South Shore Testing & Environmental

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Phone: (951) 239-3008 FAX: (951) 239-3122

December 14, 2020

Mr. Griffin Haupert
REXCO Development
1285 Corona Point Court, Suite 102
Corona, California 92879

SUBJECT: **UPDATE TO REPORT OF ROUGH GRADE COMPACTION TESTING**
Proposed Two-Story Office Building
Dos Lagos Development; APN 279-460-074
Pronio Circle
City of Corona, Riverside County, California
Work Order No. 0291402.22U

Dear Mr. Haupert:

In accordance with your request, we have prepared this "Update to Report of Rough Grade Compaction Testing" for the proposed two-story office building. A 20-scale "Precise Plan" prepared by Land Development Design Company, LLC (LDDC) of Ontario, California, was previously provided for our use and utilized to locate our field density tests (SS, 2016). Based on our site reconnaissance, numerous approximately 2 x 2 x 2-ft isolated footings have been excavated across the subject site since completion of grading. The remainder of the pad has not incurred significant damage since the completion of rough grading.

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The scope of work performed for this report included the following:

1. Onsite observation and documentation of existing site geometry and grading that has taken place with respect to the location of the proposed two-story office building.

2. Compilation of data obtained from previous laboratory testing (SS, 2016).

3. Compilation of data obtained from previous field observations and testing (SS, 2016).

4. Preparation of this report containing the results of laboratory and field testing, engineering analyses, and final foundation design minimums.

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Site Description

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Topographically, the subject site has been previously graded (SS, 2016). Vegetation on the site consists of a sparse growth of annual weeds and grasses. Drainage is accomplished by sheetflow toward existing drainage areas. Overall relief on the subject site is approximately 4-ft, from above mean sea elevations 841 to 845.

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CONCLUSIONS AND RECOMMENDATIONS

Conclusions

General

The development of the site as proposed is both feasible and safe from a geotechnical standpoint provided that the recommendations contained herein and in the referenced Supplemental Preliminary Geotechnical Report are implemented during design and construction. The recommendations for site development by this firm are presented below.

1. Owing to the existing weathered pad footings that have been excavated across the site, we recommend overexcavating the building pad a minimum of 3.5-ft below the pad surface and a minimum of 5-ft outside the building footprint.

2. Observation, classification, and based on the referenced report (SS, 2016) indicate that the near surface soils are **Non-Expansive** (Expansion Index ≥20 – 2016 CBC Section 1803.5.3) with and an EI of 11 consisting of a gravelly silty Sand (SM).

Recommendations

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Foundation design criteria, as modified by test results and analyses, are iterated herein for clarification and convenience.

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An allowable safe bearing capacity of 2,200 pounds per square foot (psf) may be used for design of continuous footings that maintain a minimum width of 12-inches and a minimum depth of at least 12-inches below the lowest adjacent grade. The bearing value may be increased by 20% for each additional foot of depth and/or width to a maximum of three times the designated value. The bearing value may be increased by one-third for seismic or other temporary loads.

Settlement

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Lateral Load Resistance

The bearing value of the soil may be increased by one third for short duration loading (wind, seismic). Lateral loads may be resisted by passive forces developed along the sides of concrete footings or by friction along the bottom of concrete footings. The value of the passive resistance for level ground may be computed using an equivalent fluid density of 335 pcf for level ground. The total force should not exceed 3,000 psf. A coefficient of friction of .35 may be used for the horizontal soil/concrete interface for resistance of lateral forces. If friction and passive forces are combined, then the passive values should be reduced by one third.

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Utility Trench Backfill

All trench excavations should be conducted in accordance with Cal-OSHA standards as a minimum. The soils encountered within our exploratory trenches are generally classified as Type "C" soil in accordance with current CAL/OSHA excavation standards. Based upon a soil classification of Type "C", the temporary excavations should not be inclined steeper than 1.5: 1 (h: v) for a maximum depth of 20-ft. For temporary excavations deeper than 20-ft or for conditions that differ from those described for Type "C" in the CAL/OSHA excavation standards, the project geotechnical engineer should be contacted.

