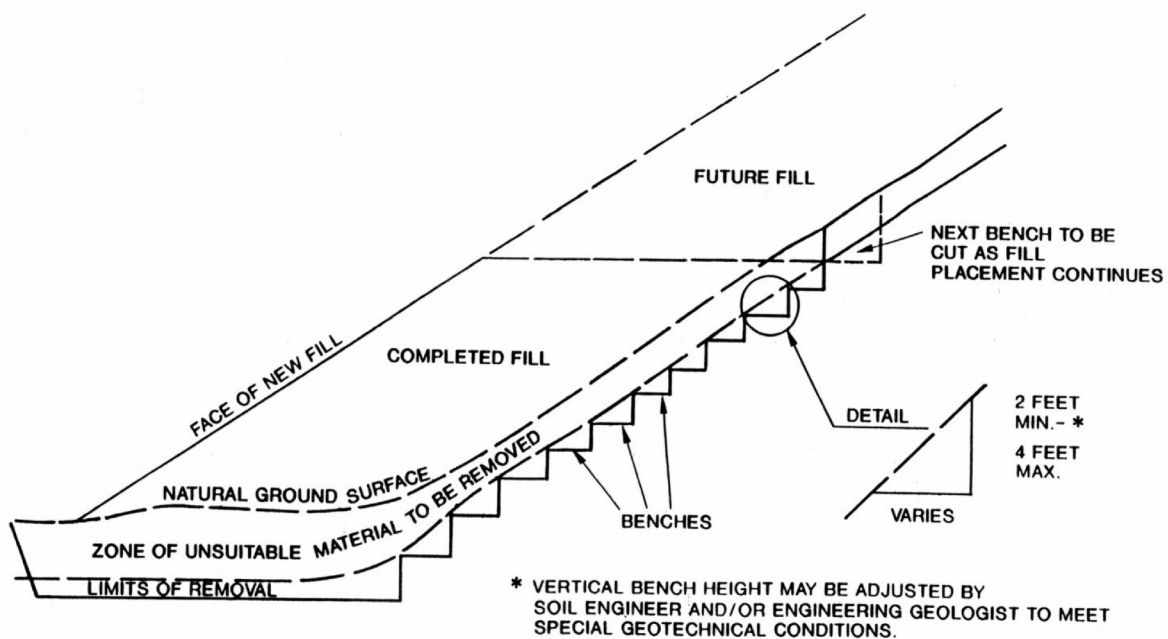
Fill slopes shall be no steeper than two horizontal to one vertical (2:1). In special circumstances where no evidence of previous instability exists and when recommended in the geotechnical engineering report and approved by the City Engineer, slopes may be constructed steeper than two to one (2:1). In no case shall slopes steeper than two to one (2:1) be approved if flatter slopes are required as a condition of approval by the City Council, Planning Commission, Zoning Administrator, or Design Review Board without appropriate revision of said condition by the approving body.

Recommendations in the geotechnical engineering report for fill slopes steeper than 2:1 shall be accompanied by a slope stability analysis for all slopes greater than 5 feet in height. The Geotechnical Engineer shall consider both gross and surficial stability of the slope and provide a written statement approving the slope stability. In addition, the Geotechnical Engineer shall recommend alternative methods of construction or compaction requirements necessary for surficial

stability. Fill slopes in excess of 100 feet in vertical height will be discouraged, except as approved by the City Engineer under special circumstances. All fill slopes in excess of 5 feet in vertical height shall be rounded into the existing terrain to produce a contoured transition from manufactured to natural ground. Variable slope ratios are encouraged to produce an aesthetically pleasing contoured effect.

9.6 LANDFORM GRADING

The use of contour grading is required for fill slopes in accordance with Council Policy. Developers and Project Engineers shall refer to "The Planning and Development Guidelines for Landform Grading and Planting" prior to beginning a hillside project design.



10. SETBACK

10.1 SETBACKS FROM PERMIT AREA BOUNDARY

The tops of cut and toes of fill slopes shall be set back from the outer property boundaries of the permit area, including slope easements in accordance with the setback diagram.

10.2 DESIGN STANDARDS FOR SETBACKS

The tops and the toes of cut and fill slopes shall be set back from structures as far as is necessary for adequacy of foundation support and to prevent damage as a result of water runoff, erosion, or maintenance of the slopes. Setbacks shall be no less than shown in on the Setback Detail Sheet, unless otherwise approved by the City Engineer. Side yards shall have a minimum three foot unobstructed clear area free of chimneys, walls, air conditioners, etc.

10.3 RETAINING WALLS

Retaining walls may be used to reduce the required setback in accordance with the Setback Detail when approved by the City Engineer. Retaining walls shall require a separate building permit.

