SECTION 31 22 00

GRADING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified in this Section: Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to complete the Contract, including, but not limited to these major items:

1. Coordinate the work of this section with other trades including off-site construction.

2. Verify all elevations at the job site.

3. Protect existing improvements designated to remain.

4. Clear and grub the site of existing vegetation.

5. All excavating, filling, backfilling, compacting and grading required for the project, except as excluded in Paragraph B below.

6. Pumping, draining, shoring, cribbing, and other protective measures.

7. Importing of fill materials.

8. Layout and setting of lines and levels.

9. Cut, cap and remove inactive utility lines encountered in the path of new construction.

10. Protect finished grading from damage.

11. Remove surplus or unsatisfactory materials from the site including above or below grade improvements, such as footings, not removed during demolition operations.

12. Contact Underground Service Alert (U.S.A.) to identify utility lines in the area.

B. Related Work Specified Elsewhere:

1. Demolition.

2. Trenching, backfilling and compacting for utilities.

3. Base course and subgrade under asphalt paving.

4. Soil enrichments and topsoil for landscaped areas.

5. Finish grading for landscaping and asphalt paving.

1.02 SITE CONDITIONS

A. Soils Investigation Reports: The following soils investigation report has been prepared by Converse Consultants for the project site: Geotechnical Investigation Report, Los Angeles County Hall of Justice, Northerly Corner of Temple Street and Spring Street, Los Angeles, California, Converse Project No. 03-31-102-01, dated May 5, 2003.

B. Data: Maps, boring logs, geotechnical and soils investigation reports, and like reference data, are not included in the Scoping Documents but are made available to the Developer Design/Builder for information only. The County, Soils Engineer, and County' s Representative assume no responsibility for any conclusions the Developer Design/Builder may draw from such information. Information in the reports shall not relieve the Developer Design/Builder of its responsibility for the work required. Logs of soil borings included in the above mentioned reports do not constitute a guarantee of the uniformity of soil conditions over the entire site, or a guarantee against variations of the ground water. The Developer Design/Builder shall determine existing conditions under which he shall operate in performing the work.

C. Site Visitation: In preparing the bid proposal, the Developer Design/Builder shall have visited the site, carefully examined the drawings and specifications, and determined the methods of removal and storage of materials, the sequencing of operations and the attendant problems. No allowance will be made subsequently to the Developer Design/Builder for errors due to negligence in observing the site conditions.

D. Earthwork Quantities: The Developer Design/Builder shall be responsible for determining quantities necessary for the Developer Design/Builder's purposes.

1.03 QUALITY ASSURANCE

A. General: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and safe methods to be used for proper performance of the work in this section.

B. Inspections and Tests: The County will employ a Geotechnical Engineer to inspect and test the work of this section. At the completion of this work the Geotechnical Engineer shall submit a written report certifying that the site was developed with acceptable materials in accordance with the County' s approved Contract Documents. The Geotechnical Engineer shall be permitted free and unrestricted access to the site as required for the performance of his duties.

1.04 REFERENCE STANDARDS

A. General: Conform to the following reference standards to the extent specified:

1. ASTM D1557: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft - 1bf/ft^3)(2,700kN-m/m^3).

2. California State Division of Industrial Safety.

3. Ordinances, Codes and Regulations: All work shall be installed in accordance with all of the requirements of all legally constituted authorities having jurisdiction, including all local ordinances, codes and the Construction Safety Orders and General Industry Safety Orders of the State Division of Occupational Safety and Health (Cal/OSHA), CCR, Title 8.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. General: Soil materials, in general, shall be free of debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, frozen, deleterious, or objectionable materials as directed by the Geotechnical Engineer.

B. Backfill and Fill: Backfill and fill shall conform to the general requirements for soil materials above and shall be an unclassified granular soil material from the site or borrow material. Maximum particle size shall be 3 inches in any dimension. The Geotechnical Engineer shall approve backfill and fill materials.

