

Job #06-215-F

July 6, 2006

Sycamore Pointe Business Park
Attention: Mr. Rick Ryerson
P.O. Box 244
San Marcos, California 92079

**AS-GRADED COMPACTION REPORT AND FOUNDATION RECOMMENDATIONS
FOR PROPOSED COMMERCIAL DEVELOPMENT, 1315 HOT SPRINGS WAY, CITY
OF VISTA GP #05-049**

In accordance with the Grading Ordinance for the City of Vista, this as-graded compaction report has been prepared for the above referenced project. We have completed engineering observation and testing services in conjunction with the wall backfill and remedial pad grading operations. This report summarizes the results of our tests and observations of the compacted fill. The compacted fill in the subject area was placed periodically from May 26, 2006 through June 27, 2006. Actual dates are shown on the enclosed compaction test result sheets.

I. REFERENCES

The following listed grading plan and documents were used by this office as part of this project:

- A. Precise Grading and Erosion Plans prepared by LDE Consulting.
- B. Keystone Retaining Wall Plan prepared by Red One Engineering, Inc.
- C. "Update Preliminary Geotechnical Report, Parcel A Sycamore Avenue", prepared by this office, dated September 14, 2005, Job #05-389-P.
- D. "Clarification Letter and Undercut Recommendations, Parcel A, Sycamore Avenue", letter prepared by this office, dated November 17, 2005, Job #05-389-P.
- E. "Response to City of Vista Third Party Geotechnical Review, Sycamore Pointe Business Park Project", letter prepared by this office, dated January 4, 2006, Job #05-389-P.

II. GRADING INFORMATION/GROUND PREPARATION

- A Keystone Retaining Wall: Continuous inspection and testing services were conducted

during construction and wall backfill operations. The placement of the pins, and “grid” width plus

vertical placement were also continuously inspected and found to be in conformance with the provided wall plans.

- B. Remedial Pad Grading: Prior to grading operations, the site within the limits of the grading operations for the construction of building pads was cleared of vegetation. All questionable loose and compressible soils were removed from the building footprint plus a 10-foot perimeter for Building "A", and 5-foot perimeter for Building "B". Removal depths are shown on the enclosed compaction test result sheets.

As the proposed buildings are situated on properly compacted fill throughout, recommendations for mitigating a cut/fill or "daylight" situation is not required.

Site preparation and grading were conducted in substantial conformance with Appendix Chapter 33, latest edition of the California Building Code, the Grading Ordinance for the City of Vista and our above listed geotechnical reports. All inspections and testing were conducted under the observation of this office. **In our opinion, all embankments and excavations were constructed in substantial conformance with the provided grading plan, and are acceptable for their intended use.**

III. FILL PLACEMENT

Fill was placed in 6 to 8-inch lifts and compacted by means of heavy construction equipment. Field density tests were performed in accordance with ASTM Method D-1556 sand cone method /xxxx ASTM D-2922 nuclear densimeter xxx/ as the fill was placed. The moisture content for each density sample was also determined. The approximate locations of the field density tests are shown on the attached drawing.

The locations of the tests were placed to provide the best possible coverage. Areas of low compaction, as indicated by the field density tests, were brought to the attention of the contractor. These areas were reworked by the contractor and retested. The test locations and final test results are summarized on the compaction test result table. Elevations and locations of field density tests were determined by hand level and pacing/tape measure relative to field staking done by others.

The results of our field density tests and laboratory testing indicate that the fills at the site were compacted to at least 90% of the corresponding maximum dry density at the tested locations.

If the building pads should undergo any prolonged seasonal wetting and drying periods prior to construction, remedial grading could be required depending on the site soil characteristics. Depths of removal and re-compact can best be determined just prior to construction by appropriate inspection and testing.

IV. SITE CORROSION ASSESSMENT

A site is considered to be corrosive to foundation elements, walls and drainage structures if one or more of the following conditions exists:

- * pH is less than 5.5.
- * Sulfate concentration is greater than or equal to 2000 ppm (0.2% by weight).
- * Chloride concentration is greater than or equal to 500 ppm (0.05% by weight).

