

# VENTURA COUNTY

## LAND DEVELOPMENT MANUAL



**Public Works Agency  
Water Resources and Development Department  
Development and Inspection Services Division**

**February 1995**

## FOREWORD

**PURPOSE:** The Ventura County Land Development Manual establishes uniform policies and procedures for the processing of land development projects.

It is not the intent of this manual that any standard of conduct or duty toward the public shall be created or imposed by the publication of this manual. The manual is not a textbook or a substitute for engineering knowledge, experience or judgment. The methods and procedures contained herein shall be reviewed by the engineer for applicability to the project on which he or she is working. Where he or she considers a particular provision inapplicable to a project, the engineer shall request a variance from the provision as provided in the manual.

## COUNTY OF VENTURA

### GUIDE TO ENGINEERS, DEVELOPERS AND CONTRACTORS

The following publications have been adopted by the County for regulating the design and construction of public improvements constructed by developers; work performed under County or Watershed Protection District permits; land grading; water systems; and sanitary sewer systems:

1. Ventura County Road Standards (RdStd)
2. Ventura County Water Works Manual and Sewerage Manual (VCWWM & VCSM).
3. Standard Specifications for Public Works Construction (SSPWC).
4. Standard Land Development Specifications (SLDS) which adopt, supplement and modify SSPWC.
5. Ventura County Water Works Districts Nos. 1, 16, 17, and 19; Ventura County Service Areas 29 and 30; and Lake Sherwood Community Services District Rules and Regulations (R&R).
6. Standard Plans for Public Works Construction (SPPWC).
7. State Standard Plans from CALTRANS (SSP).
8. Land Development Manual.
9. Standard cover sheets for grading.
10. Individual project plans and specifications (P&S).

The scope of each publication is contained within that publication. The publications should be used as follows:

Engineers - Use RdStd, VCWWM and VCSM (also R&R in Districts listed in 5 above) as the general requirements for design. Do not assume contractors have copies of these publications so don't make references to plates or formulas from these documents in the P&S. Material in SLDS, SSPWC, SPPWC, and SSP may be referred to in the P&S as contractors may be assumed to have copies of these publications.

**NOTE:** The Ventura County Standard Designs are no longer being published and should not be used as a reference. Use SPPWC in their place. Where SPPWC does not contain an appropriate design, SSP may be used. If neither have the needed feature, details of the feature must be shown in the P&S.

Developers and Contractors - Use SLDS (which adopts and modifies SSPWC); SPPWC and SSP where specified in the P&S; Grading Cover Sheet and P&S.

## **FUTURE AMENDMENTS TO THIS MANUAL**

Amendments to this manual may be issued from time to time.

Users of this publication may contact the Agency to determine the latest revision date.

To ascertain the current purchase price and postage charge for the manual or to purchase an updated edition, contact the Agency at the address shown below. Individual pages may also be purchased at the standard price for Xerox copies.

The latest version of this manual is available free on the Agency's web site:  
**[http://publicworks.countyofventura.org/eng\\_services/eng\\_serv.htm](http://publicworks.countyofventura.org/eng_services/eng_serv.htm)**

Agency:      Public Works Agency  
                  Engineering Services Department  
                  County Surveyor's Public Counter  
                  800 South Victoria Avenue  
                  Ventura, California 93009-1670

Location:     The County Surveyor's Public Counter is at the  
                  Ventura County Government Center, Hall of  
                  Administration, Third floor, at the top of the escalator  
                  from the main entrance atrium.

Phone:        **(805) 654-2068**

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**PREFACE**

**0000. PREFACE.** This manual has been prepared to introduce Developers' Engineers to the policies and procedures of the Public Works Agency with regard to processing land development projects. This manual supersedes and cancels the Land Development Manual filed with the Board of Supervisors on January 2, 1968.

**0001. PURPOSE.** This manual has been prepared to outline and reference County procedures, policies and criteria which Developers and Engineers should know and follow to expedite processing of land development projects.

**0002. STATUS.** Nothing in this manual shall be held to supersede any provision of law, ordinance or resolution, either existing or future.

**0003. DEVIATIONS.** The Director of Public Works is authorized to approve deviations from the procedures and policies originating in this manual when, in his opinion, such deviations are consistent with the best interests of the County.



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**CHAPTER 1**

**GENERAL PROVISIONS**

**1000. GENERAL PROVISIONS.** The Public Works Agency or its consultant will perform a professional improvement plan check, strictly for its own purposes, allowing maximum flexibility in planning consistent with the public safety, responsibility and economy of maintenance; and shall hold the developer's engineer responsible for furnishing completely engineered and checked plans and calculations to permit quick check by the Agency.

**1100. DEFINITIONS.** Definitions of terms used in this manual, but not listed below, are included in the following:

- a. Subdivision Map Act, Government Code, Title 7, Division 2, Chapter 1, Article 2.
- b. Subdivision Ordinance, Division 8, Chapter 2, Article 1, of the Ventura County Ordinance Code.
- c. Zoning Ordinance, Division 8, Chapters 1 and 1.1, Article 1, of the Ventura County Ordinance Code.
- d. Ventura County Building Code.
- e. Encroachment Ordinance, Division 12, Chapter 1 of the Ventura County Ordinance Code.
- f. Standard Land Development Specifications.

**1101. CONSTRUCTION ENGINEER.** The Director of Public Works' representative directly responsible for the inspection of land development improvements.

**1102. COORDINATING ENGINEER (MANAGER, DEVELOPMENT AND INSPECTION SERVICES DIVISION).** The Public Works Agency's representative to the Planning Department presenting Public Works Agency comments in connection with land developments to the Planning Department, Planning Commission and the Board of Supervisors.

**1103. COUNTY SURVEYOR.** The Director of the Public Works Agency or his authorized representative.

**1104. DEVELOPER'S ENGINEER/SURVEYOR.** A civil engineer or land surveyor registered by the State of California, employed by the developer to exercise overall control of the land development. Tentative maps which contain engineering designs, improvement plans and "record drawings" must be prepared by a professional civil engineer or other individual authorized to practice engineering design. Tentative maps which show boundary determinations must be prepared by a professional land surveyor or other individual authorized to practice surveying.

**1105. DIRECTOR.** The Director of the Public Works Agency or his authorized representative.

**1106. ENGINEERING GEOLOGIST.** An Engineering Geologist, registered by the State of California, employed by the developer to perform the investigations and make the reports required by the Building Code.

**1107. DIVISION.** Development and Inspection Services Division of the Water Resources and Development Department.

**1108. BUILDING CODE.** Ventura County Building Code as adopted by the Board of Supervisors and amended from time to time.

**1109. PROJECT DEVELOPMENT ENGINEER.** The Development Services Division staff engineer responsible for checking the improvement plans for conformance with County minimum requirements and standards.

**1110. SEWERAGE SYSTEM ENGINEER.** A civil engineer, registered by the State of California, hired by the developer or by the sewerage entity, who meets the other qualifications of paragraph 1 of the Certificate of Adequacy of Sewerage System and who has made the necessary computations to certify to paragraph 2 of the certificate. The certificate, which is located on the Title Sheet of the Improvement Plans, may be signed by the subdivider's engineer if he is so qualified and has made the necessary computations.

**1111. SOILS ENGINEER.** (Geotechnical engineer), A Civil Engineer registered by the State of California, employed by the developer, who is responsible for the soil mechanics requirements of the Building Code. The developer's engineer may be the soils engineer if he is qualified by experience to perform this function.

**1112. SUBDIVIDER'S ENGINEER OR TRACT ENGINEER.** Same as developer's engineer.

**1113. SUPERVISING CIVIL ENGINEER.** A civil engineer, registered by the State of California, who is in general charge of the design and construction of the earthwork in the subdivision. Unless specifically provided for by the subdivider, the supervising civil engineer would be the developer's engineer. The supervising civil engineer must have thorough knowledge of the construction so that he will be able to sign the "as built" plans both as to line and grade and compliance with the Building Code (in conjunction with the soils engineer and the engineering geologist) and the specifications for the job.