SETBACK DETAIL

Min. Setback From Adjacent Slope					
H	a	b	c	d	e
0'-6'	5' min	7'	5'	5'	H/2 2' min
6'-14'	H/2 5' min	7'	H/2 5' min	H/2	H/2
14'-30'	H/2	H/2 10' max	H/2 10' max	H/2	H/2 10' max
>30'	H/2 20' max	10'	H/3 40' max	15'	10' max

H	Hw (Max)	f (min)
0'-6'	3'	5' min.
6'-12'	H/2	H/2
12'-30'	6'	H/2
>30'	6'	15'

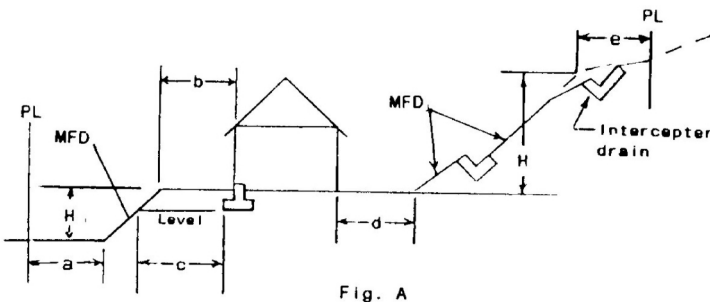


Fig. A

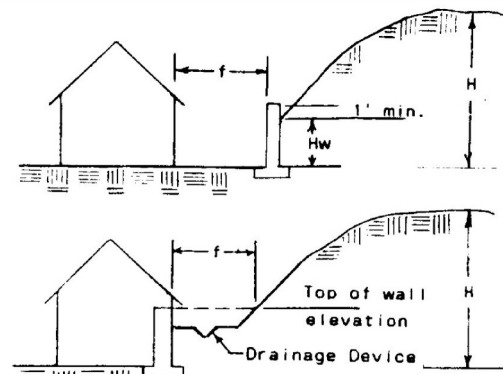


Fig. B

Special Circumstance

NOTES:

- "PL" means property line and/or permit area boundary.
- "MFD" means ,manufactured slope.
- Setbacks shall also comply with applicable zoning regulations.
- "Table A" applies to "MFD's" and 2:1 or steeper natural slopes. Setbacks from natural slopes flatter than 2:1 shall meet the approval of the City Engineer.
- "b" is measured from the face of the structure or any ground surface building protrusion to the top of the slope. Note...in all cases, Dimension "c" must be satisfied.
- "c" is measured from the bottom of the footing along a horizontal line to the face of the slope. Under special circumstances "c" may be reduced as recommended in the soils report and approved by the City Engineer.
- "b" may be reduced to 5' minimum if an approved drainage device is used (roof gutters and down spouts may be required) as required by the City Engineer.
- "b" may be reduced to less than 5' if no drainage is carries on this side and if roof gutters are included as specified by the City Engineer.
- If the slope between levels "a" and "b" is replaced by a retaining wall. "a" may be reduced to zero and "b" remains as shown in Table A. The height of the retaining wall shall be controlled by Building Division regulations.
- "f" may be reduced if the slope is composed of sound rock that is not likely to erode or deteriorate easily and is recommended by the Geotechnical Engineer or engineering geologist and approved by the City Engineer.
- "a" and "e" shall be 2' min. when "PL" coincides with street right-of-way and when improved sidewalk is adjacent to right-of-way.
- "e" shall be increased as necessary for interceptor drains.
- The use of retaining walls to reduce setbacks (Fig. B) shall be approved by the City Engineer.

11. DRAINAGE

11.1 DISPOSAL

All drainage facilities shall be designed to carry waters to the nearest practicable drainage course approved by the City Engineer. Erosion of ground in the areas of discharge shall be prevented by installation of non-erosion down-drains, rip-rap, energy dissipaters or other approved devices including a return of flow to a natural sheet flow condition.

11.2 DRAINAGE ONTO ADJACENT PROPERTY

Where surface waters are to be conducted or directed onto adjacent property in an unnatural manner, the applicant shall be required, prior to issuance of a grading permit, to obtain written permission from the owner of said property, accepting the surface waters.

11.3 BUILDING SITES

Building sites shall have a sheet flow drainage gradient of 2% away from the structure, front and rear yards, for a minimum distance of five feet. Side yards shall be graded 2% for a minimum of 2½ feet from the structure. The minimum drainage gradient of an earth swale shall be 1%.

Grading of future building sites under a rough grading permit for the purpose of lot sales shall have a sheet flow drainage gradient of 2% toward approved drainage facilities. The City Engineer may reduce this minimum gradient to 1% upon the written request of the applicant or his agent, providing the applicant demonstrates the following:

- A. Finish grades for drainage of building sites can be constructed in accordance with the requirements of this subsection without importing additional fill.
- B. Sufficient approved swales and/or drainage facilities are constructed to prevent water from ponding on any lot supported by a natural slope or cut or fill slope over five feet in height.