Utility trench backfill should be compacted to a minimum of 90 percent of the maximum dry density determined in laboratory testing by the ASTM D 1557-12 test method. It is our opinion that utility trench backfills consisting of onsite or approved sandy soils can best be placed by mechanical compaction to a minimum of 90 percent of the maximum dry density. The upper 1-ft of utility trench excavations located within pavement areas should be compacted to a minimum of 95 percent of the maximum dry density.

Post Earthwork Construction

South Shore Testing & Environmental, or a duly designated representative, should be present to test and or confirm the conditions encountered during site development. In addition, post earthwork construction monitoring should be conducted at the following stages:

- Moisture content near optimum will necessarily need to be maintained, both to maintain proper compaction and to prevent wind erosion of the pad.

- At the completion of foundation excavations, but prior to the placement of steel and or other construction materials in them. As a requirement of this report, the undersigned must, in writing, certify that the foundations meet the minimum requirements of this report and the building plans for depth and width along with the earth materials being the appropriate moisture content and compaction. Backfilling of over deepened footings with earth materials will not be allowed and must be poured with concrete. Consequential changes and differences may exist throughout the earth materials on the site. It may be possible that certain excavations may have to be deepened slightly if earth materials are found to be loose or weak during these observations.

- Any other pertinent post construction activity where soils are excavated or manipulated or relied upon in any way for the performance of buildings or hardscape features. This would necessarily include preparation of exterior slab subgrades

- Cuts to 5-ft, or slightly more will stand vertical for normal time periods associated with construction of retaining walls. Time periods for unsupported cuts 5-ft or greater vertical should be limited to 60 days in the non-rainy season and 30 days in the rainy season.

Construction Monitoring Summary

These supplemental services are necessary and required during project development and construction. They are summarized here as follows:

- Foundation plan review.

- Observation of foundation excavations prior to placement of forms and construction materials.

- During the placement of utility trench backfill

- During preparation of subgrades for hardscape and concrete flatwork.

- During overexcavation and recompaction of the office pad.

- At any time when earth materials are manipulated and or relied upon for the support of structural loads or within the vicinity of where structural loads are already applied to soils.

LIMITATIONS

Our professional services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Engineers and Geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

This report is issued with the understanding that it is used only by the owner and it is the sole responsibility of the owner or their representative to ensure that the information and recommendations contained herein are brought to the attention of the architect, engineer, and appropriate jurisdictional agency for the project and incorporated into the plans; and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations contained herein during construction and in the field.

The samples taken and used for testing and the observations made are believed representative; however, soil and geologic conditions can vary significantly between test locations. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by **South Shore Testing & Environmental**.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and revision as changed conditions are identified.

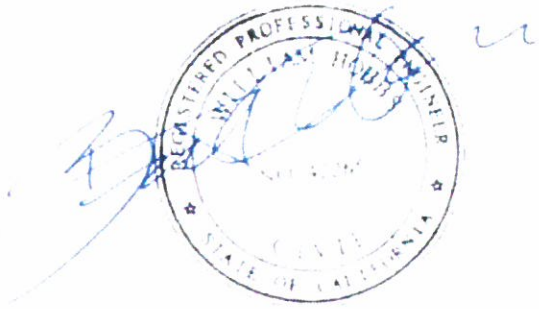
The firm that performed the geotechnical services thus far for this project should be retained to provide testing observation services during construction to maintain continuity of geotechnical interpretation and to check that the recommendations presented herein are implemented during site development, excavation of foundations and construction of improvements. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. Selection of another firm to perform any of the recommended activities or failure to retain the undersigned to perform the recommended activities wholly absolves **South Shore Testing & Environmental**, the undersigned, and its assigns from any and all liability arising directly or indirectly from any aspects of this project.

CLOSURE

The opportunity to be of service is appreciated. Should questions or comments arise pertaining to this document, or if we may be of further service, please do not hesitate to call our office.

Respectfully Submitted,

South Shore Testing and Environmental



John P. Frey
Project Manager

William C. Hobbs, RCE 42265
Civil Engineer

ATTACHMENTS

Appendix A - References
Appendix B - Laboratory Test Results
Appendix C - USGS Design Maps Summary Report

APPENDIX A

References

REFERENCES

California Building Standards Commission, 2019, "2019 California Building Code", California Code of Regulations, Title 24, Part 2, Volumes 1 and 2 of 2.