**1114. WATER SUPPLY ENGINEER.** A civil engineer, registered by the State of California, employed by the developer or by the water purveyor, who is qualified as stated in paragraphs 1 and 2 of the Certificate of Adequacy of the Water Supply System and who has made the necessary computations to certify to paragraph 2 of the certificate. The certificate, which is located on the Title Sheet of the Improvement Plans, may be signed by the subdivider's engineer if he is so qualified and has made the necessary computations.

## **1115. DESIGNATION OF IMPROVEMENT PLANS.**

- a. TRACT. Improvement plans prepared in connection with a subdivision in accordance with the conditions of approval of the tentative tract map.
- b. PARCEL MAP. Improvement plans prepared in connection with a subdivision in accordance with conditions of approval of the tentative parcel map.
- c. CONDITIONAL USE PERMIT (C.U.P.), DEVELOPMENT PERMIT (D.P.) AND PLANNED DEVELOPMENT PERMIT (P.D.). Improvement plans prepared in connection with a C.U.P., D.P. and a P.D. Permit granted by the Planning Commission or the Planning Director, in accordance with the conditions of approval.
- d. ENCROACHMENT PERMIT. Improvement plans that are prepared for construction within an existing County road right of way and not connected with any of the above. (See Section 1303 "Encroachment Permits".)
- e. GRADING PLANS. Improvement plans that are prepared in compliance with the Building Code in connection with any land development or single lot development.

**1200. GENERAL REQUIREMENTS.** General requirements for tract maps, parcel maps and improvement plans are included in the Subdivision Map Act, the Subdivision Ordinance, the Flood Plain Management Ordinance, and the Zoning Ordinance, but are further subject to any and all conditions imposed as the conditions of approval by the Planning Director, Planning Commission or the Board of Supervisors. The remarks in this section pertain to those land development projects which have conditions of approval requiring the submission of construction plans for approval by the Director.

**1201. DESIGN.** The design of the subdivision must preserve the County's responsibility under law, and must recognize and observe the intent of ordinances, resolutions, policies, and criteria. By excellence of design, or with special precautions, alternatives to County "minimum" standards may be approved. Approval by the Public Works Agency should be obtained before any proposed alternative is used as a basis for design drawings.

**1202. COMPLETE ENGINEERING.** Developer's engineers are required to present fully engineered, checked and signed improvement plans and calculations, together with other reports, exhibits, fees, etc., plus the letter of approval by the Director of any deviations from County standards and policies. Approval of deviation should be obtained prior to incorporating such into design. Requests for deviations shall include sufficient justification and necessary supporting reports. It should be noted that any deviations to right of way or improvement requirements of the Road Standards are allowed only with the approval of the Board of Supervisors. The County will not act as a plan check agency for the benefit of any individual or firm, except as necessary to protect the County's interest and the public safety and welfare as provided in law, ordinance, resolution and policy.

**1203. PRE-PLANNING.** Pre-submission planning and conferences are encouraged to clarify matters of policy. Commitments for specific design details should not be requested over the telephone. The duty to require compliance with ordinances, resolutions, standards and policies may not be compromised. Any oral agreement (by misunderstanding or any other reason), which results in a deviation of those requirements, will not be honored.

Pre-planning includes:

- a. Feasibility Studies. Conduct a feasibility study to include analysis of the site in relation to the County's planned land use, zoning and plans for roads, water, storm drainage, flood control, sewerage and utilities.
- b. Coordination with other jurisdictions. Generally, the developer's engineer shall perform all coordination required with other jurisdictions, such as the State, a city, or a special district and obtain a signature of approval on the plans. Plans are generally required to be fully approved in advance of making application for State or County Encroachment Permits.
  - (1) Coordination with Utilities. The originals of utility plans must be signed approved by the utility entity serving the area prior to submission of the improvement plans for final check by the Division.
  - (2) County Waterworks Districts governed by the Board of Supervisors. The Manager of the County Waterworks Districts should be contacted relative to water and sewerage service, including the rules & regulations of the district relative to permits, plan checking and inspection fees, annexation fees, connection fees, capital improvement charges, bonding and procedures for securing will-serve letters and utility certification on the improvement plans.
  - (3) Construction adjacent to State Highways. If any development will or may affect the State road right of way in any manner, the developer's engineer should forward two sets of prints to the local Caltrans office. (NOTE: This is separate from and in addition to any requirement for a State Encroachment Permit.)

**1204. PRESENTATION OF PLANS FOR CHECKING.** All submissions of plans for checking by the Division shall be made to the Project Development Engineer. All drawings and prints shall be trimmed to 22" x 36", assembled in sets in numerical order, and each set of prints shall be stapled along the lefthand border. The map sheet prints shall be stapled separately from the improvement plans. Copies of plan check lists are available from the secretary. Submittals shall consist of all interrelated components of the plans required for a land development project. Piecemeal submittals will not be accepted.

**1205. ITEMS REQUIRED FOR PLAN CHECK.** By diligently observing the requirements of the applicable laws, ordinances, resolutions, standards or policies, and by performing a workmanlike check before submittal, the developer's engineer can minimize the number of Agency plan checks and can reduce the time required for each check. Vague, incomplete or uncoordinated plans can only result in additional checks, longer processing time, and greater plan checking costs.

**1206. FINAL SUBMISSION OF PLANS.** When the improvement plans are found to be in acceptable form with only minor corrections required, they will be returned to the developer's engineer with a check list of items required to be submitted with the corrected original drawings for final checking and signature of the Director or his authorized representative, and for forwarding to the Board for acceptance of bonds and agreements.

**1207. MARKING PLANS FOR CHANGE.** Color coding of markings on plan prints shall conform to the following:

- RED - By County - Indicates correction required
- YELLOW - By Developer's Engineer - Indicates correction of item red-marked by County
- GREEN - By County - Indicates approval
- BROWN - By Developer's Engineer - Indicates (by circling) desired changes after the completion of first check and prior to the Director's or authorized representative's approval signature
- RED - By Developer's Engineer - Indicates changes desired as change orders during construction period

**1208. STAGED APPROVALS.** No construction work may be accomplished within the map or permit area prior to tentative map approval, approval of drawings and issuance of permits. However, staged approval of plans may be obtained at the discretion of the Project Development Engineer (with each past approval subject to review and required changes at the time of succeeding approvals), in the following order:

- a. Stage grading plan.
- b. Sewer and/or water plans.
- c. Improvement plans (bonding may be delayed pending approval of final map except for grading bond, and all construction inspection fees shall be paid prior to any construction).
- d. Final map.

**1209. STANDARD COVER SHEETS.** The standard printed cover sheet appropriate for the land development shall be purchased from the Public Works Agency and used for each set of improvement plans requiring construction subject to the Ventura County Land Development Specifications.

**1210. ESTIMATE OF COST.** An estimate of cost of improvements shall be submitted using unit cost figures as indicated on the approved form available from the Division. The estimate of cost for work within State Highway right of way shall be included for plan check, inspection fee and security purposes. Estimates of cost for water and sewer mains shall be furnished separately to the Water and Sewer entities. Water and Sewer agreements and their securities shall be furnished to the Division prior to map approval. No plan check or inspection fees will be collected for water and sewer improvements by the Division. These will be collected by the water and sewer entities.

**1211. PAYMENT IN LIEU OF CONSTRUCTION.** Payment in lieu of construction shall be in cash for deposit by the Public Works Agency. The amount of the payment shall include a reasonable amount for design, surveys, materials laboratory design and testing, grading and construction inspection, in addition to the amount of the estimate of cost of construction for which the developer is normally required to furnish a performance bond, and including an allowance for inflation.

**1212. RETENTION OF PROFESSIONAL SERVICES BY THE DEVELOPER.** The developer shall retain the services of a registered civil engineer to supervise the construction of the work, and to perform duties and responsibilities as provided in the Standard Land Development Specifications. The developer must agree to pay for all soils engineering performed, or caused to be performed, by the County for all improvements associated with the land development. The registered civil engineer shall also supervise all grading work and perform the duties of supervising civil engineer in accordance with the requirements of Chapter 70 of the Uniform Building Code. The developer shall also retain the services of a soils engineer and/or the services of an engineering geologist to make tests, investigations, perform inspections, and file the reports that are, or may be, required for compliance with the Building Code. The Director of Public Works is authorized to accept and file all documents in connection with professional services, as described above.