Finish grades, other than above, shall conform to the following minimum drainage gradient standards:

	<u>Minimum Gradient</u>
A. Earth swales	1.0%
B. Earth (sheet flow)	1.0%
C. Asphalt pavement and swales	1.0%
D. Concrete drain in earth area	0.5%
E. Concrete gutter in asphalt paved area	0.24%

Downspouts shall not be connected directly to the storm drain system.

11.4 TERRACES AND SURFACE DRAINAGE

All fill slopes, cut slopes, or combination of cut and fill slopes in excess of 25 feet in vertical height must have paved water-carrying terraces at a maximum of 25 feet vertical intervals with such terraces draining into a paved gutter, pipe or other watercourse adequate to convey the water to safe disposal area. Terraces are to be a minimum of 6 feet wide, paved, and must carry water to a safe disposal area. For cut or fill slopes greater than 60 feet up to 100 feet in vertical height, one terrace shall be 12 feet in width. Terrace widths and spacing for cut and fill slopes greater than 100 feet in vertical height shall be designed by the Civil Engineer and approved by the City Engineer. Suitable access shall be provided to permit proper cleaning and maintenance whenever practical.

All swales, ditches, etc. designed to carry surface water must have a minimum grade of 5% and must be paved with 3" colored gunite or 4" colored concrete and reinforced with 6" x 6", #10 x #10 wire mesh. Color of structures shall blend with the landscape palette and shall be reviewed and approved by the City Inspector prior to installation.

Down-drains shall be of colored concrete or asphalt dipped corrugated metal pipe. Down-drain pipes shall have a diameter of a size required by run-off calculations, but not less than eighteen (18") inches.

11.5 SUBSURFACE DRAINAGE

Cut and fill slopes shall be provided with approved subsurface drainage as necessary for stability and protection of adjacent properties from the influence of groundwater. The design of such facilities shall be contained in the approved preliminary (initial) geotechnical engineering or engineering geology report and/or shall appear on the approved grading plan pursuant to the approval of the Geotechnical Engineer and/or Engineering Geologist.

Subsurface drainage facilities shall be installed where natural and/or artificially introduced ground water will affect or is likely to affect the project in a potentially unstable, hazardous or otherwise deleterious manner.

11.6 INTERCEPTOR DRAINS

All manufactured slopes must be protected along the top from surface water run-off by berms or interceptor drains. Interceptor drains must be paved with 3" colored gunite or 4" colored concrete and reinforced with 6" x 6", #10 x #10 wire mesh. Color of structures shall blend with the landscape palette and shall be reviewed and approved by the City Inspector prior to installation.

The longitudinal grade of required interceptor drains shall not be less than 4 percent nor more than 12 percent. Any change in grade shall be increasing in the direction of flow and within the above

limits.

A single run of interceptor drain shall not exceed 150 feet to a down drain.

12. ASPHALT CONCRETE PAVEMENT

12.1 ASPHALT CONCRETE AND UNTREATED BASE STANDARDS

When asphalt concrete pavement is proposed for surfacing of private parking lots, private streets or other similar use, this paving, including the tack coat, prime coat, seal coat and base course, shall conform to the current edition of the Standard Specifications for Public Works Construction (The “Greenbook”) and to City of Orange Standard Plans and Specifications.

Exception: The provisions of this section shall not apply when (1) another governmental agency is designated to assume the responsibility for plan check and inspection of private streets; and (2) a private asphalt concrete driveway providing access to a single residence is proposed.

Prime coat shall be placed on subgrade or untreated base when the base will be subjected to substantial construction traffic or long periods of time before asphalt concrete is placed, as determined by the Geotechnical Engineer and approved by the City Engineer.

Untreated base may require testing by an approved testing agency to insure its compliance with the applicable specifications and special provisions when determined necessary by the City Engineer. Tests may include but shall not be limited to:

- A. Sieve analysis
- B. Sand equivalent
- C. Percent of crushed particles retained by a No. 4 screen

12.2 SUB-GRADE COMPACTION

The top 6 inches of the subgrade material shall be compacted to a relative compaction of 90 percent of maximum density as determined by test method ASTM D1557 or approved equivalent unless otherwise recommended by the Geotechnical Engineer in the preliminary soil report and approved by the City Engineer.

12.3 SOIL STERILIZATION

Weed killer shall be required on subgrade if no aggregate base is used.

12.4 SURFACE DRAINAGE

All concentrated drainage in asphalt paved areas shall be carried by approved concrete drainage devices.

12.5 PAVEMENT STRUCTURAL SECTION

The project Geotechnical Engineer or Civil Engineer shall determine the pavement structural section(s) for parking lots/service roads, and private streets based on: (1) soil tests of the subgrade soil(s) performed by an approved soil testing laboratory; and (2) anticipated traffic and/or loading conditions. The methods used for soil testing and pavement design shall be that currently in use by the City of Orange for construction of public roadways, or methods acceptable to the City Engineer. Unless otherwise specified by the Geotechnical Engineer, the relative compaction of each layer of base material shall not be less than 95 percent.