Gray, C.H., Jr., Morton, Douglas, M. and Weber, F.H., 2002, "Geologic Map of the Corona South 7.5 Minute Quadrangle, Riverside and Orange Counties, California", Scale: 1" = 2,000', U.S.G.S. Open-File Report 02-21.

Gray, Clifton H., Jr., 1961, "Geology of the Corona South Quadrangle and Santa Ana Narrows Area, Riverside, Orange and San Bernardino Counties, California and Mines and Mineral Deposits of the Corona South Quadrangle, Riverside and Orange Counties, California", California Division of Mines Bulletin 178.

Land Development Design Company, LLC, 2015, "Precise Grading Plan, Pronio Business Park, Dos Lagos, Corona, CA", Scale: 1" = 20', Dated February 9, 2015, Sheet 3 of 6 Job No. 4925.

Land Development Design Company, LLC, 2014, "Preliminary Grading Plan, Dos Lagos, Corona, CA", Scale: 1" = 20', Dated February 21, 2014, Job No. 4925, Sheet 1 of 1.

Neblett & Associates, Inc., 2007, "Mass/Rough Grade Compaction Report, Tract 32538, Lot 9, Proposed Hotel Site, Dos Lagos Development Site, City of Corona, California", Project No. 443-005-07, Dated November 26, 2007.

South Shore Testing & Environmental, 2014, "Report of Testing, Proposed Two-Story Office Building, Dos Lagos Development, APN No. 279-460-074, Pronio Circle, City of Corona, Riverside County, California", Dated August 18, 2016, Work Order No. 0291402.22

South Shore Testing & Environmental, 2014, "Update to Mass/Rough Grade Compaction Report, Proposed Two-Story Office Building, Dos Lagos Development, APN No. 279-460-074, Pronio Circle, City of Corona, Riverside County, California", Dated November 20, 2014, Work Order No. 0291402.00U

APPENDIX B

Laboratory Test Results

TABLE I Maximum Density/Optimum Moisture			
	Description	**Lbs/Ft^3**	**% Moisture**
1	Yellow Brown Silty Sand (SM)	132.5	7.5

TABLE II EXPANSION INDEX		
TEST LOCATION	EXPANSION INDEX	EXPANSION POTENTIAL
0-3-ft Building Pad	11	Non-Expansive

TABLE III CORROSIVITY SUITE				
TEST LOCATION	**SATURATED RESISTIVITY**	pH	**CHLORIDE CONTENT**	**SULFATE CONTENT**
0-3-ft Building Pad	1,050	8.0	90 ppm	0.058 % by wt

APPENDIX C

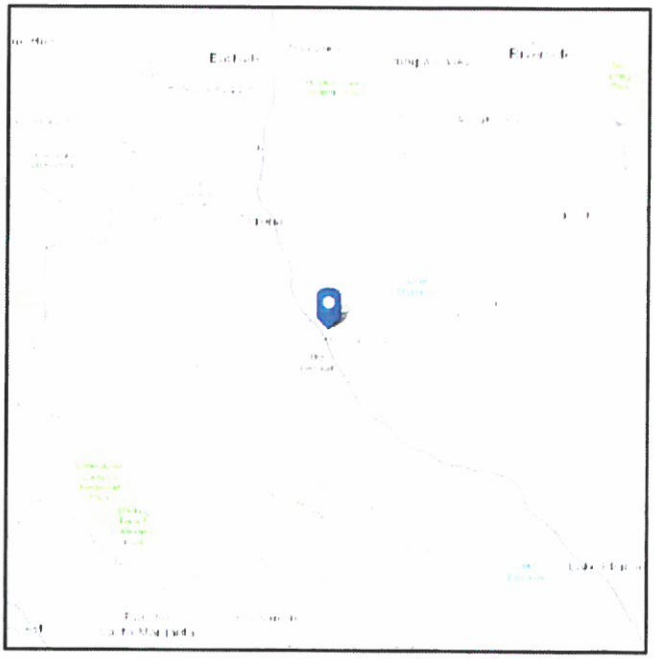
USGS Design Maps Summary Report

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: C - Very Dense Soil and Soft Rock