For structural elements, the minimum resistivity of soil (or water) indicates the relative quantity of soluble salts present in the soil (or water). In general, a minimum resistivity value for soil (or water) less than 1000 ohm-cm indicates the presence of high quantities of soluble salts and a higher propensity for corrosion.

V. APPROPRIATE LABORATORY TESTS

- A. Maximum Dry Density Optimum Moisture Tests:** The maximum dry density and optimum moisture contents of the different soil types used as compacted fill were determined in accordance with ASTM Method D-1557 during the preliminary investigative phase of the project. As no new soils were encountered during the grading operations, no additional testing was conducted.
- B. Expansion Tests:** An expansion test was conducted per 2001 UBC Standard Procedure 18-2 on a representative sample of the on site soils during the preliminary investigative phase of the project in order to determine the expansion potential and to provide appropriate foundation recommendations. As no new soils were encountered during the grading operations, no additional testing was conducted.
- C. Direct Shear Tests:** A direct shear tests was conducted on a representative sample of the on site soils during the preliminary investigative phase of the project in order to determine the allowable bearing capacity and to provide retaining wall design parameters. As no new soils were encountered during the grading operations, no additional testing was conducted.
- D. Corrosion Testing:** pH-Resistivity and sulfate testing were determined in accordance with California Test Method 643 and 417 respectively on a representative sample of the on site soils during the “update” preliminary investigative phase of the project in order to determine the corrosiveness of the soil. As no new soils were encountered during the grading operations, no additional testing was conducted.

VI. RECOMMENDATIONS

THIS REPORT SHOULD BE CONSIDERED AS A PART OF THE PROJECT FOUNDATION PLANS AND MUST BE PROVIDED TO THE PROJECT ARCHITECT/STRUCTURAL ENGINEER TO ENSURE THE FOLLOWING FOUNDATION RECOMMENDATIONS ARE INCLUDED IN THOSE PLANS**

The following minimum foundation recommendations for very low expansive (Expansion Index less than 21) bearing soils, classified using the “Unified Soil Classification System” or “USCS” as SM/GM, with minimal indicated fill differential depth from our “Update Preliminary Geotechnical ” report should be adhered to, and **incorporated into the foundation plans**. Foundation plans and details **may** be submitted to our office for review, to insure conformance with our recommendations.

A. Foundations, Monolithic Pour System

Conventional shallow foundations with stem walls and slab-on-grade floors, or slab-on-ground with turned-down footings.

1. Continuous strip stem wall foundations and turned-down footings should be a minimum of 15-inches wide by 18-inches deep for single and two story structures respectively, and 18-inches wide by 24-inches deep for three story structures. Spread pad footings should be at least 24-inches square and 18-inches deep, for one and two story structures. Minimum depths are measured from the lowest adjacent ground surface, not including the sand under the slab. Exterior continuous foundations or turned-down footings should enclose the entire building perimeter.
2. Continuous interior and exterior stem wall foundations should be reinforced with a minimum of four #4 reinforcing bars. Place two bars 3-inches below the top of the stem, and two bars 3-inches above the bottom of the footing. Turned-down footings should be reinforced with a minimum of two #4 bars top and two #4 bars at the bottom. Reinforcement for spread pad footings should be designed by the project structural engineer.
3. Foundations where the surface of the ground slopes more than 1-unit vertical in 10-units horizontal (10% slope), shall be level or shall be stepped so that both top and bottom of such foundation are level. Individual steps in continuous footings shall not exceed 18-inches in height and the slope of a series of such steps shall not exceed 1-unit vertical to 2-units horizontal (50%) unless otherwise specified. The steps shall be detailed on the structural drawings. The local effects due to the discontinuity of the steps shall also be considered in the design of foundations as appropriate and applicable.