Pavement design for parking areas and for drive aisles shall conform to the current edition of the Standard Specifications for Public Works Construction (The "Greenbook") and to City of Orange Standard Plans and Specifications. Minimum thickness for parking lots shall be 2 inch asphalt concrete over 4 inch asphalt base.

13. EROSION & SEDIMENT CONTROL AND LANDSCAPING

13.1 EROSION & SEDIMENT CONTROL

All grading projects are required, at a minimum, to implement an effective combination of erosion and sediment controls and waste and materials management BMPs.

The Civil Engineer who prepared the grading plan and designed the erosion and sediment control BMPs shall be responsible for inspecting and, when necessary, modifying the BMPs, throughout the year. When significant modifications to the erosion and sediment control BMPs are made, revised plans shall be approved by the City Engineer.

Paved streets, sidewalks, and other improvements shall be maintained in a neat and clean condition free of loose soil, construction debris and trash. Approved BMPs shall be implemented to prevent storm flows from carrying sediment and debris outside the project boundaries. Nearby storm inlets shall be protected and the runoff filtered prior to entering the storm drain system.

Graded areas around the tract perimeter must drain away from the face of slopes at the conclusion of each working day.

A. Erosion Control

The faces of cut and fill slopes shall be protected from surface erosion.

Erosion protection shall consist of effective planting of all slopes in excess of 5 feet in height using permanent and/or temporary planting or other mechanical measures. Slopes exceeding 15 feet high may require an adequate sprinkler system, as determined by the City Engineer. Protection for the slopes shall be installed as soon as practicable, which may be prior to Rough Grade Approval. Effective planting shall be installed, fully germinated and effectively cover the required slopes, unless otherwise approved by the City Engineer

The erosion control provisions shall take into account drainage patterns during the current and future phases of grading throughout the rainy season.

Equipment and workers for emergency work shall be made available at all times during the rainy season. Necessary materials shall be available on-site and stockpiled at convenient locations to facilitate rapid construction of erosion control devices when rain is imminent.

B. Sediment Control

Sediment control shall include BMPs implemented to prevent an increase of sediment load in the storm water conveyance system.

Sediment control BMPs are required at all times during the rainy season, and shall be placed at appropriate locations along the site perimeter and at all operational internal inlets to the storm drain system.

Sediment control practices may include filtration devices and barriers, such as fiber rolls, silt fence, sandbags, and gravel inlet filters, and settling devices, such as sediment traps or basins. Effective filtration devices, barriers, and settling devices shall be selected, installed and maintained properly.

Adequate sediment control materials shall be made available during non-rainy season to control sediment discharges at the downgrade perimeter and operational inlets in the event of a predicted storm. Consideration of sediment control BMPs shall include, in addition to the above list, straw bale dikes, earth dikes, brush barriers, drainage swales, check dams, subsurface drain, sandbag dikes, fiber rolls, etc. Applicable BMPs may be found in the City's LIP or in California Stormwater Quality Association (CASQA) manuals.

Desilting facilities shall conform to the latest State General Construction Permit and shall be provided at drainage outlets from the graded site. The facilities shall have at least a capacity equivalent to 3,600 cubic feet of storage per acre draining into the facilities

Desilting basins shall be constructed around the perimeter of projects whenever feasible when it provides improved maintenance access from paved roads during wet weather.

Desilting basins constructed of compacted earth shall be compacted to a relative compaction of 90% of maximum density. A geotechnical engineering report, prepared by the Geotechnical Engineer, which includes the type of field testing performed, location and results of testing, shall be submitted to the City Engineer for approval upon completion of the desilting basins.

Equipment and workers for emergency work shall be made available at all times throughout the year. Necessary materials shall be available on-site and stockpiled at convenient locations to facilitate rapid construction of sediment control devices when the 5-day rain probability forecast exceeds 40%.

13.2 EROSION AND SEDIMENT CONTROL PLAN

Erosion and Sediment Control Plans prepared in accordance with this Manual of Grading shall be submitted to the City Engineer as a component of the Grading Plans for review and approval prior to issuance of a Grading Permit. Additional Erosion and Sediment Control Plans shall also be submitted by September 1 for review and approval for projects not completed by October 1 of each year.

The Erosion and Sediment Control Plan shall include but not be limited to:

- A. The name and 24 hour telephone number of the person responsible for performing emergency erosion control work.
- B. The signature of the Civil Engineer or other qualified individual who prepared the Grading

Plan and who is responsible for the inspection and monitoring of the erosion and sediment control work.

- C. All desilting and erosion protection facilities necessary to protect adjacent property from sediment deposition.
- D. The streets and drainage devices that will be completed and paved by October 1st.
- E. The placement of sandbags or gravel bags, slope planting or other measures to control erosion from all slopes above and adjacent to roads open to the public. Gravel bags are preferred over sandbags.
- F. Indication of how access will be provided to maintain desilting facilities during wet weather.

