SECTION 111

GRADING

111-1 GENERAL - Grading improvements shall include: excavation and embankment work for channels, pads and roadways, erosion control measures and retaining walls. These improvements shall be installed in accordance with the approved improvement plans, these Construction Standards, the latest edition of the California Building Code, (CBC), the City of Roseville Grading Ordinance, the SWRCB Construction General Permit No.CAS000002, (WQ ORDER No. 99-08-DWQ), The City of Roseville Stormwater Ordinance, and the latest edition of The State of California Department of Transportation Standard Specifications hereinafter referred to as the Caltrans Standard Specifications.

The City of Roseville has adopted Stormwater Quality Design Standards to reduce water pollution generated by urban runoff. These design standards are detailed in the Stormwater Quality Design Manual for the Sacramento and South Placer Regions. This Manual is available on-line at the Sacramento Stormwater Management Partnership website, www.sacramentostormwater.org/SSQP/SSQP.asp. The manual can also be purchased at the City's Permit Center located on the first floor of the Civic Center Building at 311 Vernon Street downtown Roseville.

111-2 CONSTRUCTION STAKING - Construction staking shall be provided by the Developer for all grading improvements as indicated below including adjacent to wetlands per 111-3.G: Cut sheets shall be on-site and shall be furnished to the City's Construction Inspector upon request.

A. Channels - Channel staking shall provide the station and offset, as well as the cut to the nearest 0.1 foot. Stakes shall be provided at a minimum of every 50 feet in tangent sections and every 25 feet in curved sections.

B. Erosion Control Measures - Erosion control measures shall be staked per the approved plans. Erosion control requirements shall apply to all construction sites regardless of size, which involve disturbed soil. Sites exceeding 1 acre of disturbed surface area are subject to the Storm Water Pollution Prevention Plan (SWPPP) requirements. Owner's SWPPP must be approved by the City prior to the commencement of grading operations.

C. Pads - Pad staking shall provide the station and offset, as well as the cut to the nearest 0.1 foot. Stakes shall be provided at each property corner, front and rear.

D. Retaining Walls - All retaining wall shall be staked for line and grade to the nearest 0.1 foot.

E. Roadways - Roadway excavation staking shall provided the station and offset, as well as the cut to the nearest 0.1 foot. Minimum staking intervals shall be 50 feet in tangent sections and 25 feet in curves. Stakes shall also be placed at curve beginnings, ends, points of reverse curvature, points of compound curves, horizontal angle points and at changes of grade.

111-3 INSTALLATION - All grading improvements shall be installed in accordance with provisions in Chapter 33 of the UBC, recommendations of site specific geotechnical reports and geotechnical engineer, provision in Sections 16 through 19 of the Caltrans Standard Specifications, the approved improvement plans and per the following specifications:

A. Channels - All fill areas in channels shall receive suitable fill material to be compacted to a minimum of 90 percent relative compaction. The Developer's geotechnical engineer will determine suitable fill material. Unsuitable materials shall be removed from the channel and replaced with suitable backfill material based on recommendations provided by a State of California licensed geotechnical engineer.

B. Erosion Control Measures - Construction sites shall have required erosion and sediment control measures in place between October 1 and April 30. All projects adjacent to creeks, wetlands, vernal pools, drainage ditches, and Stormwater drain inlets shall have adequate sediment control measures in place prior to ground disturbance regardless of time of year. If construction is in progress, the Contractor shall ensure that the construction site is prepared prior to the onset of any storm. For Stormwater quality compliance information, refer to the City's Storm Water Quality Best Management Practices (BMP) Guidance Manual for Construction Activities, latest edition. Waterways under the jurisdiction of governmental agencies other than the City of Roseville may be subject additional erosion control measures or criteria and is the responsibility of the Developer/Owner. City of Roseville erosion control provisions shall include, but are not limited to:

1. Broadcast Seed - Where required, broadcast seed shall be applied as follows:

Brando Brome	12 lbs/acre
Rose Clover	9 lbs/acre

Areas with sandy, dry soil shall receive:

Zorro Annual Fescue	6 lbs/acre
Rose Clover	9 lbs/acre

A fertilizer consisting of 16-20-0 shall be applied at a rate of 500 pounds per acre. If hydroseeding/mulching is used, seed quantities shall be increased by 30 percent.