**1300. PERMITS.** Grading, Watershed Protection, Flood Plain Development Permit, and Encroachment Permits, when appropriate, must be obtained after County approval of improvement plans. State Highway Encroachment Permits issuance will not be coordinated by the County. The County will cooperate with local jurisdictions and property owners by not approving improvement plans, indicating any encroachment onto their property, until permission is obtained.

**1301. GRADING PERMITS.** See Chapter 6 "Grading".

**1302. WATERSHED PROTECTION DISTRICT PERMITS.** Watershed Protection District Encroachment and/or Watercourse Permits, when required, must be obtained from the Watershed Protection Department. Construction drawings for Watershed Protection facilities which will be accepted by the Watershed Protection District for maintenance and operation must be on standard Watershed Protection sheets, with Watershed Protection drawing numbers. Any required agreements, bonds, fees, deeds, etc. will be processed by the Department.

**1303. ENCROACHMENT PERMITS.** Encroachment Permits must be obtained from the Traffic Engineering and Permit Section of the Transportation Department for work to be accomplished within County Road rights-of-way, including the rights-of-way being dedicated as part of the land development. (See Encroachment Ordinance for details.)

- a. Street improvement plans in connection with all land use entitlements shall be required to conform to the general requirements (as applicable) of Sections 1200 through 1300 of this manual.

**1304. ROAD CLOSURE AND DETOURS.** No road may be closed except with the prior approval of the Road Commissioner or Deputy Road Commissioner. Marking, or construction of detours may be required. Any road closure contemplated on a set of improvement plans must be specifically approved by the Board of Supervisors prior to approval of the plans by the Director. The California Streets and Highways Code gives the Board of Supervisors the authority to close roads only under very specific circumstances. The Board desires to provide for the orderly movement of traffic, and to facilitate construction. Therefore, a written request shall be submitted to the Public Works Agency at least fourteen (14) days prior to the meeting at which the Board is to consider the requested closure. This request must describe (or include):

- a. Why the construction cannot take place without closing the road.
- b. The length of time of the proposed road closure.
- c. The hours involved (normal working hours only).
- d. Detours available for traffic circulation.
- e. Access for emergency vehicles into the area affected.
- f. A scaled map indicating the extent of the road closure and the placing of necessary barricades, signs and lights.

**1305. FLOOD PLAIN DEVELOPMENT PERMIT.** Flood Plain Development Permit, when required, must be obtained from the Watershed Protection Department.

**1400. FEES.** Fees are charged by the Public Works Agency to recover the costs incurred by the County of Ventura in processing of permits, plans, maps, etc., for land developments. These fees are in addition to the fees required by the Planning Department for processing applications.

A complete listing of Public Works Agency fees is available from the Division.

**1500. SECURITY REQUIREMENTS, PROCEDURES AND AUTHORIZATION TO ACCEPT.** Every agreement for the construction of improvements shall be in writing, and shall be secured by good and sufficient improvement security. Said improvement security shall include faithful performance security in the amount of 100% of the estimated cost of completing the work described in the agreement, and payment (labor and materials) security in the same amount. One Thousand dollars of the required improvement security shall be in the form of a cash deposit with the County of Ventura for emergency clean-up work, if required. All agreements for construction of improvements and all security therefor shall be submitted to the Board, or to the Director of Public Works for approval as hereinafter provided, prior to acceptance and filing of any Parcel Map or Final Map, or prior to clearance of a permit conditioned by the Planning Commission or the Planning Director. Agreements and bonds for construction of subdivision tract improvements, or for construction of a new road, or for reconstruction of a road on a new alignment, must be submitted to the Board of Supervisors for approval. Where subdivision improvements are not involved, or where the construction of a new road or the new construction of a road on a new alignment is not involved, the Director is authorized to approve the security and agreements.

**1501. IMPROVEMENT SECURITY.** Improvement agreements and security shall be executed on forms furnished by the Director in accordance with the Subdivision Ordinance and Bond Book. Agreement and security forms are available from the Division. Do not make copies of the forms. They will be furnished by the Division at the appropriate time in the checking process.

**1600. CONTRACT CITIES.** Specific services are provided by the County for some cities as contract services. The developer's engineer shall become familiar with the extent of contract services and be guided accordingly in his processing of maps.

**1601. STANDARDS AND FORMS.** When the County Surveyor Division performs map check for cities, the check will be based on city standards.

**1602. APPROVAL BY CITY.** All maps within the city limits shall be prepared for signature of the City Engineer. The County will prepare a letter of transmittal certifying the checking and the sufficiency of the map.

**1700. COUNTY PARTICIPATION.** When the County becomes obligated to financially participate with developers in road construction, the amount and method of participation must be agreed upon with the Director prior to approval of the improvement plans.

**1800. WATERSHED PROTECTION DISTRICT.** When a land development is in an incorporated city, and the development affects the facilities of the Ventura County Watershed Protection District, application for permits, plans, fees, bonds, agreements and deeds, as required, should be submitted and processed through the Watershed Protection Department, Permit Section.



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**CHAPTER 2**

**TRACTS**

**2000. TENTATIVE TRACT MAPS.** See Subdivision Map Act, and the Ventura County Subdivision Ordinance.

**2001. PROCEDURE.** The procedure for processing tentative maps is detailed in the Subdivision Ordinance. Apply for a Tract Map number at the County Surveyor Division.

**2002. DESIGN.** The considerations for design of tentative maps are detailed in the Subdivision Ordinance, Article 6. A copy of a "Tentative Map Information" check list may be obtained from the Planning Department.

**2100. FINAL MAPS.** See Subdivision Map Act.

**2101. PROCEDURE.** The procedure for processing final maps is detailed in the Subdivision Ordinance. After approval of the tentative map, make all submissions (maps, letters, reports, etc.) to the Division. Copies of checking sheets are available from the Secretary.

**2102. REQUIREMENTS.** Requirements for the Final Map are specified in the Subdivision Ordinance.

**2200. SUBDIVISION IMPROVEMENT PLANS.** See Subdivision Ordinance.

**2201. REQUIREMENTS.** Requirements for improvement plans are detailed in the Subdivision Ordinance, and in Chapter 1 "General Provisions" of this manual.

**2300. STREET LIGHTS.** The Subdivision Ordinance requires annexation to a Service Area of all properties proposed to be subdivided, unless waived by the Board. Street lights with underground wiring are required in subdivisions when specified in the conditions of approval. After Board of Supervisors action on the tentative map, the developer's engineer shall submit to the Division a copy of the tentative map showing the location and size of street lights to be placed in the subdivision. The developer's engineer will show the street lights on the street plans when they are submitted to the Division for review. The Estimate of Cost for the subdivision security shall include an amount for each street light required.

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**CHAPTER 3**

**PARCEL MAPS**

**3000. GENERAL.** Parcel map procedural requirements, in some respects, can be less burdensome than those imposed on tracts. Where necessary for protection of the health and safety of the public or where required improvements are prerequisite to the orderly development of the area, procedural and substantive requirements similar to those required for tracts may be imposed on parcel maps. Parcel maps will be subject to all land development policies of the County unless specifically excluded by conditions of approval of the tentative parcel map. (See Subdivision Ordinance.)

**3001. PARCEL MAP NUMBER.** Apply for a Parcel Map number at the County Surveyor Division.

**3100. PARCEL MAP.** See Subdivision Map Act and Subdivision Ordinance, for requirements. After approval of the tentative parcel map by the Planning Director, final parcel maps and improvement plans, if required, will be presented to the Division for checking.

**3200. IMPROVEMENTS.** If the tentative parcel map was conditionally approved, improvement plans and other documents may be required to be submitted to the Division, together with the final parcel map. The map will not be approved until improvement plans are approved and all conditions required prior to recordation have been met.