C. Borrow Material: Obtain material required for fill in excess of that produced within the grading limits of the work from borrow areas selected and paid for by the Developer Design/Builder and approved by the Geotechnical Engineer. Borrow material shall be granular and non-expansive or of low expansion potential (expansion index less than 20) and shall contain sufficient fines (binder material) so as to be relatively impermeable when compacted. The Geotechnical Engineer shall evaluate and/or test the material for its conformance with the specification prior to delivery to the site. The Developer Design/Builder shall notify the Geotechnical Engineer at least 72 hours prior to importing fill to the site. Rocks larger than 3 inches in any dimension shall not be imported onto the site.

D. Capillary Vapor Barrier: The capillary vapor barrier shall consist of an 8 mil PVC membrane over a 4 inch thick layer of gravel. A 2 inch thick layer of sand shall be placed above and below the membrane. The gravel layer shall conform to the following gradation:

Sieve Size	Percent Passing
3/4"	90 - 100
No. 4	0 - 10
No. 100	0 - 3

PART 3 - EXECUTION

3.01 PROTECTIVE MEASURES

A. Underground Utilities:

1. Prior to the commencement of any excavations, telephone Underground Service Alert (U.S.A.). Two working days shall be allowed after contacting U.S.A. before the excavation work is started to allow utility owners to be notified. If any utilities are to remain in place, provide adequate protection during earthwork operations to prevent damaging them.

2. Should uncharted or incorrectly charted utilities be encountered during excavation, notify the utility owner for instructions. Cooperate with the utility owner in keeping respective services and facilities in operation. Repair damaged utilities to the satisfaction of the utility owner and pay all costs thereof.

3. If utility lines are encountered which prove to be abandoned in place, they shall be removed as part of the excavation, or if sufficiently below grade, as determined by the Geotechnical Engineer, may be capped and left in place.

4. If seepage pits or cesspools are encountered, do not fill until approval has been obtained from the Geotechnical Engineer.

5. Do not interrupt existing utilities serving facilities occupied and used by the County or others, during occupied hours, except when permitted in writing and then only after acceptable temporary utility services have been provided.

B. Drainage:

1. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding the project site and surrounding area. Grade perimeter of excavations so that water run-off drains away from the excavations.

2. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting of footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering appurtenances necessary to convey water away from excavations.

3. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting areas. Do not use trench excavations as temporary drainage ditches.

4. Dispose of water resulting from dewatering operations in a manner that will not cause damage to public or private property, or constitute a nuisance or menace to the public and in accordance with federal, state, and local regulatory requirements.

5. Protect sloped embankments from erosion and during rainy weather by covering with impermeable membranes or by using other approved methods.

C. Shoring, Cribbing and Bracing: Shore, crib and brace the excavations as necessary to prevent cave-ins and to support and protect adjacent construction, in accordance with federal, state and local laws, including but not limited to, CCR, Title 8, Construction Safety Orders. All such shoring shall be provided in accordance with CCR, Title 8, or if designed, shall be designed by a licensed Civil or Structural Engineer, currently registered in California and employed by the Developer Design/Builder.

D. Benchmarks and Monuments: Protect benchmarks, monuments and other reference points against displacement and damage. Repair or replace benchmarks, monuments and other permanent survey data that becomes displaced or damaged due to the performance of this work at no cost to the County.

E. Dust Palliation: Control dust at the site by intermittent watering and sprinkling while the work of this section is being performed.

F. Preservation of Property From Damage: Existing improvements, adjacent property, utility and other facilities, and trees and plants that are not to be removed shall be protected from injury or damage. Repair or replace existing improvements damaged during the conduct of this work with material of same kind, quality and size. Materials, trees, plants, or equipment which are temporarily removed for protection and not damaged shall be reinstalled following completion of the new work.

G. Provide necessary barricades and protective systems to protect the public, personnel, equipment and premises from damage, harm, hazard or disturbance arising out of this work. Conduct work using the quietest of available, suitable processes and equipment to keep noise down below regulated limits, and use Best Management Practices to reduce the amount of dust carried beyond the property line, by an effective dust control program.