Seed for creek banks shall conform to the latest requirements of the California Department of Fish and Wildlife.

2. **Drainage Areas -** All bare areas, regardless of slope, within 50 feet of natural drainages and active stormwater collection systems shall be covered with straw, erosion control blankets, hydromulch, or other types of soil stabilizers suitable for elimination soil migration. A City Stormwater Inspector may require additional control measures be installed if deemed necessary.

   No grading or trenching, except as required for erosion or sediment control, shall occur within 35 feet from the centerline of perennial and intermittent drainage swales between October 1 and April 30 unless approved by the Engineering Division, as well as any other governmental agency which may have additional jurisdiction and/or requirements.

3. **Dust/Mud Control -**

   a. **Construction Access -** Where construction traffic accesses a project, on or off public streets, the contractor shall have in place prior to the start of grading, a construction access conforming the City's Stormwater Quality Best Management Practices Guidance Manual. Alternative tracking control measure will be considered provided they are equally or more effective than specified. Construction access locations shall be maintained during the course of construction.

   b. **Adjacent Streets -** Adjacent street frontages shall be kept clean at all times. When tracking has occurred, the contractor must clean immediately, or as directed by the ~~City~~ Development Services Construction Inspector.

   c. **Construction Vehicles -** The Contractor is responsible for cleaning construction vehicles leaving the site on a daily basis to prevent dust, silt, mud and dirt from being released or tracked offsite. See the City of Roseville Stormwater Quality BMP Guidance Manual for information on vehicle and equipment

cleaning requirements, and instructions concerning concrete washout areas.

d. Grading Spoils - Dry stock piles of soil shall be watered, covered with tarpaulins, or stabilized suitable to prevent the generation of airborne dust. Trucks transporting dry soil shall be covered with tarpaulins. Stockpiling of spoils during the wet season, (October 1 to April 30), should be avoided. If avoidable, spoil stockpiles shall be covered with plastic, or adequately stabilized by other BMP's, with a perimeter sediment barrier installed at all times. The City Stormwater Inspector may require additional control measure depending on the proximity of the stockpile to any sensitive areas and/or drainage systems.

e. Dust Control - Water shall be sprayed on all exposed earth surfaces during clearing, grading, earth moving and other site preparation activities. The exposed earth shall be watered throughout the day to minimize dust. Care must be taken to ensure that excessive water use doesn't create a sediment-laden discharge. Water from City hydrants is usually available to supply water, however a hydrant permit from the Environmental Utilities Department must be obtained prior to use.

f. Wind Allowances - Grading activities shall be restricted or halted when winds exceed 15 miles per hour as deemed necessary by the City's Development Services Construction Inspector. In addition, Placer County Air Pollution Control District may issue enforcement actions for air-borne migration violations, per their guidelines.

4. Drain Inlet Protection - Drain inlet filters must be employed whenever there is risk of sediment-laden water entering the City's storm drain system. This applies to both existing and newly constructed drain inlets. If the storm drain system is active and open to discharges, then immediately following installation, all drop inlets shall be protected with silt and gravel bags until construction no longer poses a risk of sediment laden discharges. Only high flow volume bag type filter, or other devices that have been approved of the Stormwater Inspector shall be used.

5. Perimeter Protection - Silt fences, and straw wattles are commonly used as perimeter sediment control BMP's. Proper installation of these is critical for their effectiveness. Refer to the City's Stormwater Quality Best Management Practices Manual, for proper installation procedure for these BMP's and for information on additional BMP's that may be available.

6. **Slope Protection -** Disturbed exposed slopes pose the highest risk of erosion and shall be protected as required. BMP's such as blown or broadcast straw, erosion control blankets, plastic sheeting, soil stabilizers, and linear sediment controls along the toe, face, and grade breaks of exposed slopes shall be employed to minimize or eliminate erosion. Refer to the City's Stormwater Quality Best Management Practices Manual, Temporary Soil Stabilization, for proper installation procedures.