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**CHAPTER 4**

**CONDITIONAL USE PERMIT,  
DEVELOPMENT PERMIT, AND  
PLANNED DEVELOPMENT PERMIT**

**4000. GENERAL.** The County Zoning Ordinance provides for control of land development by zoning, and assigns responsibility for administration of the ordinance to the Planning Director. Decisions of approval or denial of proposed land use entitlements are performed by the Board of Supervisors, Planning Commission and Planning Director.

**4100. PROCEDURE.** The developer applies to the Planning Department for the desired clearance, permit or variance, in accordance with procedures specified in handouts available from that Department.

**4101. HEARING.** Unless the application can be approved by the Planning Director, a hearing must be scheduled before the Planning Commission for consideration of approval, and for specifying conditions of approval.

**4102. IMPROVEMENTS.** If the development is conditionally approved, any improvement plans required shall be submitted to the Division in accordance with the procedures specified in the General Provisions, Chapter 1 of this manual.

**4103. ZONING CLEARANCE.** Prior to the issuance of a Zoning Clearance, the appropriate conditions of the permit must have been satisfied.

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**CHAPTER 5**

**DRAINAGE**

**5000. POLICY.** See Subdivision Ordinance, "Drainage and Drainage Easements".

**5100. DESIGN CRITERIA.** The following general criteria are applied to the development design to comply with policy. Excellence of design, special precautions or alternate methods may be considered even though they are contrary to these criteria if it can be shown that future owners, neighbors and the County are protected in accordance with the policy.

**5101. DESIGN STORM CRITERIA.** Private ditches, channels, drains, levees, small dams, road improvements and all other private storm water carrying facilities shall be designed and constructed to the standards established by the Public Works Agency. Public roads and drainage facilities shall be designed in accordance with the Ventura County Road Standards and Ventura County Watershed Protection District Standards, where applicable.

**5102. WATERSHED PROTECTION DISTRICT STANDARDS** shall be observed for all facilities within their jurisdiction, and District approval shall be obtained on all improvement plans for such facilities. All land development projects need to be in compliance with the Countywide Stormwater Quality Management Program.

**5103. THE ROAD STANDARDS**, County of Ventura, Public Works Agency, approved by the Board of Supervisors, specify criteria for determining the maximum water carrying section of streets and roads.

**5104. STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION (GREEN BOOK STANDARDS)** include hydraulic structures which may be indicated on improvement plans by reference. Non-standard structures may be used, but must be fully detailed on the plans and supported by computation.

**5105. INTENSITY OF PRECIPITATION** shall be determined from the latest approved Isohyetal Map published by the Watershed Protection District, with proper correction factors given in the Hydrology Manual.

**5106. OVERLAND FLOW** shall be intercepted at the boundaries and directed through or around the development.

**5107. DITCHES AND CHANNELS THAT ARE LINED** shall be in accordance with the provisions of the Ventura County Watershed Protection District Design Manual.

**5108. MANHOLES** or access holes will generally be required (for access for inspection and maintenance) at angle points greater than 10 degrees, at junctions, at intervals specified in the Ventura County Watershed Protection District Design Manual, at locations where the conduit changes in size, and points where an abrupt flattening of the grade occurs. Manhole frames and covers shall be in accordance with the Ventura County Standards.

**5109. STORM WATER ACCEPTANCE DEEDS** may be required when storm waters are concentrated and discharged onto adjacent property. Diversions of storm waters are not allowed.

**5110. FLOOD PLAIN MANAGEMENT. SEE FLOOD PLAIN MANAGEMENT ORDINANCE.**

**5200. DRAINAGE CALCULATIONS.** It is important that the drainage calculations be accurate, complete and demonstrate that the Road Standards have been met, and that house pads are safe from hazard from a 100-year design storm.

**5201. HYDROLOGIC CALCULATIONS** shall be included in a report that includes the following items:

- a. A topographic map of all drainage areas affecting the land development.
- b. Calculations showing the determination of design flow including all assumptions and physical data. Generally, the modified Rational Formula shall be used for watersheds less than 1 square mile, and the Watershed Protection Method (See VCWPD Hydrology Manual) shall be used for Flood Control channels and for all watersheds in excess of 1 square mile.

**5202. HYDRAULIC CALCULATIONS** shall show the carrying capacities of all road cross-sections, pipes, channels and appurtenant structures. This should include consideration of any non-uniform flow conditions, entrance and exit conditions, critical depth, hydraulic jumps, scouring and silting velocities, head losses at obstructions and changes in cross sections, freeboard, super-elevation of water surface at curves, air entrainment, trajectory of flow at change in grades, coordination of hydraulic and energy grade lines of side drains, debris load and any other item affecting the proper functioning of the facility.

**5203. STRUCTURAL CALCULATIONS** shall include consideration of soil types, strength, weight, expansiveness, angle of internal friction and other pertinent characteristics in design of structures supporting, protecting or containing earth, or consisting of earth. Soils test results shall be submitted with the calculations.

**5204. SIGNATURE REQUIRED.** All sets of calculation sheets shall be signed and sealed by a civil engineer registered by the State of California.

**5205. SECONDARY STORM DRAIN INFORMATION.** When a land development project contains secondary storm drains, the developer's engineer shall provide the Division all pertinent Secondary Storm Drain Information.

Secondary storm drains are a category of drainage facilities which are not part of the "red-line" system formally recognized as major channels under the jurisdiction of the Ventura County Watershed Protection District.

Secondary storm drains outside County rights of way are generally maintained by the Homeowner's Association or the individual owners of the property the facilities traverse.

Secondary storm drains within County rights of way are maintained by the County's Transportation Department.

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**CHAPTER 6**

**GRADING**

**6000. GENERAL.** All grading for land development is subject to the Ventura County Building Code, which adopts the Uniform Building Code as amended by the Ventura County Building Code, referred to herein as the Grading Ordinance. The plan check fees, bonding and inspection fees are in accordance with the latest Board of Supervisors' approved fee schedule for land development and single lot grading, respectively. Appurtenances to grading (i.e., drainage devices, fences, walls, etc.) must conform to the Standard Land Development Specifications.

**6001. BUILDING OFFICIAL AND STAFF.** The Director is designated as the Building Official for administration of the Grading Ordinance.

Decisions of the Building Official concerning administration and interpretations of the Grading Ordinance including these policies and procedures may be appealed to the Grading Appeals Board in accordance with Section 6114 herein. County staff engineers or consultants review all engineering geologic and soils reports and grading plans submitted for a Grading Permit and make field investigations as necessary.

The County assigns engineers and inspectors to administer the Grading Ordinance, to review plans for compliance with the ordinance and to assure that engineered grading is being accomplished by the Engineering Professionals employed by the owner and to inspect work being performed as regular grading. Work may be stopped whenever the grading is not being performed according to plan or ordinance and whenever engineered grading is proceeding without continuous supervision and control of the Soils Engineer or his qualified representative.

**6100. SUBMISSION OF APPLICATIONS.** Submit applications and plans to the Development and Inspection Services Division.

**6101. APPLICATION AND PERMIT.** Application forms are available from the Development and Inspection Services Division. The Grading Application form and the grading plan become the Grading Permit upon approval by the County. The application must be signed by the owner or his authorized representative, provided that any bond required is furnished by the owner.

**6102. PERMIT SCOPE.** All permits shall include the provision that the applicant, his agent, contractors or employees, shall carry out the proposed work in accordance with the approved plans and specifications and in compliance with all the requirements of the Building Code.

### **6103. EXEMPTION FROM PERMITS.**

- A) In addition to Section 7003 of the Uniform Building Code, no permit is required for grading in the following areas:
1. Land on which water impounding structures are constructed under the direct control of the U. S. Department of Agriculture, Soil Conservation Service.
  2. The Grading Ordinance is not applicable to the construction of dams or reservoirs regulated or owned by the State of California or the Federal Government.
  3. The Grading Ordinance is not applicable on property owned by the State of California, publicly organized special districts or the Federal Government.
  4. Agricultural related grading pursuant to a Hillside Erosion Control Plan approved by the Resource Conservation District pursuant to the Hillside Erosion Control Ordinance as amended.