4. Open or backfilled trenches parallel with a footing shall not be below a plane having a downward slope of 1 unit vertical to 2 units horizontal (50%) from a line 9-inches above the bottom edge of the footing, and not closer than 18-inches from the face of such footing.
5. Where pipes cross under footings, the footings shall be specially designed. Pipe sleeves shall be provided where pipes cross through footings or footing walls and sleeve clearances shall provide for possible footing settlement, but not less than 1-inch all around the pipe.
6. All interior slabs should be a minimum of 4-inches in thickness reinforced with #3 reinforcing bars spaced 16-inches on center each way, placed midheight in the slab. Use 4-inches of clean sand (SE 30 or greater) beneath all slabs. A well performing moisture/vapor retardant (10-mil or greater) must be placed midheight in the sand. Joints in the moisture/vapor retardant should be overlapped a minimum of 12-inches.
7. Provide re-entrant (∇270E corners) reinforcement for all interior slabs as generally shown on the enclosed "Isolation Joints and Re-Entrant Corner Reinforcement" detail. Re-entrant corners will depend on slab geometry and/or interior column locations.
8. Provide "soft-cut" contraction/control joints consisting of sawcuts spaced 10-feet on center maximum each way for all interior slabs. Cut as soon as the slab will support the weight of the saw, and operate without disturbing the final finish, which is normally within 2-hours after final finish at each control joint location, or when the compressive strength reaches 150 to 800 psi. The "soft-cut" must be a minimum of 1-inch in depth and must not exceed 1¼-inch in depth or the reinforcing may be damaged. Anti-ravel skid plates should be used and replaced with each blade to avoid spalling and raveling. Avoid wheeled equipment across cuts for at least 24-hours.

B. Corrosiveness

1. Laboratory test results indicate that the minimum resistivity is greater than 1000 ohm-cm suggesting the presence of low quantities of soluble salts..

Test results show that the sulfate concentration is less than 2000 ppm.

Based on the results of the available corrosion analyses, the project site is considered non-corrosive.

The project site is not located within 1000-feet of salt or brackish water.

2. Based upon the result of the sulfate test, the amount of water soluble sulfate (SO₄) was found to be 0.002 percent by weight which is considered negligible according to the California Building Code Table No. 19-A-4. Portland cement Type II may be used.

C. Paving and Concrete Improvements Not Within The Public or Private Street Right of Way

1. Exterior flatwork adjacent to buildings must be a minimum of 4-inches in thickness reinforced with 6x6/10x10 welded wire mesh carefully placed 2-inches below the top of the slab. Provide “tool joint” or “soft cut” contraction/control joints spaced 10-feet on center (not to exceed 12-feet maximum) each way within 24-hours of concrete pour. The construction procedures for sawcuts (if used) are described in Item #A-8 above.
2. Concrete driveways, parking and trash enclosure slabs should consist of 5-inch thick concrete reinforced with #3 reinforcing bars spaced 18-inches on center each way placed midheight in the slab. The concrete should be placed over 12-inches subgrade compacted to a minimum of 95% of ASTM 1557-91. Additionally, provide a minimum of 12-inch wide by 12-inch deep thickened slab edge reinforced with a minimum of one #4 reinforcing bar placed near the bottom, around the free edges of the trash enclosure slab.

Provide “tool joint” or “soft cut” contraction/control joints spaced 10-feet on center (not to exceed 12-feet maximum) each way within 24-hours of concrete pour. The construction procedures for sawcuts (if used) are described in Item #A-8 above.

3. Recommendations for asphalt concrete (AC) travel lanes and parking stalls will be provided at a later date based on R-Value testing. For estimating purposes, a minimum of 3-inches asphalt over 6-inches Cal Trans aggregate base may be used.
4. Sub and basegrade soils should not be allowed to dry out or become saturated prior to placement of concrete or asphalt. Subgrade and basegrade soils shall be tested for proper moisture and compaction levels just prior to placement of the improvements.
5. Proper drainage must be maintained at all times so that no water from any source is allowed to infiltrate the sub or basegrade soils, or deterioration of the improvements may occur.