7. **Straw Bales -** Straw bales should strategically stockpiled on site during the "Wet Season" for the purpose if immediate broadcasting prior to storm events. Measures shall be provided to keep straw dry. Refer to the projects' SWPPP or erosion control plan for proper stockpiling of BMP's.

8. **Alternative Control Devices -** Use of alternative sediment control devices will be approved of at the discretion of the City's Stormwater Inspector.

9. **Wildlife Friendly / Non-entrapment Materials** – Areas where permanent erosion and sediment control materials are placed, or locations adjacent to open space or other sensitive areas shall employ wildlife friendly, or non-entrapment products. (Non-entrapment products are those that use specially designed netting, biodegradable netting, or no netting at all for their blanket and waddle products, which are designed to minimize or eliminate animal entrapment). Materials shall be approved prior to placement by Development Services staff.

C. Pads - All pads shall be compacted to a minimum of 90 percent relative compaction. Unsuitable materials shall be removed from the pad areas per the recommendations of the Developer's licensed geotechnical engineer. The Developer shall submit a letter from the geotechnical engineer stating that the grading was performed in substantial conformance with the geotechnical report (and subsequent updates). Recertification of lot pad compaction/elevation certificates may be necessary due to stockpiling, rutting, sales trailers, temporary parking lots, erosion, and time lapse at the discretion of the City Construction Inspector, refer to section 21-5 E.

D. Retaining Walls -

1. **Concrete/Masonry/Rock Walls -** All concrete, masonry, or rock walls shall be installed per the manufacturer's instructions or design engineer's recommendations.

2. **Wood Retaining Walls -** All wood retaining walls shall be installed in accordance with Construction Standard Detail GR-3.

E. Roadways -

1. **Compaction -** Relative compaction of not less than 95 percent shall be obtained for a minimum depth of 0.5 feet below the subgrade grading plane for the width between the outer edges of shoulder, including curb and gutter areas, whether in excavation, embankment or at original ground level. All other material shall be compacted to a relative compaction of 90 percent.

2. **Grade Control -** When the next layer to be placed on the subgrade is an asphalt concrete pavement, asphalt concrete base or asphalt concrete subbase, the subgrade grading plane at any point shall not vary more than 0.05 foot above or below the grade established by the project surveyor.

3. **Stability Testing -** The Contractor shall proof roll the subgrade areas with a full, 3,000 gallon water truck prior to placement of aggregate base or aggregate subbase. The City's Development Services Construction Inspector shall approve the equipment used for proof rolling.

4. **Unsuitable Materials -** Any unsuitable material encountered within 2 feet below subgrade or 2 feet below original ground shall be removed and replaced with a suitable backfill material.

   Suitable backfill materials and methods for placement are to be reviewed and approved by the on-site geotechnical engineer. Other methods for subgrade stability may be used upon review and approval of the Developer's geotechnical engineer.

F. Tree Grading - Grading activities within the protected zone of a Native Oak Tree or Landmark Tree shall be conducted under the conditions set forth under the Grading Permit and Tree Permit Conditions. These conditions shall also include:

1. **Fencing -** A minimum 5-foot high chain link fence, or approved equal by the Planning Department, shall be installed at the outermost edge of the protected zone of each protected tree or group of trees. The fence shall not be removed until written authorization is received from the Planning Department.

   Fences must be installed in accordance with the approved fencing plan prior to the start of any grading operations. The Contractor

shall call the Planning Department for an inspection of the fencing prior to grading operations.

Signs must be installed on the fence in four locations, equidistant around the tree. On fencing around a grove of trees, the signs shall be placed at approximately 50-foot intervals. Sign verbiage is indicated in Section 111-4.B.

2. **Grade Changes -** No grade changes are permitted which cause water to drain to within twice the longest radius of the protected zone of any protected tree.