H. Use of Explosives: Explosives shall not be used.

I. Trees and plants that are not to be permanently removed shall be protected from injury at the Developer Design/Builder's expense. Perform excavations, within the drip-lines of large trees designated to remain, by hand and protect the root system from damage or dry-out. Maintain a moist condition for the root system and cover exposed roots as directed by the County' s Representative. Paint root cuts of one inch diameter and larger with emulsified asphalt tree paint.

3.02 GROUND SURFACE PREPARATION

A. Clearing and Grubbing: All vegetation, such as roots, brush, heavy sods, heavy growth of grass, and all decayed vegetable matter, rubbish, debris and other unsatisfactory material within the area upon which fill is to be placed shall be stripped or otherwise removed before the fill is started. The removals shall extend to a depth of three feet below the existing ground surface or subgrade, whichever is deeper.

B. Preparation of Subgrades: Scarify the resulting subgrade to a depth of 6 to 8 inches and compact to at least 90 percent of the maximum density obtainable by the ASTM D1557 method of compaction. Moisten or dry as necessary to obtain a moisture content that does not vary more than 2 percent from optimum.

3.03 EXCAVATION

A. Excavate all materials encountered regardless of their nature to the lines and grades indicated or necessary to complete the work. Remove all existing fill soils and disturbed natural soils for their entire depth. Size excavations to allow for placing and removing formwork, installing protective shoring and bracing as may be necessary to prevent caving or sloughing of banks, to protect workers in accordance with CCR, Title 8, to maintain stability, and to allow for installation of waterproofing and other services.

B. Clean out excavations of any loose material to firm undisturbed soil.

C. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the County' s Representative. Unauthorized excavation, as well as remedial work directed by the County' s Representative, shall be at Developer Design/Builder's expense.

D. Material Storage: Stockpile satisfactory excavated materials until required for backfill or fill. Place, grade and shape stockpiles for proper drainage. Locate and retain soil materials away from edge of excavations, in accordance with CCR, Title 8, Construction Safety Orders. Do not store within drip line of trees indicated to remain. Dispose of excess soil material and waste materials as herein specified, and in accordance with applicable laws and regulations.

E. Stability of Excavations: Slope sides of excavations to comply with CCR, Title 8, Construction Safety Orders and with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

F. Slopes: When completed, the average planes of excavation slopes shall conform to the slopes indicated on the drawings and no point on the completed slopes shall vary from the designated plane by more than six inches. All debris and loose material shall be removed.

3.04 FILLS

A. Fills shall be constructed at the locations and to lines and grades indicated. The completed fill shall conform to the shape of the typical sections indicated or shall meet the requirements of the particular case. Compaction shall be continuous over the entire area. Equipment shall make sufficient passes to obtain uniformly the desired density. Each layer shall be compacted before the overlaying lift is placed.

B. The exposed grade shall be scarified to a depth of 6 to 8 inches, moistened to optimum moisture content, and recompacted to a minimum of 90 percent of the maximum density in accordance with ASTM D1557. Fill shall then be placed in lifts compatible with the type of compaction equipment used. The thickness of the compacted fill layer shall not exceed the maximum allowable thickness of 8 inches. Flooding or jetting techniques to accomplish compaction will not be allowed.

C. Soils shall be treated so that the moisture content at the time of compaction does not vary more than 2 percent from optimum. Do not place fill during unfavorable weather conditions. If work is interrupted by heavy rain, do not resume operations until the proper moisture content and density of materials have been achieved.

D. If during the grading operations, soil types other than those analyzed in the soils report are encountered, consult the Geotechnical Engineer to determine the suitability of these soils as fill materials.

E. The Geotechnical Engineer shall observe the placement of compacted fill and conduct in-place field density tests on the compacted lifts to check for adequate moisture content and the required relative compaction. Where less than 90 percent relative compaction is indicated, additional compaction effort shall be applied and the soil moisture conditioned as necessary until 90 percent relative compaction is attained.

3.05 BACKFILLING

A. Place backfill as specified in paragraph 3.04 FILLS, as construction operations permit, but not before the following operations take place:

1. Work to be covered has been inspected and approved.

2. Concrete formwork and loose soils and debris have been removed from the excavations.

3. Underground utility locations have been recorded.

4. Shoring and bracing have been removed, during backfilling so as to maintain stability, and voids have been filled and compacted.