The Erosion and Sediment Control Plan may be waived for grading of single residential lot provided that an erosion control system, meeting the approval of the City Engineer, has been installed, placed, planted or constructed before October 1st.

13.3 WATER QUALITY REQUIREMENTS

Work on site shall be conducted in a manner that will protect water quality. All construction activities including waste and material management shall include the use of appropriate BMPs to minimize the discharge of pollutants off-site. Appropriate BMPs can be found in the County-wide DAMP and City of Orange LIP. Appropriate locations for material and waste handling shall be shown on the grading plan. All project specific BMPs shall be included in the Erosion Control, Sediment Control, and Water Quality Notes in the title sheet of the grading plan.

13.4 EROSION AND SEDIMENT CONTROL MAINTENANCE

Within 24 hours of each rainstorm, silt and debris shall be removed from check berms and desilting basins and the basins pumped dry. A filter shall be placed at the end of the hose to minimize discharge from the basin.

Within 24 hours of each rainstorm, the performance of the erosion and sediment control system shall be evaluated and revised and repaired as necessary.

The permittee shall be responsible and shall take necessary precautions to prevent public trespass onto areas where impounded water creates a hazardous condition.

The permittee shall be responsible for continual maintenance of the devices year round. In the event of failure or refusal by the permittee to properly maintain the devices, the City Engineer may cause emergency maintenance work to be done to protect adjacent private and public property and environmental resources. The cost shall be charged to the permittee and shall include an initial mobilization cost plus the cost of doing the work.

If any Grading has commenced on private property without a valid Grading Permit, the property Owner may be required to prepare and implement an erosion and sediment control plan. In the event of failure by the property Owner to install an approved erosion and sediment control system, the City Engineer may cause emergency work to be done to protect adjacent private and public property. The cost shall be charged to the Owner.

13.5 PLANTING OF SLOPE AND EXPOSED AREAS

Landscape and Irrigation Plans shall be required for all projects involving 2:1 or greater slopes in excess of 5 feet in height, requiring approval by the Design Review Committee, the Planning Commission or City Council, or as otherwise required by this Manual of Grading. Such plans shall be submitted for approval to the Director of Community Development prior to the issuance of building permits. Said plans shall be prepared in accordance with the provisions of this article. Landscaping and irrigation systems shall be installed in accordance with the standards maintained by the Director of Community Services.

An applicant may apply for an Administrative Adjustment in order to develop a landscape plan that meets the intent of this section but fails to satisfy the specific criteria contained therein.

Landscape and Irrigation Plans shall be prepared by a licensed landscape architect or other person allowed by the State of California Business and Professions Codes.

Landscaping materials and irrigation systems shall be located, designed, installed, and maintained as specified on the approved plans.

Any modification to an approved landscape or irrigation plan must be applied for in writing and approved by the Director of Community Services prior to installation of said landscaping or irrigation system.

No final inspection or occupancy clearance will be granted until the designer per Subparagraph C has certified to the City that all work has been completed in accordance with the approved plans or bonded for in an amount to be determined by the Director of Community Services.

If the provisions of this section conflict with other sections of the Orange Municipal Code, the more restrictive provisions shall apply.

14. GRADING INSPECTIONS

14.1 GENERAL

All grading operations for which a permit is required shall be subject to inspection by the City Engineer or his designated City Inspector.

14.2 PRE-GRADING MEET

The City Inspector, and any other City Official designated by the City Engineer, shall be present at a pre-grading meet held to discuss details of the proposed project prior to commencing work. Failure to accommodate this meeting will result in the issuance of a Stop Work Order. Members of the owner's professional "team" including the Grading Contractor, Geotechnical Engineer, Geologist, Soils Technician, Civil Engineer and others should be available to discuss details of the project with the inspector.

14.3 GRADING REQUIREMENTS

The City Inspector shall inspect the work and require adequate geotechnical supervision and compaction control by a Geotechnical Engineer.

Periodic reports certifying the compaction or acceptability of all fills shall be required. These shall include, but need not be limited to, inspection of cleared areas and benches prepared to receive fill and removal of all soil and unsuitable materials. The placement and compaction of fill materials, the bearing capacity of the fill to support structures, and the inspection of subdrains, drainage devices, buttress fills and other similar devices. Inspection of retaining walls shall be performed by the Building Division under separate permit.

The City Engineer may require sufficient inspection to assure that all geological conditions have been adequately considered. Where geologic conditions warrant, the City Engineer may require periodic geologic reports. These inspections may be required to include, but need not be limited to, cut slopes, canyons during clearing operations for ground water and earth material conditions, benches prior to placement of fill, and possible spring locations.

For Engineered Grading, it shall be the responsibility of the Civil Engineer who prepares the grading plans to incorporate all recommendations of the Geotechnical Engineer and Engineering Geologist into the plans. The Civil Engineer shall also be responsible for the professional supervision and approval of the grading within his area of technical competence and for the submission of as-built grading plans.