Elevation: 861.27 ft (NAVD 88)
Latitude: 33.8164
Longitude: -117.5073



ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

Seismic

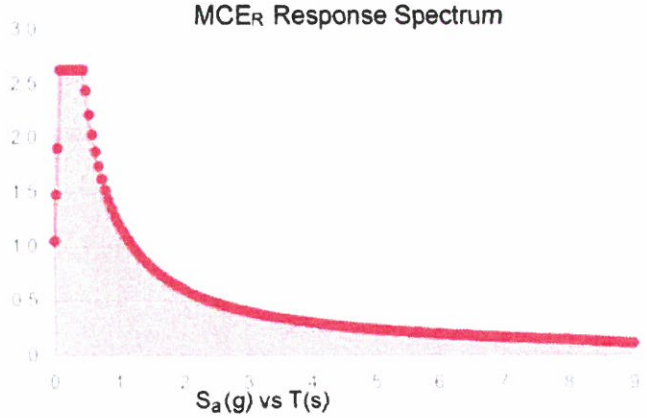
Site Soil Class: C - Very Dense Soil and Soft Rock

Results:

S_S :	2.197	S_{D1} :	0.814
S_1 :	0.872	T_L :	8
F_a :	1.2	PGA :	0.926
F_v :	1.4	PGA_M :	1.111
S_{MS} :	2.636	F_{PGA} :	1.2
S_{M1} :	1.22	I_e :	1
S_{DS} :	1.757	C_v :	1.3

Seismic Design Category E

MCE$_R$ Response Spectrum



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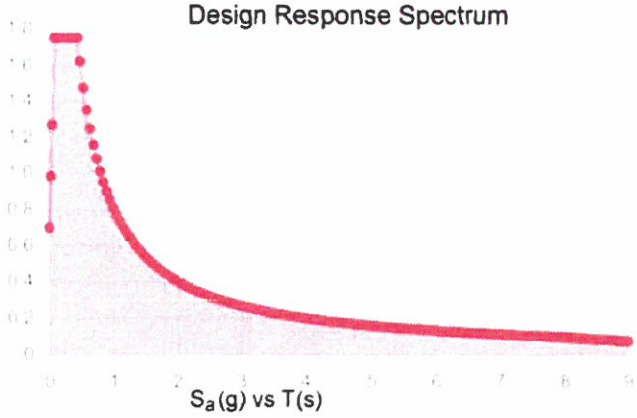
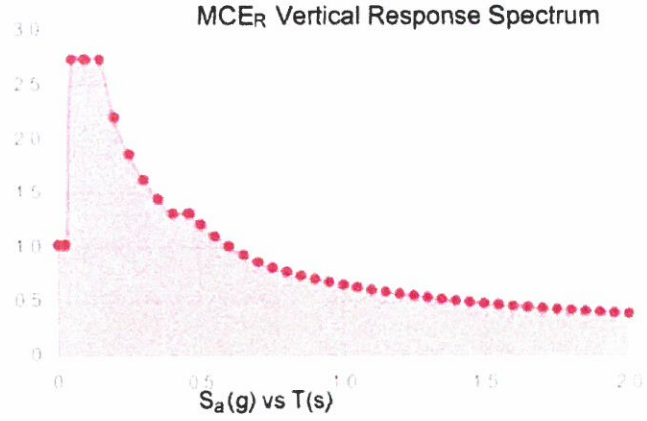
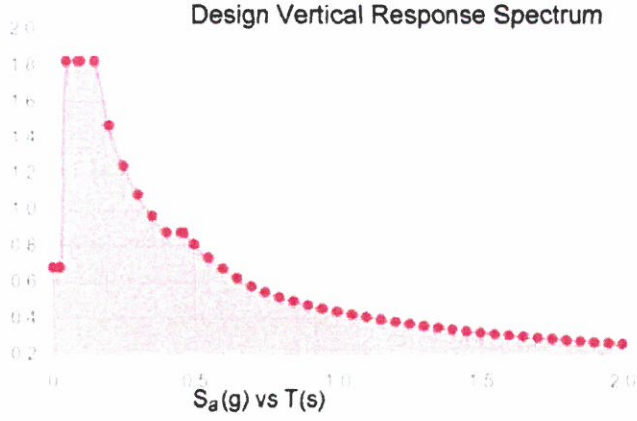


MCE$_R$ Vertical Response Spectrum



Design Vertical Response Spectrum



Data Accessed: Tue Dec 15 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

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Fine grading of areas outside of the proposed structures should be accomplished such that positive drainage exists away from all footings in accordance with 2019 CBC and local governing agency requirements. Run-off should be conducted in a non-erosive manner toward approved drainage devices per approved plans. No run-off should be allowed to concentrate and flow over the tops of slopes.