5. Waterproofing and prefabricated in-plane wall drainage system, if any, have been inspected and approved.

6. Permanent or temporary horizontal bracing is in place on walls supported by a floor or roof.

B. Compact backfill as specified in paragraph 3.04 FILLS.

C. Where backfill is required on both sides of a structure, place it simultaneously so that the height of fill remains approximately equal on both sides at all times.

D. Brace construction which has not been designed to withstand eccentric loading during backfilling.

E. Backfill only after the structure to be backfilled against has attained its design strength or has been properly braced to resist the load of the backfill. Compacting by flooding or jetting is not allowed.

F. Keep rollers and other equipment at least four feet from footings, foundations, piers and walls of building and appurtenances and provide suitable shoring, in accordance with Cal/OSHA, CCR, Title 8, for any loads and vibration imposed by such equipment.

3.06 GRADING

A. The locations and elevations of all constructions shall be indicated on the Developer Design/Builder' s Construction Documents. The Developer Design/Builder will be held responsible for the proper location and elevations of the completed work.

B. Grade all areas to the lines and levels required. Finish areas free from irregular and abrupt surface changes. Keep grades straight between changes in elevations. Rough grading shall be within plus or minus 0.1 foot of the elevations shown on the drawings. Finish grades shall be the maximum elevations shown on the drawings with a minus tolerance of ½ inch if uniformly distributed.

C. The required subgrade elevation shall be such that when subbase and indicated construction are added, the final elevations will be those shown on the drawings.

3.07 DISPOSAL

A. Satisfactory excavated materials, in excess of that required for filling and backfilling, and unsatisfactory materials, shall be disposed of off-site in a legal manner.

B. Burning and burying materials on-site is prohibited.

3.08 PROTECTION OF NEWLY GRADED WORK

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

C. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.09 FIELD QUALITY CONTROL

A. All site grading operations will be observed by the County' s Geotechnical Engineer. The Geotechnical Engineer shall provide the following duties at a minimum:

1. Observe the clearing and grubbing operations for proper removal of all unsuitable materials.

2. Observe the exposed subgrade in areas to receive fill and in areas where excavation has resulted in the desired finished subgrade. The representative should also observe proof rolling and delineate the areas requiring over excavation.

3. Evaluate the suitability of on-site and import soils for fill placement; collect and submit soils samples for required or recommended laboratory testing where necessary.

4. Observe the fill and backfill for uniformity during placement.

5. Test backfill for field density and compaction to determine the percentage of compaction achieved during backfill placement.

6. Observe and probe foundation materials to confirm that suitable bearing materials are present at the design foundation depths.

B. Field Density Tests:

1. The location and frequency of the tests will be at the Geotechnical Engineer's discretion.

2. If, in the County's opinion, based on reports submitted by the Geotechnical Engineer, subgrade, fill and backfill have been placed below specified density or on improperly prepared subgrades, remove in-place soils, and provide additional compaction and tests at no additional costs to the County.

C. Notice: Provide the Geotechnical Engineer at least two working days notice prior to start of each phase of earthwork operations.

D. Verifications of Elevations: Provide written certification by a licensed Surveyor or Civil Engineer upon completion of earthwork operations that grades are within the tolerances specified.

E. Lines and Levels: Employ a licensed Land Surveyor or Civil Engineer to lay out the work and establish the necessary lines and levels for the work.

3.10 ADJUSTING

A. Regrading: Raise or lower existing manholes and cleanouts in regraded areas and carefully remove, clean and reset frames and covers to finished grade.

3.11 CLEANUP

A. Cleanliness of Site: During progress of work, keep premises reasonably free of debris and waste materials.

B. Removal of Debris: Upon completion and before final acceptance of work, remove all debris, rubbish, left-over materials, waste test water, tools and equipment from site in accordance with regulatory requirements and in an environmentally responsible manner.

C. Keep sidewalks and streets adjoining the property clean and free of debris, excavated materials, rubbish and other materials resulting from the performance of this work which might affect the safety and free passage of persons and vehicles on the streets, sidewalks, utilities and property.

END OF SECTION