**6104. ENGINEERED GRADING PLANS.** If engineered improvements are required for the project, and/or the project involves more than 1,000 cubic yards, submit three prints of the grading plans for checking and processing in accordance with the General Provisions, Chapter 1 of this Manual. Plans shall be submitted on reproducible sheets no greater than 22" x 36", Section 7309 shall be complied with for "Record Drawings". Plans shall include all information indicated on the Grading Plan Check List. Existing contours and finished grades, including contours as necessary to show configuration of included surfaces, and all critical elevations shall be shown. Existing contours shall extend a sufficient distance beyond the property boundaries so that the relationship between the proposed grading and the adjacent property is clearly shown. Plans required under this section shall be prepared and signed by a Registered Civil Engineer and approved by signature of authorized County personnel.

**6105. REGULAR GRADING.** If there is less than 1,000 cubic yards involved and no improvements, such as engineered fills, engineered slopes or drainage devices, etc., necessary, submit 4 copies of plans. Approval will be by stamped endorsement of the prints. No reproducibles or "Record Drawings" (As-builts) will be required.

**6106. RETAINING WALLS AND FREE STANDING WALLS.** Building Permits are issued by Building and Safety, a Division of Resource Management Agency.

**6107. STAGED GRADING PLAN.** The Developer may desire to accomplish some grading of the site prior to approval of the improvement plans. In this case the grading plan may be approved, and a grading permit issued at the discretion of the Project Development Engineer. Soils and geologic reports will be required, and all other conditions of approval of a grading plan must be met. Grading plans processed in this manner must bear the following statement:

**CAUTION: STAGED GRADING PLAN**

This plan is approved as a staged grading plan only. This approval does not include approval for placement of base materials, or construction of curb and gutter or any other street improvements. Grades are subject to change before approval of the road improvement plans. (This note must be removed by change order at the time the road improvement plans are submitted for approval.)

**6108. MODIFICATION TO REQUIREMENTS OF THE GRADING ORDINANCE.** Modification of engineering requirements of the Grading Ordinance, such as steeper slopes or use of rock in shallow fills, will be made only on the basis of soils engineering reports, geological reports, etc., including recommendations for grading procedures and design criteria. Such reports must include calculations, where appropriate, allowing a quick check by County personnel. Anticipated modifications should be indicated at the tentative map stage and prior to engineering design. Approval of modifications shall be obtained prior to the issuance of a grading permit for either a grading plan or a staged grading plan.

**6109. CAUTION IN REGARD TO CUT/FILL LINE.** The construction of buildings across a cut-fill line should be avoided. Where such construction is necessary, the foundation material should be investigated on both sides of the line, and the foundation engineered to prevent differential movement.



**6110. ENGINEERING GEOLOGY AND SOILS ENGINEERING REPORTS.** Engineering geology and soils engineering reports must be submitted if required by the Building Official as provided by the UBC. Reports required by the Building Official must be submitted through the developer's engineer. Three copies of each report required plus one grading plan must be submitted to the Development and Inspection Services Division for review. County review of such reports shall be transmitted to the Engineer as well as the Soils Engineer and Engineering Geologist, as applicable.

The following criteria will be used for determining whether soils and geologic reports are required.

1. A soils engineering report shall be required if:
  - a. The depth of cut or fill is three feet or greater, or
  - b. The fill is to support structural footings, or
  - c. An engineered cut or fill is required.
2. An engineering geology report as well as a soils engineering report shall be required for projects in hillside areas and in other areas within the County where the County Staff Engineering Geologist believes geologic hazards may exist.

A hillside area is defined as one where any of the following conditions exist or are proposed within the project area or the area of any off-site work in connection with the proposed project:

- a. Finish cut or fill slope faces with vertical heights in excess of 10 feet.
- b. Existing slope faces steeper than 10 horizontal to 1 vertical, having a vertical height in excess of 10 feet.

**6111. EMPLOYMENT OF ENGINEERING PROFESSIONALS.** Prior to the issuance of a Grading Permit, the owner of land on which engineered grading is to be performed shall execute an agreement with the County to provide professional services. Such agreement shall be acknowledged by each of the professionals involved.

**6112. RESPONSIBILITIES OF ENGINEERING PROFESSIONALS.** The Engineering Professionals employed by the property owner on grading work will include the Civil Engineer, the Soils Engineer and the Engineering Geologist whose duties will include those outlined in the Building Code.

**6113. RELEASE OF ENGINEERING PROFESSIONS.** Since each of the engineering professionals employed in grading has a responsibility for certification of the work on completion of the project, none of the engineering professionals should be changed during the course of the project. If a change must occur, the new engineering professional must satisfy himself as to the work performed by his predecessor through certifications from his predecessor, field review, soil exploration and testing, or combinations of these or by other methods so that he will be able to certify the entire project on completion. When changes are being made, grading shall stop until the new professional has agreed to take responsibility for the work and the old professional has submitted a report acceptable to the County documenting all work accomplished under his observation or, in the event no work has taken place, a letter so stating.

The Civil Engineer shall sign and place his registration stamp and number on the grading plan. The Soils Engineer and Engineering Geologist shall also indicate, by a suitable statement, signature, registration, certification stamp, number and date on the grading plan submitted to the County, that the plan incorporates all recommendations made by them.

**6114. APPEALS.** The Grading Appeals Board, as established by the Ventura County Building Code, operates in accordance with rules set forth in this section.

1. Meeting Schedule.

- a. The regular meeting time of the Grading Appeals Board is 2:00 p.m. on the fourth Tuesday of each month. The regular meeting place is Conference Room No. 331, in the Ventura County Government Center Administration Building, 800 South Victoria Avenue, Ventura, California. The Grading Appeals Board may revise the time and place of its meetings by filing notice of such change with the Clerk of the Board of Supervisors.
- b. Regular meetings will be held only when all members of the Grading Appeals Board are notified in advance by the Executive Secretary.
- c. Special meetings may be called by the Chairman or the Executive Secretary.
- d. Meetings may be adjourned by the Board should the Board be unable to complete their business during the regular or special meeting, or fail to have a quorum, or find it necessary to delay completing action on an appeal to obtain additional evidence.
- e. Notices of regular, special, and adjourned meetings will be given in accordance with the current Brown Act requirements in effect at the time (Sec. 54950 et al. of the Government Code).

## 2. Attendance and Quorum

- a. A quorum of the Board for the transaction of business shall be three members and the Executive Secretary.
- b. Should any member of the Grading Appeals Board, other than a County Building Official, be involved in an action before the Appeals Board, he shall not sit on the Appeals Board during hearing, consideration and decision on such action.
- c. Meetings of the Board will be open to the public, in accordance with the current Brown Act requirements in effect at the time (Government Code).

## 3. Voting

- a. The Chairman may vote.
- b. All actions of the Board shall be decided by a majority vote of those members present.
- c. A tie vote on an appeal shall be considered a vote to deny the appeal and to sustain the decision of the Building Official.

## 4. Records

A written record of the actions of the Appeals Board shall be maintained by the Executive Secretary.

## 5. Policy Changes

The Appeals Board may recommend to the Board of Supervisors that policies supporting the Building Code be changed but shall not, through their decisions, attempt to change such policies.

## 6. Filing Appeals

- a. Appeals shall be filed at least twelve days prior to the regular meeting day of the Board.
- b. All appeals to the Board shall be made in writing and submitted together with all supporting evidence.
- c. An appeal filing is prescribed by Resolution of the Board. No appeal will be considered until the filing fee is paid.

## 7. Processing Appeals

- a. The County shall file a written statement supporting its position on the appeal, together with supporting evidence.
- b. Copies of the appeal and the County's statement will be made available to all members of the Board and the appellant prior to the date set for the hearing.