3. **Native Ground Surface Fabric -** Removal of any native ground surface fabric from the protected zone of the tree shall require protection of the tree within 48 hours of removal.

4. **Preservation Devices -** Preservation devices (such as aeration systems, oak trees wells, drains, special paving and cabling systems) shall be installed per approved plans and certified by the Developers arborist.

5. **Retaining Walls -** The Contractor shall provide immediate protection against moisture lost to exposed roots due to construction of a retaining wall within the protected zone of the tree. The retaining wall shall be constructed within 72 hours after completion of grading in the protected zone.

6. **Roots -**

   a. **Minor roots -** Minor roots (less than 1 inch in diameter) may be cut. Damaged roots shall be traced back and cleanly cut behind any split, cracked or damaged area.

   b. **Major roots -** Major roots (over 1 inch in diameter) may not be cut without approval and supervision of the Developer's arborist.

7. **Trenching -** Trenching within the protected zone of a tree, when permitted, may only be conducted with hand tools, in order to avoid root damage. The Contractor shall follow provisions approved in the Utility Trenching Pathway Plan, submitted by the Developer to the Planning Department.

G. **Grading Adjacent to Wetlands -** Grading activities adjacent to sensitive wetland or creek areas shall be conducted under the conditions set forth under the Grading Permit. These conditions shall also include:

1. Prior to construction within any phase of the project, high visibility temporary construction fencing shall be installed along the parcel adjacent to the Preserve or Creek. Fencing shall be maintained daily until permanent fencing is installed, at which time the temporary fencing shall be removed from the project site.

2. With the exception of access required for maintenance and/or emergency vehicles, the project shall be designed to prevent vehicle access into the Preserve. Post and cable fencing or other improvements shall be utilized to meet this requirement.

3. Landscaping adjacent to the Preserve shall be California native, drought-tolerant groundcover, shrubs, plants and trees.

4. The Pre-Construction meeting shall address the presence of the Preserve, the sensitive habitats present and minimization of disturbance to the Preserve. During grading and construction the preserve area shall be avoided and shall not be used for parking, storage, or project staging. The contractor shall remove all trash blown into the preserve from adjacent construction on a daily basis. After construction is complete, the temporary fencing shall be removed from the preserve, along with all temporary erosion control measures.

111-4 MATERIALS

A. Retaining Walls -

1. **Concrete/Masonry/Rock Walls -** All concrete, masonry, or rock walls shall conform to materials and specifications provided by the wall manufacturer or designing engineer.

2. **Wood Retaining Walls -** All wood retaining wall materials are to be in accordance with Construction Standard Detail GR-~~1~~3.

B. Tree Fencing -

1. **Signs -** The size of each sign shall be a minimum of 2 feet by 2 feet and shall contain the following language.

WARNING
THIS FENCE SHALL NOT BE REMOVED
OR RELOCATED WITHOUT WRITTEN
AUTHORIZATION FROM THE
PLANNING DEPARTMENT

C. Wetland Preserve Fencing -

1. **Signs -** The size of each sign shall be a minimum of 2 feet by 2 feet and shall contain the following language:

WARNING
THIS FENCE SHALL NOT BE REMOVED
OR RELOCATED WITHOUT WRITTEN
AUTHORIZATION FROM THE
COMMUNITY DEVELOPMENT DEPARTMENT

111-5 SOIL TESTING PROCEDURES AND FREQUENCIES

A. Field Testing -

1. **Field Density Testing -** Field density test for earthwork and backfill will be performed by either the owner's Independent Testing Laboratory (ITL), or the City's Geotechnical Engineering Consultant, at the discretion of the City Engineer as follows:

   a. Private property building areas including 10 feet outside the exterior building lines shall be tested by the property owner's Geotechnical Engineer with proper written pad certifications submitted to City Building Official prior to foundation placement.

   b. Public Right-of-Way - All grading operations, which involve revision to existing contours for the purpose of accepting right-of-way improvements, shall require written and stamped certification from a licensed California Geotechnical Engineer.