Utility Trench Backfill

All trench excavations should be conducted in accordance with Cal-OSHA standards as a minimum. The soils encountered within our exploratory trenches are generally classified as Type "C" soil in accordance with current CAL/OSHA excavation standards. Based upon a soil classification of Type "C", the temporary excavations should not be inclined steeper than 1.5: 1 (h: v) for a maximum depth of 20-ft. For temporary excavations deeper than 20-ft or for conditions that differ from those described for Type "C" in the CAL/OSHA excavation standards, the project geotechnical engineer should be contacted.

Utility trench backfill should be compacted to a minimum of 90 percent of the maximum dry density determined in laboratory testing by the ASTM D 1557-12 test method. It is our opinion that utility trench backfills consisting of onsite or approved sandy soils can best be placed by mechanical compaction to a minimum of 90 percent of the maximum dry density. The upper 1-ft of utility trench excavations located within pavement areas should be compacted to a minimum of 95 percent of the maximum dry density.

Post Earthwork Construction

South Shore Testing & Environmental, or a duly designated representative, should be present to test and or confirm the conditions encountered during site development. In addition, post earthwork construction monitoring should be conducted at the following stages:

- Moisture content near optimum will necessarily need to be maintained, both to maintain proper compaction and to prevent wind erosion of the pad.

- At the completion of foundation excavations, but prior to the placement of steel and or other construction materials in them. As a requirement of this report, the undersigned must, in writing, certify that the foundations meet the minimum requirements of this report and the building plans for depth and width along with the earth materials being the appropriate moisture content and compaction. Backfilling of over deepened footings with earth materials will not be allowed and must be poured with concrete. Consequential changes and differences may exist throughout the earth materials on the site. It may be possible that certain excavations may have to be deepened slightly if earth materials are found to be loose or weak during these observations.

- Any other pertinent post construction activity where soils are excavated or manipulated or relied upon in any way for the performance of buildings or hardscape features. This would necessarily include preparation of exterior slab subgrades

- Cuts to 5-ft, or slightly more will stand vertical for normal time periods associated with construction of retaining walls. Time periods for unsupported cuts 5-ft or greater vertical should be limited to 60 days in the non-rainy season and 30 days in the rainy season.

Construction Monitoring Summary

These supplemental services are necessary and required during project development and construction. They are summarized here as follows:

- Foundation plan review.

- Observation of foundation excavations prior to placement of forms and construction materials.

- During the placement of utility trench backfill

- During preparation of subgrades for hardscape and concrete flatwork.

- During overexcavation and recompaction of the office pad.

- At any time when earth materials are manipulated and or relied upon for the support of structural loads or within the vicinity of where structural loads are already applied to soils.

LIMITATIONS

Our professional services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Engineers and Geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

This report is issued with the understanding that it is used only by the owner and it is the sole responsibility of the owner or their representative to ensure that the information and recommendations contained herein are brought to the attention of the architect, engineer, and appropriate jurisdictional agency for the project and incorporated into the plans; and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations contained herein during construction and in the field.

The samples taken and used for testing and the observations made are believed representative; however, soil and geologic conditions can vary significantly between test locations. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by **South Shore Testing & Environmental**.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and revision as changed conditions are identified.

The firm that performed the geotechnical services thus far for this project should be retained to provide testing observation services during construction to maintain continuity of geotechnical interpretation and to check that the recommendations presented herein are implemented during site development, excavation of foundations and construction of improvements. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. Selection of another firm to perform any of the recommended activities or failure to retain the undersigned to perform the recommended activities wholly absolves **South Shore Testing & Environmental**, the undersigned, and its assigns from any and all liability arising directly or indirectly from any aspects of this project.

CLOSURE

The opportunity to be of service is appreciated. Should questions or comments arise pertaining to this document, or if we may be of further service, please do not hesitate to call our office.