This responsibility shall include, but not be limited to, inspection and approval as to the establishment of line, grade and drainage of the developed area. The Civil Engineer shall act as the coordinating agent in the event the need arises for liaison between the other professionals, the

contractor, and the City Engineer.

The Geotechnical Engineer's area of responsibility shall include, but need not be limited to, professional inspection and approval concerning the preparation of ground to receive fills, testing for required compaction, stability of all finish slopes, design of buttress fills, subdrain installation and incorporation of data supplied by the Engineering Geologist.

The Engineering Geologist's area of responsibility shall include, but need not be limited to, professional inspection and written approval of the adequacy of natural ground for receiving fills, the stability of cut slopes with respect to geological matters, and the need for subdrains or other ground water drainage devices. The Engineering Geologist shall report his findings to the Geotechnical Engineer and the Civil Engineer for engineering analysis.

The City Inspector shall inspect the project at the various stages of the work requiring approval and at frequent intervals as necessary to determine that adequate control is being exercised by the professional consultants.

The City Engineer shall not issue any Grading Permit, waiver, or exemption unless the City Engineer finds that the work authorized by the Grading Permit, waiver, or exemption complies with applicable Water Quality Requirements.

14.4 TERMINATION OF SERVICES

In the event the design Civil Engineer, Geotechnical Engineer or Engineering Geologist who is responsible for the professional supervision of that portion of the grading which is within his area of technical competence is relieved of, or otherwise terminates, his duties prior to completion of the work shown on the grading plans, he shall report the fact in writing to the City Engineer within 48 hours at the time of his termination. Persons assuming the duties of any of these consultants shall perform any investigations they deem necessary to approve that the entire work including the previous reports is in conformance with this chapter and the permit. Acceptance of the project by the new consultant shall include his certification of all work previously accomplished and his responsibility for the remainder of the project in writing.

14.5 REVISED GRADING PLAN

If the City Inspector finds the soil or other conditions not as stated in the Grading Plan or Soil Report, he may refuse to approve further work until approval is obtained for a revised grading plan which will conform to the existing conditions.

The City Engineer may conduct additional inspections as deemed necessary. Whenever the City Engineer determines that the work does not comply with the terms of the permit or this code, or that the soil or other conditions are not as stated on the permit, The City Engineer may order the immediate cessation of all work, and such work shall cease until such corrections have been complied with. Prior to the release of the graded site for building construction the rough grading shall be completed to the satisfaction of the responsible engineers and the City Engineer. Notice in

writing to this effect shall be submitted to the City Engineer.

14.6 REQUIRED INSPECTIONS FOR GRADING

The following is a list of normally required inspections to be made by the City Inspector

- A. Initial Inspection (pre-grading)
- B. Excavation and fills
- C. Concrete or gunite drainage devices
- D. Installation of water quality BMP structures
- E. Paving
- F. Rough grading
- G. Final grading
- H. Completion of water quality BMPs

Inspections for each of these areas are fully explained below. If any work requiring inspection is covered or concealed by additional work without first having been inspected the City Inspector shall require, by written notice, that such work be exposed for examination.

A. Initial Inspection

1. Pre-grading meeting prior to starting any grading or brushing. The project coordinator shall contact the City Inspector 48 hours prior and shall contact the following principals to be represented at the meeting: Owner, Geotechnical Engineer, Geologist, Design Engineer and the Grading Contractor.
2. Request for inspection must be made 24 hours before the inspection is required. Include job address and project number.

B. Excavation and Fills

1. Toe and key for slope fills.
2. Canyon Clean-Out - After all brush and unsuitable material has been removed and a suitable bottom or bedrock has been exposed, but before any fill is placed.
3. Subdrains - After excavation but prior to placement of filter material and pipe. Subdrain pipe and filter material shall be on-site for inspection. After filter material and subdrain has been placed, but prior to covering with fill.
4. Over Excavation.
5. Excavation - After the excavation is started but before the vertical depth of the excavation exceeds ten feet.
6. Fill - After the fill has started but before the vertical height of the fill exceeds ten feet.

C. Concrete or gunite drainage devices

1. Alley gutter and/or concrete device draining asphalt
 - a. Subgrade (prior to placement of concrete)

Subgrade is to be prepared and the forms are to be in place, with reinforcement when required. The Design Engineer or Architect shall provide written approval of line and grade.
 - b. Concrete placement

Inspections to be made during placement. Continuous inspection by a Deputy Inspector shall be required for concrete strength equal or greater than 1,500 psi.
2. Curb and gutter on private property and non-dedicated streets
 - a. Subgrade (prior to placement of concrete)

Subgrade is to be made and forms in place. The Design Engineer or Architect shall provide written approval of line and grade.
 - b. Concrete placement