   c. Test Method-In-place nuclear density, ASTM D2922 (Method B-Direct Transmission) to check conformance to requirements of Geotechnical Report, project plans, specifications, and Section 71 of these Standards. In addition to testing, the field technicians shall observe ALL backfill operations to ensure methods consistent with those that achieved minimum required compaction results are used throughout the backfill process. The field technician shall record these observations in the Daily Field Reports (DFR's). The field technician shall perform additional testing when the operations deviate from proven practices even if testing at the frequencies required below has already been performed. Samples for compaction curves shall be taken at the discretion of the technician or as directed by the City's field representative.

d. The City expects testing at a higher frequency at the discretion of the field technician or City's Development Services Construction Inspector if there is any reason to doubt the effectiveness of the operations or the precision of the test results, and when a material change is observed in the soil being compacted. These tests shall be recorded in the DFR.

B. Minimum Reporting Requirements -

1. **Daily Field Reports (DRF) -** All testing and observations shall be recorded in a DFR. The DFR shall include all field density testing; test tables and/or plans shall show the field-recorded dry density, moisture content, reference laboratory compaction test used and any moisture offset used based on supplemental laboratory testing. All test results indicating less than minimum compaction shall be recorded in the DFR's along with the observation of corrective operations and retest results. DFR's shall also indicate where observation and soil probing was performed in between nuclear gauge testing.

C. Mass Grading Testing Frequencies -

1. Large Area Density Testing – One test per 1,000 to 2,000 cubic yards. A separate compaction certification report is required for City right-of-way limits.

2. Small Area Density Testing – One test per 500 cubic yards or each 10,000 square feet of fill.

D. Trench Backfill Testing Frequencies -

1. Utility Installations - Observe all bedding, shading, shovel slicing, and filter fabric installation procedures for compliance with City Standards and project plans and specifications. Observations shall be documented in DFR's along with measures taken to correct noncompliant items.

2. Compaction Testing - By Nuclear Gauge Method -Tests shall be taken at a minimum frequency of 1 test per lift per 200 lineal feet of backfill, testing pattern should be staggered such that the location of test varies with each lift of backfill. The maximum loose lift thickness shall conform to the requirements outlined in Section 31-2E, Typical Compaction Equipment and Maximum Lift Depths Achieved by Proper Compaction, of these Standards, or as approved

3. by the City Engineer. The ITL shall submit copies of the field technician's DFR's and testing logs on a weekly basis to the City City's Construction Inspector for review.

4. Performance Specification Observation - (Deep Trenches or Rocky Material), Performance specifications shall be used to verify compaction efforts where vertical cuts or other issues prevent safe entry for nuclear gage density testing. A series of tests will be performed at the beginning of the backfill operations in a protected area of the trench to determine the minimum number of passes, acceptable equipment, moisture conditions, and maximum loose lift thickness. Once the procedure is approved, full-time observation will be performed to check that operations comply with the approved performance specifications. The field technician shall require the contractor to provide access for further testing by the field technician if, in the opinion of the City's Development Services Construction Inspector, conditions change such that observation alone will not suffice to verify compliance or if the material or equipment used to backfill the trench changes such that re-evaluation or compaction procedures is required. Adequate compaction of material containing more than 30 percent rock larger than ¾ inch shall be verified via performance specifications. The ITL shall develop the performance specification and, if none exists, perform full-time observation of the operations to verify compliance. Field observations shall be recorded in the field technician's DFR's as described above. The DFR shall clearly reference approximate stations and elevations over which the observation of performance specification was performed.

5. Dry Utility Trenches - Installation of Electric Department facilities shall be according to Electric Department designed job print and City of Roseville Electric Department Specifications, Details: Residential 1.2, 1.2.1; Commercial 3.1, 3.2. Frequencies of testing to coincide with these Standards.

6. Manholes -Areas around manholes shall be tested every vertical foot. Testing methods and recordings shall be as described above.

7. Utility Services to Residences - Test at least every other lift on a minimum of 50 percent of the services.

8. Retrofit Utilities - See Section 31 of these Construction Standards.