Respectfully Submitted,

South Shore Testing and Environmental

John P. Frey
Project Manager

William C. Hobbs, RCE 42265
Civil Engineer

ATTACHMENTS

Appendix A - References
Appendix B - Laboratory Test Results
Appendix C - USGS Design Maps Summary Report

APPENDIX A

References

REFERENCES

California Building Standards Commission, 2019, "2019 California Building Code", California Code of Regulations, Title 24, Part 2, Volumes 1 and 2 of 2.

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Land Development Design Company, LLC, 2015, "Precise Grading Plan, Pronio Business Park, Dos Lagos, Corona, CA", Scale: 1" = 20', Dated February 9, 2015, Sheet 3 of 6 Job No. 4925.

Land Development Design Company, LLC, 2014, "Preliminary Grading Plan, Dos Lagos, Corona, CA", Scale: 1" = 20', Dated February 21, 2014, Job No. 4925, Sheet 1 of 1.

Neblett & Associates, Inc., 2007, "Mass/Rough Grade Compaction Report, Tract 32538, Lot 9, Proposed Hotel Site, Dos Lagos Development Site, City of Corona, California", Project No. 443-005-07, Dated November 26, 2007.

South Shore Testing & Environmental, 2014, "Report of Testing, Proposed Two-Story Office Building, Dos Lagos Development, APN No. 279-460-074, Pronio Circle, City of Corona, Riverside County, California", Dated August 18, 2016, Work Order No. 0291402.22

South Shore Testing & Environmental, 2014, "Update to Mass/Rough Grade Compaction Report, Proposed Two-Story Office Building, Dos Lagos Development, APN No. 279-460-074, Pronio Circle, City of Corona, Riverside County, California", Dated November 20, 2014, Work Order No. 0291402.00U

APPENDIX B

Laboratory Test Results

TABLE I Maximum Density/Optimum Moisture			
	Description	**Lbs/Ft^3**	**% Moisture**
1	Yellow Brown Silty Sand (SM)	132.5	7.5

TABLE II EXPANSION INDEX		
TEST LOCATION	EXPANSION INDEX	EXPANSION POTENTIAL
0-3-ft Building Pad	11	Non-Expansive

TABLE III CORROSIVITY SUITE				
TEST LOCATION	**SATURATED RESISTIVITY**	pH	**CHLORIDE CONTENT**	**SULFATE CONTENT**
0-3-ft Building Pad	1,050	8.0	90 ppm	0.058 % by wt