D. Inspections

1. **If required by the governing agency**, this office should be notified to inspect or test the following prior to foundation concrete pours:
 - a) Inspect the plumbing trenches beneath slabs after the pipes are laid and prior to backfilling.
 - b) Test the plumbing trenches beneath slabs for minimum compaction requirements prior to sand and moisture barrier placement.
 - c) Inspect the bottom of the footing trenches for proper embedment into firm compacted or formational soils, and inspect for proper footing width **prior to placement of reinforcing steel.**
 - d) Inspect the footing reinforcement size and placement. Inspect the slabs for proper thickness, reinforcing placement and size, inspect the sand thickness and moisture barrier placement and thickness, **after the initial footing embedment and width inspection, and prior to concrete pour.**

E. Soil Design Parameters

The following soil design parameters are based upon the on site soils used in the construction of the building pad:

1. Use a friction angle of 34 degrees.
2. Use a wet density of 129.0 pcf.
3. Use a coefficient of friction of 0.40 for concrete on compacted soils.
4. Use an active pressure of 37 pcf equivalent fluid pressure for cantilever, unrestrained walls with level backfill surface.
5. Use a active pressure of 56 pcf equivalent fluid pressure for cantilever unrestrained walls with a 2:1 (horizontal to vertical) backfill.
6. Use an at rest pressure of 58 pcf equivalent fluid pressure for restrained walls.
7. Use a passive resistance of 450 pcf equivalent fluid pressure for level surface condition at the toe.

8. Use an allowable foundation pressure of 2,000 psf for minimum 15-inch wide by 18-inch deep footings embedded into certified compacted fill.
9. Use an allowable lateral bearing pressure of 150 psf per foot for all structures except retaining walls.

Notes:

1. Use a minimum safety factor of 1.5 for wall overturning and sliding stability. Because large movements must take place before maximum passive resistance can be developed, a safety factor of 2.0 may be considered if sensitive structures or improvements are planned near or adjacent to the top of the wall.
2. When combining passive and frictional resistance, the passive component should be reduced by one-third.
3. The allowable soil bearing pressure provided herein was determined for footings having a minimum width of 15-inches and a minimum depth of 18-inches below the lowest adjacent ground surface. This value may be increased 20% for each additional foot of depth, and 20% for each additional foot of width to a maximum of 5,500 psf, if needed. The allowable soil bearing pressure provided herein is for dead plus live loads and may be increased by one-third for wind and seismic loading.
4. The lateral bearing earth pressures may be increased by the amount of the designated value for each additional foot of depth to a maximum of 1,500 pounds per square foot.
5. **These values are for the tested on site soils only. Additional testing and recommendations will be required for any new or import soils that are not tested and approved.**

F. General Recommendations

1. The minimum steel reinforcement provided herein is based on soil characteristics only, and is not intended to be in lieu of reinforcement necessary for structural considerations.
2. Recommendations for a swimming pool/spa are not within the scope of this report. If a swimming pool/spa and associated structures are to be constructed, this office

should be contacted in order to provide site specific recommendations prior to beginning any excavations.

3. All retaining walls should be provided with a drain along the backside as generally shown on the enclosed "Retaining Wall Drain" detail. **Specific drainage provisions behind retaining wall structures must be inspected by this office prior to backfilling the wall. All backfill soils must be compacted to a minimum of 90% of the corresponding maximum dry density, ASTM 1557-91.**
4. All underground utility trenches beneath interior and exterior slabs 12-inches or more in depth shall be compacted by mechanical means to a minimum of 90% of the maximum dry density of the soil, unless otherwise specified. Care should be taken not to crush the utilities or pipes during the compaction of the trench backfill. No flooding or jetting of the backfill is allowed.
5. The planting of large trees behind any retaining wall will adversely affect their performance and should be avoided.

G. Seismic Coefficients

The following site specific seismic parameters for the above referenced project were determined in accordance with the latest edition of the California Building Code requirements. The following parameters are consistent with the indicated project seismic environment and may be utilized for project design work.