## 8. Hearing Appeals

- a. The appellant and/or his technical representatives shall be present at the Board Hearing to give oral testimony and to answer questions of the Board.
- b. The County's technical representative shall be present at the Board Hearing to give oral testimony and to answer questions of the Board.
- c. The County shall present the evidence supporting its action first, followed by the appellant's presentation of evidence supporting his appeal. The Board may then question both parties before closing the evidence portion of the hearing. The Board may also adjourn to allow gathering of additional evidence before closing the hearing.
- d. Following closing of the hearing, the Board shall deliberate on the evidence before making a decision on the appeal.

## 9. Decision on Appeals

- a. The decision on any appeal shall be furnished in writing to the appellant and to the County within seven working days after the regular meeting date of the Board unless a delay is agreed to by both the appellant and the County.
- b. The reasons for denial of an appeal shall be made known to the appellant in writing if he so requests.

**6200. BONDS REQUIRED.** The Building Official has determined, pursuant to UBC, that a performance bond shall be posted with the Building Official by an applicant for a grading permit before the permit is issued when either of the following conditions exist:

- a. The grading is for a subdivision or other land entitlement where the sale or lease of all or portions of the property normally occurs.
- b. In the opinion of the Building Official for single lot grading, unusual hazard may be expected to result from a partially completed grading project.

**6201. BOND FORM.** The Bond shall be as prescribed in the Ventura County Bond Book.

**6202. AMOUNT OF BOND.** The face amount of the bond shall be not less than the following:

- a. For projects described in Section 6200(a) hereof: The estimated cost of completing all grading, drainage work, geologic hazard repair work, storm damage precaution measures and any other work required by the grading permit.
- b. For projects described in Section 6200(b) hereof: The estimated cost of performing any corrective work necessary to protect adjacent property should grading, drainage and other work be stopped at any point in the course of the project.

**6203. CONDITIONS.** Every bond shall include the conditions that the permittee shall:

1. Comply with all of the provisions of the Building Code, applicable laws, and ordinances;
2. Comply with all of the terms and conditions of the permit for the excavation or fill to the satisfaction of the Building Official;
3. Complete all of the work contemplated under the permit within the time limit specified in the permit. (The Building Official may, for sufficient cause, extend the time specified in the permit, but no such extension shall release the surety upon the bond.)
4. Guarantee that the permittee shall remedy any defects in the work and pay for any damages to other work or property resulting therefrom, which may appear within one year from the date of final acceptance of the work under the permit.

**6204. BOND REDUCTION.** The amount of the bond required pursuant to Section 6202 may be reduced under any of the following conditions:

1. Where the permittee requests reduction of the bond amount after completion of a portion of the work and the Building Official finds that reduction of the bond amount would not be adverse to the public interest and would be of substantial benefit to the permittee. Only one such reduction is allowed prior to completion of all grading.

The reduction in bond amount shall be at the discretion of the Building Official, but not more than 80% of the value of the work completed. The face amount of the bond after reduction shall not be less than \$10,000, or the original amount of the bond, whichever is less.

2. On satisfactory completion of all work required by the permit with the exception of the one year guarantee. The reduction in bond amount shall be at the discretion of the Building Official but not more than 90% of the original bond amount. The face amount of the bond after reduction shall not be less than \$10,000, or the original amount of the bond, whichever is less.

Where surety bonds are used, reduction in bond amount will be processed only at the time an additional premium is to be paid by the permittee. All other types of security may be reduced as prescribed above.

**6205. FAILURE TO COMPLETE WORK.** The term of each bond shall begin upon the date of permit issuance and shall remain in effect until exonerated in accordance with Section 6206 below. In the event of failure to complete the work or failure to comply with all of the conditions and terms of the permit, the Building Official may order the work described in the permit to be completed to his satisfaction or cause the performance of all necessary corrective work to eliminate hazards caused by not completing the work. 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 incurred or expended by the County in causing any and all such work to be done. In the case of cash deposits, any unused portion thereof shall be refunded to the permittee at the time prescribed for exoneration of the bond.

**6206. BOND DURATION.** Any bond posted pursuant to Section 6200 shall remain in full force and effect until one year after a certificate of completion is executed by the Building Official, unless exonerated at an earlier date by the County. For a period of one year after execution of the certificate of completion, the principals shall perform all maintenance and comply with all requirements and conditions of the permit and the Building Code.

**6300. Ventura County Building Code - SUBSURFACE DRAINAGE.** In addition to subsurface drainage facilities required to insure slope stability, subdrains are required under all fills placed in natural drainage courses along the drainage course flowline or in any areas of active or potential springs or seeps which will be covered by fill and under all fills where recommended by the Soils Engineer or Engineering Geologist. Subdrain designs shall be based upon the recommendations of the Soils Engineer and Engineering Geologist.

**6301. Ventura County Building Code - DISPOSAL (OF SURFACE WATERS).** Before the Building Official will authorize the discharge of water onto any road, drain or disposal in accordance with Ventura County Building Code, the permittee shall satisfy the Building Official that such discharge, both during construction and following construction, will not cause damage to public or private property. To insure that this requirement is met during the construction period, the permittee shall comply with the following:

- a. Storm damage precautions shall be provided during the rainy season to prevent damage to public and private property of others by flooding, saturation, erosion, deposition of debris and any other damage related thereto resulting from the grading operations.
- b. The rainy season, as used herein, shall mean the period between October 15 and April 15 of the following year. Plans for storm damage precaution measures shall be submitted to the Building Official by September 15 or with permit application when application is submitted between September 15 and April 15 for approval. The protective measures or devices shall be installed by November 1 or as grading progresses and maintained in good working order until April 15 of the succeeding year unless their removal at an earlier date is authorized by the Building Official.
- c. The Civil Engineer shall be responsible for the design of storm damage precaution measures and will supervise their installation and maintenance in accordance with the plans. No devices or precaution measures shall be moved or modified without submitting revised plans to the Building Official.
- d. Devices to reduce storm damage within the site are left to the discretion of the Civil Engineer, but these devices must be shown on the plans because their presence may affect the functioning of the required control measures.
- e. Should the owner fail to submit the plans or fail to provide the protective measures required by the dates specified herein, it shall be deemed a failure to comply with the terms and conditions of the permit as provided in Section 6205.

**6304. VENTURA COUNTY BUILDING CODE - EROSION CONTROL.** Specifications for erosion control for landscaping and irrigation systems or other erosion control measures, where required, shall be submitted for review and approval prior to issuance of grading permits. The following measures are required to reduce erosion.

- a. Paved interceptor drains shall be installed along the top of all cut slopes where the tributary drainage area above slopes towards the cut and has a drainage path greater than 40 feet measured horizontally. Interceptor drains shall be paved with a minimum of three (3) inches of concrete or gunite and reinforced with wire mesh. They shall have a minimum depth of 1.5 feet and a minimum paved width of four (4) feet measured horizontally across the drain.
- b. Downdrains for terrace and interceptor drains shall be of concrete or gunite open channel construction, pipe, or equivalent. All downdrains shall outlet directly into approved paved drainage channels, roads, storm drains or natural drainage courses at the flowlines.
- c. Planting of all graded areas where recommended by the soils engineer or required as a mitigation measure in the applicable environmental document, or as a condition of approval of the underlying development permit.

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**CHAPTER 7**

**CONSTRUCTION**

**7000. GENERAL.** When the improvement and grading plans have been signed and the permits issued by the Director, the inspection of the land development is assumed by the Construction Engineer. The Construction Engineer will assign an inspector to insure that the grading and the construction of the improvements meet the minimum requirements of County ordinances and standards. This assignment in no way relieves the developer from the responsibility for meeting the requirements of the plans, permits, Building Code, and the Standard Land Development Specifications or for assuring construction in accordance with recommendations of the Soils Engineer and Engineering Geologist. Prior to any construction, the Developer shall schedule a pre-construction conference with the Construction Engineer. The Developer shall insure that the civil engineer, soils engineer, engineering geologist and contractors attend the conference.