Inspection(s) to be made during placement.
3. Terrace drains, down drains, brow ditches and all other paved drainage devices.
 - a. Subgrade

Prior to placement of welded wire mesh or reinforcing steel, the Design Engineer or Architect shall provide written approval of line and grade.
 - b. Thickness control wire and reinforcing steel or welded mesh to be installed prior to placement of gunite or concrete.
 - c. Concrete or gunite placement

Inspection(s) to be made during placement.
4. Sidewalks used as drainage devices

Subgrade - Prior to placement of concrete, subgrade is to be made and forms are to be in place with the required reinforcement. The Design Engineer or Architect shall provide written approval of line and grade.
5. Drainage devices other than concrete or gunite.
 - a. Subdrains - After excavation but prior to placement of filter material and pipe,

subdrain pipe and filter material shall be on-site for inspection. After filter material and subdrain has been placed but prior to covering with fill.

- b. Prior to rough release.
- c. Prior to final approval.

D. Installation of Water Quality BMP Structures

- 1. Structural and treatment BMP such as bioswales, detention basins, and their associated drainage systems.
- 2. Filter devices including installation of underground vaults, in-line filter devices, and their associated drainage system.
- 3. Pervious pavers, planters, subsurface treatments, and other porous materials used for infiltration.

E. Paving

Pavement and base course specifications shall be in accordance with current City of Orange Standards and/or per the approved grading plan and geotechnical engineering report.

- 1. Subgrade - After subgrade has been established, tested and approved by the Geotechnical Engineer but prior to placement of base, the Geotechnical Engineer or his qualified representative may leave field memo of test results on-site. The Design Engineer or Architect shall provide written approval of line and grade.
- 2. Base (material invoices may be required) -After base course has been placed, tested and approved by the Geotechnical Engineer or his qualified representative but prior to prime coat and asphalt placement, the Geotechnical Engineer or his qualified representative may leave a field memo on-site to provide compaction test and base thickness results.

It may be necessary, as determined by the City Engineer, to have the rock base tested to insure its compliance with Standard Plans and Job Specifications. Required test may include:

- a. Sieve analysis
 - b. "R" Value
 - c. Sand Equivalent
 - d. Durability Index
 - e. Percent of crushed particles retained by #4 screen
- 3. Asphalt (material invoices may be required) - Weed killer and prime coat shall be required on sub-grade if no aggregate base is used.

Inspection shall be made during asphalt lay down to verify continuous inspection by

the Geotechnical Engineer, his qualified representative or a Deputy Inspector when authorized.

4. Water Test - Paved surfaces shall be water tested to reveal any irregularities and patched where required.

F. Rough Grading

When all rough grading has been completed, this inspection may be called for without the necessity of the City Inspector having previously reviewed and approved the required reports. Under normal circumstances all subdrains and slope drains shall be in place and approved as a condition for rough grading release.

G. Final Grading

When all work, including installation of all drainage structures and other protective devices, including slope planting where required, has been completed and all written professional approvals and the required reports have been submitted.

H. Completion of Water Quality BMP's

Final inspection shall also ensure the completion and functionality of water quality BMPs.

1. Verify that structural and treatment BMPs have not been disturbed during final grading and the dimensions and flow line remain as designed.
2. Make sure that planting of proper vegetation in the natural treatment systems such as bioswales, basins, wetlands, buffers, etc. is complete.
3. Verify that underground vaults and in-line filters are correctly installed as shown on the plans.
4. Insure that no roof drains and downspouts are directly connected the any storm drain system.

15. COMPLETION OF WORK

15.1 FINAL REPORTS

Upon completion of the rough grading work and at the final completion of the work prior to the issuance of any building permit, the City Engineer shall require submittal of the following reports, drawings and supplements thereto:

- A. As-Graded Grading Plan. An as-graded grading plan prepared by the Civil Engineer which shall include original ground surface elevations, as-graded ground surface elevations, lot drainage patterns, manufactured slope inclination, and location and elevation of all surface and subsurface drainage facilities.

- B. Civil Engineer Rough Grade Certification Letter. The Civil Engineer shall provide a rough grade certification letter, in a form prescribed by the City Engineer, indicating that the work has been completed substantially in conformance with the approved rough grading plan and which specifically approves the following items as appropriate to the project and stage of grading:
 - 1. Construction of line and grade for all engineered drainage devices.
 - 2. Staking of temporary property corners which may be at offsets for proper building location (rough grading).
 - 3. Setting of all monuments in accordance with the recorded tract map.
 - 4. Location and inclination of all manufactured sloped.
 - 5. Construction of earthen berms and positive building pad drainage.

- C. Civil Engineer Final Grade Certification Letter. The Civil Engineer shall provide a rough grade certification letter, in a form prescribed by the City Engineer, indicating that the work has been completed substantially in conformance with the approved rough grading plan and which specifically approves the following items as appropriate to the project and stage of grading:
 - 1. Construction of line and grade for all engineered drainage devices and retaining walls.
 - 2. Setting of all monuments in accordance with the recorded tract map.
 - 3. Location of permanent walls or structures on property corners or property lines where monumentation is not required.
 - 4. Location and inclination of all manufactured sloped.
 - 5. Construction of earthen berms, positive building pad drainage away from all building structures.

