



GRADING FIELD INSPECTION **REQUIREMENTS**

CITY OF ORANGE
PUBLIC WORKS DEPARTMENT

REV. OCT 2015

Required Inspection for Grading

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

- A. Initial (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. Completion of water quality BMPs
- H. Final grading

Inspection for each of these areas is 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, Soils Engineer, Geologist, Design Engineer and the Grading Contractor.
- 2. Request for inspection must be made 24 hours in advance. Include job address and job number.

B. Excavation and Fills:

- 1. Toe and key for slope fills.
- 2. Canyon Clean-Out
- 3. After all brush and unsuitable material has been removed and a suitable bottom or bedrock has been exposed, but before any fill is placed.
- 4. Subdrains
- 5. 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.
- 6. Over Excavation.
- 7. Excavation
- 8. After the excavation is started but before the vertical depth of the excavation exceeds ten (10) feet.
- 9. Fill
 - a. 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)

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- b. 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 that line and grade of forms is within .02' of the approved precise grading plan.
 - c. Concrete Placement
 - d. Inspection(s) to be made during placement. When design strength of the concrete is 2,500 PSI or greater, continuous inspection by a Deputy Inspector shall be required.
 2. Curb and gutter (private property and non-dedicated streets)
 - a. Subgrade (prior to placement of concrete)
 - b. Subgrade is to be made and forms in place. The Design Engineer or Architect shall provide written approval that line and.
 - c. Concrete placement. Inspection(s) to be made during placement.
 3. Terrace drains, down drains, brow ditches and all other paved drainage devices.
 - a. Subgrade
 - b. Prior to placement of welded wire mesh or reinforcing steel, the Design Engineer or Architect shall provide written approval of line and grade.
 - c. Thickness control wire and reinforcing steel or welded mesh to be installed prior to placement of gunite or concrete.
 - d. Concrete or gunite placement
 - e. Inspection(s) to be made during placement.
 4. Sidewalks used as drainage devices
 - a. Subgrade - Prior to placement of concrete subgrade is to be made, forms are to be in place with the required reinforcement. The Design Engineer or Architect shall provide written approval that 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 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 Soil Engineer Report).
 1. Subgrade - After subgrade has been established, tested and approved by the Soil Engineer but prior to placement of base. The Soil Engineer or his qualified representative shall leave field memo of test results on site. The Design Engineer or Architect shall provide written approval that line and grade is within .04'.
 2. Base (material invoices may be required): After base course has been placed, tested and approved by the Soils Engineer or his qualified representative but prior to prime coat and

asphalt placement. The Soil Engineer or his qualified representative shall leave a field memo on-site to provide compaction test and base thickness results.

3. It may be necessary, as determined by the Grading Inspector, to have the rock base tested to insure its compliance with Grading Ordinance and job specifications. Required test may include:
 - a. Sieve and analysis
 - b. "R"-value
 - c. Sand equivalent
 - d. Durability index
 - e. % of crushed particles retained by #4 screen
4. Asphalt (material invoices may be required): Weed killer shall be required on subgrade if no aggregate base is used.
5. Inspection shall be made during asphalt lay down to verify continuous inspection by the Soil Engineer, his qualified representative or a Deputy Inspector when authorized.
6. Water Test: Paved surface shall be water tested to reveal any irregularities and patched where required.

F. Rough Grading

1. 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 shall be in place and approved as a condition for rough grading release.

G. Completion of Water Quality BMP

1. Final inspection shall be made to ensure the completion and functionality of water quality BMPs.
2. Final inspection shall be made to verify that structural and treatment BMPs have not been disturbed during final grading and the dimensions and flow line remain as designed.
3. Make sure that planting of proper vegetation in the natural treatment systems such as bioswales, basins, wetlands, buffers, etc. is complete.
4. Verify that underground vaults and in-line filters are correctly installed as shown on the plans.

H. Final

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

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.