**7100. DEVELOPER'S ENGINEER.** The Developer is required to sign an agreement to retain the services of a Registered Civil Engineer (Developer's Engineer) to represent him during the course of construction. Whenever there is a problem in the field, the Construction Engineer will contact the Developer's Engineer to take corrective action. This may be accomplished by the issuance of a Warning of Non-Compliance.

**7200. CHANGE ORDERS.** During the course of construction, change orders may be required to authorize the Developer's Engineer to change the plans and to direct the contractor to perform the construction in accordance with the changed plans. Change orders are handled as minor change orders or as major change orders. All change orders involving another jurisdiction's facilities shall be reviewed and approved by that jurisdiction prior to submittal to the Construction Engineer. It shall be the prerogative of the Construction Engineer to determine if the requested changes are minor or major changes. No requests for change orders will be processed without the change order slip signed by the Developer's engineer and accompanied by supporting calculations, reports and plans which reflect the change(s).

**7201. MINOR CHANGE ORDERS.** The Construction Engineer may approve or deny a minor change order by signing a change order slip and marking it "minor change order". The Developer's engineer shall submit a signed change order slip together with four sets of red-line mark-ups to the Construction Engineer. If approved, the Developer's Engineer will be given an approved change order slip and one set of approved mark-ups. This minor change order shall be reflected on the plans, indicating the revision, citing "minor change order" and indicating date of approval, prior to submittal of Record Drawings (As-builts).



**7202. MAJOR CHANGE ORDERS.** On request of the Developer's Engineer, the Construction Engineer will issue a change order slip. The change order slip, signed by the Developer's Engineer must be submitted with two marked-up prints to the Construction Engineer for plan check. On completion of plan check, the Developer's Engineer will revise the original drawing and submit it to the Construction Engineer for County approval. Three prints plus an approved reproducible of the approved change will be made by the County prior to release of the original to the Developer's Engineer.

**7300. GRADING INSPECTION.** Inspection of grading is accomplished under the Building Code. The Building Code is directed particularly to grading of private property. The responsibilities of the Developer, Developer's Engineer, Developer's Soils Engineer, and Developer's Engineering Geologist are assigned under the Grading Ordinance. Omissions from the plans of any work required by the Grading Ordinance will not excuse the developer from any responsibility for compliance.

**7301. NOTIFICATION OF CONSTRUCTION ENGINEER.** The permittee on engineered and regular grading projects shall notify the Construction Engineer at the following stages during the grading operations:

- (a) After each area on which fill (including buttress and sliver fills) is to be placed is prepared to receive the fill but before any fill is placed.
- (b) Immediately prior to commencement of grading in that area where hazardous geologic or soils conditions are indicated in preliminary reports or on the plans or where such conditions are determined during grading.
- (c) After cut and fill slopes are completed to their final slope and grade but before any concrete, planting, irrigation system or other erosion control provisions have been installed.
- (d) Upon completion of all rough grading operations and the installation of erosion control provisions.
- (e) Upon completion of all grading work.

On regular grading projects, work shall not continue until the Soils Engineer inspects the site and approves the work previously completed. On engineered grading projects, work shall not continue until the supervising Civil Engineer has inspected and approved the work previously completed.

**7302. MODIFICATION OF PLANS.** Any proposed modifications of the approved grading plans must be submitted to the Building Official for approval via Change Order procedure. Justification by the Civil Engineer and Soils Engineer and/or Engineering Geologist, as appropriate, for the modifications must accompany the Change Order. If soil and/or geologic conditions are encountered during grading which require modification of plans, recommendations for corrective measures and/or change of plans must also be submitted by Change Order. No grading work in connection with the proposed modifications will be permitted without an approved change order. See Section 7200 of this manual for Change Order procedure.

If the Building Official finds any existing conditions differing from those stated in the grading permit or shown on approved plans, he may refuse to allow further work until the conditions are corrected or until approval is obtained for a revised grading plan.

**7303. DRAINAGE INSPECTION.** Inspection of drainage facilities, other than within County rights-of-way or storm drain easements, is also accomplished under the Building Code.

**7304. GRADING PLANS - NOTIFICATION OF NON-COMPLIANCE.** The Building Official may issue a "Warning of Non-Compliance" to the Civil Engineer or his representative on the project, when a violation of plans, specifications or the Building Code is in evidence. If it appears that the final acceptance of work on the project may be unreasonably jeopardized, a "Stop Work Notice" will be distributed to the following:

- a. The Civil Engineer
- b. The Soils Engineer
- c. The Contractor
- d. The Developer

The Public Works Agency will not process acceptance of any project until all work has been performed to correct the violations specified in all "Warnings of Non-Compliance" or "Stop Work Notices" for the subject project.

**7305. GRADING REPORTS.** The Building Official requires that the compaction test data, including results, locations and elevations, be available for inspection on the site at all times during business hours; and interim reports are to be mailed upon request to the Construction Engineer. The method of reporting shall be determined at the preconstruction conference at the discretion of the Construction Engineer. Final soils and geologic reports shall be submitted to the Construction Engineer upon completion of the grading.

The Building Official requires sufficient inspection by the Engineering Geologist to assure that all geologic conditions have been adequately considered. Where geologic conditions warrant, the Building Official may require interim geologic reports. These reports may be required to include, but need not be limited to, reporting on field investigation or inspection of: cut slopes; canyons during clearing operations; groundwater; earth material conditions; benches prior to placement of fill; and possible spring locations.

**7306. CERTIFICATIONS.** When rough grading is completed and prior to issuance of Building Permits, interim reports and rough grading certifications shall be submitted to the Construction Engineer. Upon approval of the reports, certifications and on-site conditions, the Construction Engineer will clear lots with the Division of Building and Safety for issuance of Building Permits.

The final grading reports and final grading certifications shall be submitted to the Construction Engineer when all grading is completed, including drainage devices and erosion control.

**7307. CERTIFICATION OF GRADING BY GRADING CONTRACTOR.** The owner of land on which engineered or regular grading is performed shall, upon completion of grading, provide certification of the grading by the Grading Contractor. The owner may sign the certification if the work was not done by a licensed Grading Contractor (provided the work was not required to be performed by a contractor licensed pursuant to the State Contractor's Licensing Law).

**7308. RECORD GRADING PLANS.** Upon completion of the grading work, the Civil Engineer shall prepare a "Record" (As Built) grading plan. The Soils Engineer and the Engineering Geologist shall indicate by a suitable statement, signature, and date on the original "Record" (As Built) grading plan that it agrees with the results of the work for which they were responsible as determined by field inspection. The Civil Engineer shall also indicate on the original "Record" grading plan that the grading was completed in accordance with the "Record" plans.

**7309. SIZE OF PLANS.** Although grading plans may have been submitted for checking and construction on sheets larger than 22" x 36", they must be resubmitted as "Record" Drawings in a series of 22" x 36" sepia prints (made with proper overlaps) with a County standard title block on each sheet.

**7400. IMPROVEMENT PLANS - NOTIFICATION OF NON-COMPLIANCE.** The Construction Engineer may issue a "Warning of Non- Compliance" when a violation of plans or specifications is in evidence. If it appears that the final acceptance of work on the project is being jeopardized, a "Stop Work Notice" will be issued. Copies of "Warnings of Non-Compliance" and "Stop Work Notices" will be sent to the following:

- a. The Civil Engineer
- b. The Contractor
- c. The Developer

The Public Works Agency will not process acceptance of any project until remedial work has been performed to correct the violations specified in all "Warnings of Non-Compliance" or "Stop Work Notices".

**7401. RECORD IMPROVEMENT DRAWINGS.** (Subdivision Ordinance As-Built Plans). The Developer's Engineer shall submit the original drawings of the improvement plans with three sets of prints. The originals shall have been modified to reflect the "completed" condition of the grading and the improvements, and shall state that all work has been constructed in accordance with the lines and grades shown on the Improvement Plans. Submission of "Record" Drawings is required before a final inspection will be scheduled.

**7500. STRUCTURAL SECTION INSPECTION.** The Developer is required to sign an agreement to pay for the soils engineering required by the County for design and inspection of the structural section of all roads in dedicated rights-of-way, and any other roads which may become the maintenance responsibility of the County.