6. Positive lot drainage to the street and/or that a drainage device approved by the City Engineer has been installed to provide adequate lot drainage and is functioning properly.
7. Water quality BMPs have been constructed or installed.

Final grade certification letter shall be submitted upon completion of building construction and prior to issuance of a Certificate of Occupancy. For multiple-lot developments the certification letter shall certify each lot.

- D. Geotechnical Engineer Certification Letter and Final Geotechnical Report. A Geotechnical Report prepared by the Geotechnical Engineer including type of field testing performed, suitability of utility trench and retaining wall backfill, summaries of field and laboratory tests and other substantiating data, and comments on any changes made during grading and their effect on the recommendations made in the soil engineering investigation report. The Geotechnical Engineer shall provide a certification letter, in a form prescribed by the City Engineer, as to the adequacy of the site for the intended use;

The Final Geotechnical Report shall contain information that provides the Building Official data with which to properly analyze structure design. As a prerequisite to the issuance of the building permit, the report shall include the following information for the Building Officials review:

- Specific comments/recommendations
- Soil bearing values
- Expansion index
- Existence of soluble sulfates
- Electrical conductivity
- Corrosivity
- Equivalent fluid pressure for retaining wall design
- Friction coefficient
- Lateral bearing values
- Shear values
- Internal angle of friction
- Trench/retaining wall backfill requirements
- Seismic design recommendations
- Boring locations/number of borings
- Boring logs

Additional requirements may be required due to specific site variations, such as, pile values, water levels, slope treatments, site drainage characteristics, and faults.

All documents must be signed by a registered engineer.

- E. Engineering Geologist Certification Letter and Engineering Geology Report. An Engineering Geology Report prepared by the Engineering Geologist including a final

description of the geology of the site including any new information disclosed during the grading, and the effect of same on recommendations incorporated in the approved as-graded grading plan. The Engineering Geologist shall provide a certification letter, in a form prescribed by the City Engineer, as to the adequacy of the site for the intended use as affected by geologic factors. This report and the certification letter may be combined with Final geotechnical Report discussed above.

- F. Grading Contractor Statement of Conformance. The grading contractor shall submit in a form prescribed by the City Engineer a statement of conformance to the as-graded plan and the specification, including volume of cut and fill moved on the project.

15.2 NOTIFICATION OF COMPLETION

The permittee or his agent shall notify the City Engineer when the grading operation is ready for final inspection. Final approval shall not be given until all work including installation of all drainage facilities and their protective devices, all erosion control measures, and all water quality BMP's have been completed in accordance with the final approved as-graded grading plan and the required reports have been submitted.

15.3 GRADING BOND RELEASE

Upon submittal, review, and approval of the forgoing information by the City Engineer, the grading bond will be authorized for release.

REFERENCES

The following list of documents may contain helpful information, but they are not a part of this Manual of Grading.

City of Orange:

- Local Implementation Plan. City of Orange, Department of Public Works.
http://www.cityoforange.org/depts/publicworks/storm_water_npdes/default.asp

County of Orange:

- Grading Manual. Planning & Development Services, Orange County.
<http://www.ocplanning.net/Documents/pdf/GradingManual.pdf>
- Orange County Hydrology Manual. Orange County Flood Control Division, OC Flood.
http://www.ocflood.com/docs_online_manuals.aspx
- Orange County Local Drainage Manual. Orange County Flood Control Division, OC Flood.
http://www.ocflood.com/docs_online_manuals.aspx

California Geologic Survey

- Note 52: Guidelines for Preparing Geologic Reports for Regional-Scale Environmental and Resource Management Planning. California Geologic Survey.
http://www.consrv.ca.gov/cgs/information/publications/cgs_notes/note_52/Documents/note_52.pdf.
- California Code of Regulations-Title 14 Article 3. California Geologic Survey.
<http://www.consrv.ca.gov/cgs/codes/ccr/t14/Pages/3600.aspx>
- California Code of Regulations-Title 14 Article 10. California Geologic Survey.
<http://www.consrv.ca.gov/CGS/codes/ccr/t14/Pages/3720.aspx>

State Water Resources Control Board

- Order No. R8-2009-0030. NPDES Permit No. CAS618030 as Amended by Order No. R*-2010-0062. SWRCB.
http://www.swrcb.ca.gov/rwqcb8/water_issues/programs/stormwater/oc_permit.shtml
- Order No. 2009-0009-DWQ National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002 for Discharges of Storm Water Runoff Associated with Construction Activity. SWRCB.
http://www.swrcb.ca.gov/water_issues/programs/stormwater/constpermits.shtml