Site Soil Profile Type	Seismic Zone	Seismic Zone Factor	Seismic Source Type	Seismic Response Coefficients					
				Na	Nv	Ca	Cv	Ts	To
SD	4	0.4	B	1.0	0.44	0.64	0.64	0.582	0.116
According to Chapter 16, Division IV and V, latest edition of the California Building Code									

Liquefaction and seismically induced settlements will not be factors in the development of the proposed structures and improvements.

H. Setbacks

1. Footings located on or adjacent to the top of slopes should be extended to a sufficient depth to provide a minimum horizontal distance of 7-feet or one-third of the slope height, whichever is greater (need not exceed 40-feet maximum) between the bottom edge of the footing and face of slope. Reinforcement for deepened footings should

be provided by the project structural engineer and detailed on the approved foundation plans.

2. The outer edge of all slopes experience "down slope creep", which may cause distress to structures. **If any structures including buildings, patios, sidewalks, swimming pools, spas etc, are placed within the setback, FURTHER RECOMMENDATIONS WILL BE REQUIRED.**

The concrete reinforcement recommendations provided herein should not be considered to preclude the development of shrinkage related cracks, etc.; rather, these recommendations are intended to minimize this potential. If shrinkage cracks do develop, as is expected from concrete, reinforcements tend to limit the propagation of these features. These recommendations are believed to be reasonable and in keeping with the local standards of construction practice. Special attention should be given to any "re-entrant" corners (∇ 270 degree corners) and curing practices during and after concrete pour in order to further minimize shrinkage cracks.

I. Slopes

1. All slopes should be landscaped with types of plants and planting that do not require excessive irrigation. Excess watering of slopes should be avoided. Slopes left unplanted will be subject to erosion. The irrigation system should be installed in accordance with the governing agencies.
2. Water should not be allowed to flow over the slopes in an uncontrolled manner. Until landscaping is fully established, plastic sheeting should be kept accessible to protect the slopes from periods of prolonged and/or heavy rainfall. Berms should be constructed along the top edges of all fill slopes. In no case should water be allowed to pond or flow over slopes.
3. Brow ditches should be constructed along the top of all cut slopes sufficient to guide runoff away from the building site and adjacent fill slopes prior to the project being completed.

J. Drainage

1. The owner/developer is responsible to insure adequate measures are taken to properly finish grade the building pad after the structures and other improvements are in place so that the drainage waters from the improved site and adjacent properties are directed away from proposed structures in accordance with the designed drainage patterns shown on the approved plans.

2. A minimum of 2% gradient should be maintained away from all foundations. Roof gutters and downspouts should be installed on the building, all discharge from downspouts should be led away from the foundations and slab to a suitable location. Installation of area drains in the yards should also be considered.

3. Planter areas adjacent to foundations should be provided with damp/water proofing, using an impermeable liner against the footings, and a subdrainage system within the planter area.

4. It should be noted that shallow groundwater conditions may still develop in areas where no such conditions existed prior to site development. This can be contributed to by substantial increases of surface water infiltration resulting from landscape irrigation which was not present before the development of the site. It is almost impossible to absolutely prevent the possibility of shallow groundwater on the entire site. Therefore, we recommend that shallow groundwater conditions be remedied if and when they develop.

5. The property owner should be made aware that altering drainage patterns, landscaping, the addition of patios, planters, and other improvements, as well as over irrigation and variations in seasonal rainfall, all affect subsurface moisture conditions, which in turn affect structural performance.

VII. GENERAL INFORMATION

It should be noted that the characteristics of as-compacted fill may change due to post-construction changes from cycles of drying and wetting, water infiltration, applied loads, environmental changes, etc. These changes can cause detrimental changes in the fill characteristics such as in strength behavior, compressibility behavior, volume change behavior, permeability, etc.

Where present, clayey deposits are subjected to continued swelling and shrinkage upon wetting and drying. Maintaining a uniform moisture during the post construction periods is essential in the future performance of the site structures and improvements.