**7600. PRIVATE DRIVES.** If a road meets the County criteria for a private drive, and there is provision and understanding that the County will never have to assume maintenance responsibility for the road, the road may be constructed as a private drive, without payment of County inspection fees for inspection of road improvements. The inspection of grading and drainage, and the inspection of work encroaching in the County right-of-way will be performed under the grading and encroachment ordinances. If there is any probability that the future owners may wish to have the private drive dedicated to the County, the developer should ask for County inspection of construction. Road name signs for private roads shall include the word "Private" below the street name.

**7700. TIME EXTENSIONS.** The Developer should file for time extensions for construction with the Construction Engineer at least 30 days in advance of expiration of the improvement agreement. The fees required will be in conformance with the applicable fee resolution.

**7800. FINAL INSPECTION.** A final inspection will not be scheduled prior to submission of "Record" plans and a certification that all improvements have been constructed in accordance with the approved plans and are in condition to be accepted for maintenance by the County. The Developer's Engineer must be one of the inspection party.

**7801. PUNCH LIST.** The Developer will normally have ten days from date of receipt of Punch List in which to complete the correction of the items on the punch list. At the discretion of the Construction Engineer, the punch list may be canceled after the tenth day and require a final re-inspection of the entire project.

**7900. BOND REDUCTION.** When requested by the developer and in accordance with the provisions of the Bond Book, the Performance Bonds may be reduced to not less than 50 percent of the original amount when the required construction of public improvements is more than 50% completed. The Payment (Labor & Materials) Bond cannot be reduced. For reduction of the Grading Bond, see Section 6204 of this Manual.

**7901. BOND EXONERATION.** Performance Bonds will be exonerated after satisfactory completion of the improvements and all Punch List work, acceptance of the work by the Director, and receipt of any guarantee security required by County Ordinance Code. Payment (Labor and Materials) Bonds will remain in effect and will be automatically exonerated 90 days from the date of this letter, pursuant to Government Code Section 66499.7 and Section 3115 and 3116 of the Civil Code of the State of California. For exonerated of Grading Bonds, see Section 7206 of this Manual.

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**CHAPTER 8**

**REINFORCED SOIL WALLS AND SLOPES**

**8000. GENERAL.** The following design guidelines and criteria were prepared in order to assist applicants and consultants submitting geotechnical reports for reinforced earth slopes and walls. These requirements are intended to provide an explicit statement of the minimum scope of work needed for project approval. Their implementation will expedite report review and provide a consistent basis for evaluation. Site specific conditions will sometimes require deviation from these standards in accordance with sound engineering and geologic practice.

Consultants are encouraged to contact the Public Works Agency to discuss the scope of work required on individual projects, prior to report submittal. Refer to Figures 1 and 2 for Definition of Terms and Modes of Failure for Reinforced Soil Walls. Manufacturer representatives should be contacted, as required, for assistance during the planning, design and construction phases of reinforced slope and soil wall projects. Technical design and cost-estimating assistance is available from the manufacturers.

**8001. SUBSURFACE INVESTIGATION.**

1. Sufficient number of exploratory excavations required to adequately define stratigraphy, soil properties and structural features.
2. Minimum one boring to 40' or 10' below true water table, whichever is greater.
3. Borings or trenches extend minimum 10' into bedrock or competent bearing material and below lowest elevation critical failure plane with respect to global stability.
4. Soil and bedrock materials in exploratory excavations on hillside projects logged and USCS-classified by an engineering geologist. Lithostratigraphic classifications required (alluvium, colluvium, terrace deposits, weathered and unweathered bedrock, etc.).
5. All borings in bedrock require downhole logging by engineering geologist.
6. Provide top-of-hole elevations on all logs.
7. Provide graphic logs for all trenches.
8. Provide undisturbed and bulk samples of all surficial soil types, highly weathered bedrock, poorly consolidated and soft sedimentary bedrock.
9. Maximum undisturbed sample interval of 5'.
10. Sampler type, size, drive weight, drop shown on log.
11. Groundwater seepage, water table shown on log.

**8002. LABORATORY TESTING.** The purpose of the soil laboratory testing program is to define appropriate soil engineering parameters required for wall design and to provide a basis for the assumptions made in slope stability analyses.

1. Moisture/density of all undisturbed samples.

#### Reinforced Soil

2. Remolded direct shear strength of reinforced soil (ASTM D 3080). Minimum acceptable  $\phi_r$  angle =  $13^\circ$ .
3. P.I. of Reinforced soil (ASTM D 4318). Maximum acceptable P.I. = 10.
4. Moist unit weight of reinforced soil ( $\gamma_r$ ).
5. Particle size analysis of reinforced soil (ASTM D 422). Maximum allowable % Passing #200 sieve = 50. Maximum particle size = 3".
6. Compaction tests (ASTM D 1557) of reinforced soil.
7. Corrosion series (pH,  $SO_4$ , C1, resistivity) for soil in contact with metal or concrete reinforcing elements.

#### Backfill Soil

8. Remolded direct shear strength of backfill soil ( $\phi_b$ ).
9. Moist unit weight of backfill soil ( $\gamma_b$ ).
10. Compaction tests of backfill soil.
11. Particle size analysis of backfill soil. Maximum particle size = 6".

#### Foundation Soil

12. Undisturbed direct shear strength of foundation soil ( $\phi_f, c_f$ ).
13. Moist unit weight of foundation soil ( $\gamma_f$ ).
14. Consolidation test(s) of foundation soil (ASTM D 2435). Not required for bedrock.

#### Drainage Fill

15. Shear strength of drainage fill ( $\phi_d$ ).
16. Moist unit weight of drainage fill ( $\gamma_d$ ).
17. Particle size analysis of drainage fill. Maximum 5% passing #200 sieve.

### Insitu (Natural) Soil/Rock

18. Shear strength of insitu soil ( $\bar{\sigma}_i$ ,  $c_i$ ).
19. Moist unit weight of insitu soil ( $\bar{\rho}_i$ ).

### **8003. DESIGN AND STABILITY ANALYSIS.**

1. Design should follow the procedures outlined in the manufacturer's design manual(s). Copies of all manuals, computer programs and diskettes should be available to the Public Works Agency in order to verify results.
2. Sufficient illustrations should be provided to show terms, parameters, and results.
3. Graphical plots should be provided showing critical failure modes and minimum F.S.
4. Disregard soil cohesion in the reinforced and backfill zones.
5. Piezometric conditions should be modeled as appropriate.
6. Provide for all surcharge loads.
7. Use computer search for minimum F.S.
8. Provide printouts of input and output data.
9. Minimum F.S. in accordance with Table I.

## 8004. REPORT.

1. Provide recommendations for geogrid type or material specifications. Minimum: 120 year lifespan, UV stable.
2. Provide geogrid design and placement recommendations, including fill placement and compaction, observation and testing.
3. Provide grading, drainage and erosion recommendations.

TABLE I  
MINIMUM FACTOR-OF SAFETY

External:	Sliding	1.5
	Overturning	2.0
	Bearing Capacity	2.0
Internal:	Pullout	1.5
	Tensile Overstress	1.5
	Local: Overturning	2.0
	Local: Sliding	1.5
	Local: Facing	1.5
	Local: Facing Connection	1.5
Global:	Circular	1.5
	Wedge (where appropriate)	1.5
	Seismic	1.1



## **8005. REFERENCES.**

ASTM 1992 Annual Book of Standards, Volume 4.08: Soil and Rock; Dimension Stone; Geosynthetics.

Mirafi, Inc., Design Methodology for Miragrid Reinforced Soil Retaining Walls.

Mirafi, Inc., Design Methodology for Mirafin Reinforced Soil Slopes and Embankments.

The Tensar Corporation, Slope Reinforcement with Tensar Geogrids, Design and Construction Guidelines.

The Tensar Corporation, Design Guidelines for Tensar Geogrid Reinforced Soil Walls with Modular Concrete Facing Units.

Transportation Research Board (1987), Reinforcement of Earth Slopes and Embankments, Report No. 290.