The property owner(s) should be aware of the development of cracks in all concrete surfaces such as floor slabs and exterior stucco associated with normal concrete shrinkage during the curing process. The features depend chiefly upon the condition of concrete and weather conditions at the time of construction and do not reflect detrimental ground movement. Hairline stucco cracks will often develop at windows/door corners, and floor surface cracks up to 1/8-inch wide in 20 lineal feet may develop as a result of normal concrete shrinkage (according to the

American Concrete Institute).

The amount of shrinkage related cracks that occur in concrete slab-on-grades, flatwork and driveways depend on many factors, the most important of which is the amount of water in the concrete mix. The purpose of the slab reinforcement is to keep normal concrete shrinkage cracks closed tightly. The amount of concrete shrinkage can be minimized by reducing the amount of water in the mix. To keep shrinkage to a minimum, the following should be considered:

- A. Use the stiffest mix that can be handled and consolidated satisfactorily.
- B. Use the largest maximum size of aggregate that is practical, for example concrete made with 3/4-inch maximum size aggregate usually requires about 40-pounds (nearly 5 gallons) more water per cubic yard than concrete with 1-inch aggregate.
- C. Cure the concrete as long as practical.

The amount of slab reinforcement provided for conventional slab-on-grade construction considers that good quality concrete materials, proportioning, craftsmanship, and control tests where appropriate and applicable are provided.

This office is to be notified no later than 2 p.m. on the day before any of the following operations begin to schedule appropriate testing and/or inspections.

- A. Fill placed under any conditions 12-inches or more in depth, to include:
 - 1. Building pads.
 - 2. Street improvements, sidewalks, curbs and gutters.
 - 3. Utility trench backfills.
 - 4. Retaining wall backfills.
 - 5. The spreading or placement of soil obtained from any excavation (spoils from footings, underground utilities, swimming pools, etc.).
- B. Inspection and testing of subgrade and basegrade beneath driveways, patios, sidewalks, etc., prior to placement of pavement or concrete.
- C. Moisture testing.

- D. Geotechnical foundation inspections, if required by the governing agency.
- E. Any operation not included herein which requires our testing, observation, or inspection for certification to the appropriate agencies.

VIII. LIMITATIONS

Our description of grading operations, as well as observations and testing services herein, have been limited to those grading operations performed periodically from May 26, 2006 through June 27, 2006. The conclusions contained herein have been based upon our observations and testing as noted. No representations are made as to the quality or extent of materials not observed and tested.

This report is issued with the understanding that the owner or his representative is responsible to ensure that the information and recommendations are provided to the project architect/structural engineer so that they can be incorporated into the plans. Necessary steps shall be taken to ensure that the project general contractor and subcontractors carry out such recommendations during construction.

The project soil engineer should be provided the opportunity for a general review of the projects final design plans and specifications in order to ensure that the recommendations provided in this report are properly interpreted and implemented. The project soils engineer should also be provided the opportunity to field verify the foundations prior to placing concrete. If the project soil engineer is not provided the opportunity of making these reviews, he can assume no responsibility for misinterpretation of his recommendations.

The attached drawing details the approximate locations of cuts, fills, and approximate locations of the density tests taken, and is applicable to the site at the time this report was prepared. This report should be considered valid for permit purposes for a period of six months and is subject to review by our firm following that time. **IF ANY CHANGES ARE MADE, PAD SIZE, BUILDING LOCATION, ELEVATIONS, ETC., THIS REPORT WILL BECOME INVALID AND FURTHER ENGINEERING AND RECOMMENDATIONS WILL BECOME NECESSARY.**

If you have any questions or need clarification, please contact this office at your convenience. Reference to our **Job #06-215-F** will help to expedite our response to your inquiries.

We appreciate this opportunity to be of service to you.

VINJE & MIDDLETON ENGINEERING, INC.

Dennis Middleton
CEG #980

Steven J. Melzer
CEG #2362

DM/SJM/mpr

Distribution: Addressee: (6)

mpr\my files\fill control reports\06-215-f ryerson sycamore pointe as-grade report