APPENDIX C

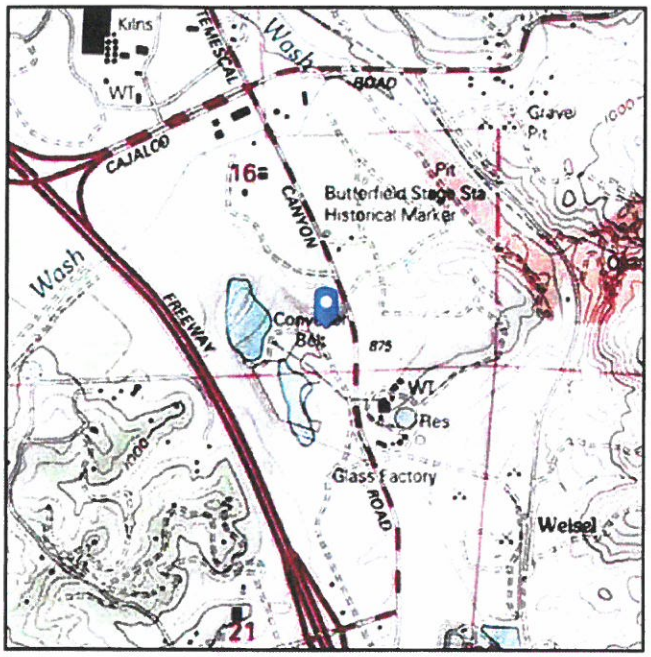
USGS Design Maps Summary Report

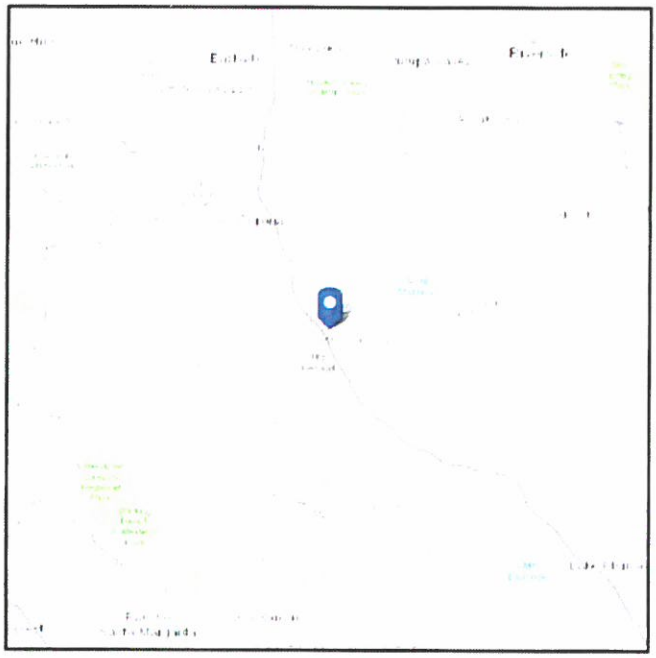
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: C - Very Dense Soil and Soft Rock

Elevation: 861.27 ft (NAVD 88)
Latitude: 33.8164
Longitude: -117.5073





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Seismic

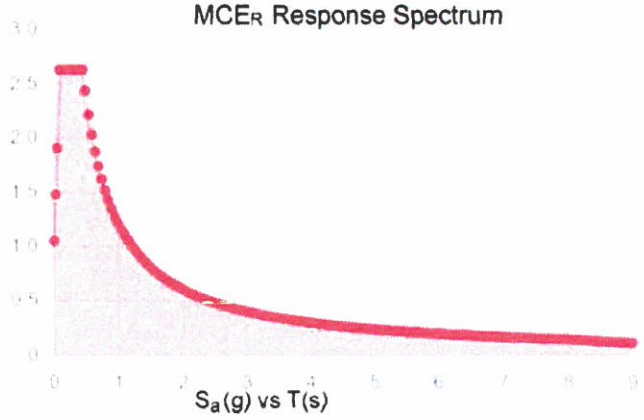
Site Soil Class: C - Very Dense Soil and Soft Rock

Results:

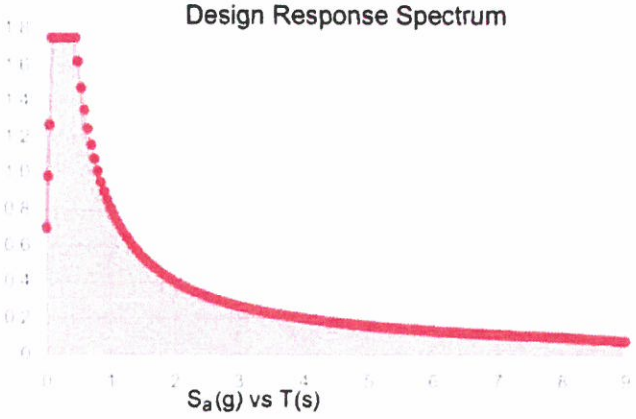
S_S :	2.197	S_{D1} :	0.814
S_1 :	0.872	T_L :	8
F_a :	1.2	PGA :	0.926
F_v :	1.4	PGA_M :	1.111
S_{MS} :	2.636	F_{PGA} :	1.2
S_{M1} :	1.22	I_e :	1
S_{DS} :	1.757	C_v :	1.3

Seismic Design Category E

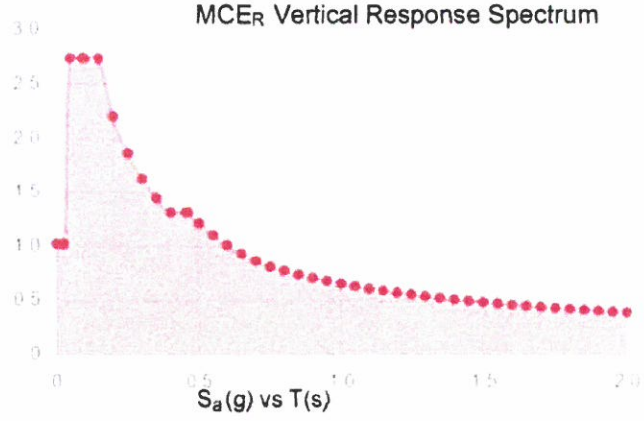
MCE$_R$ Response Spectrum



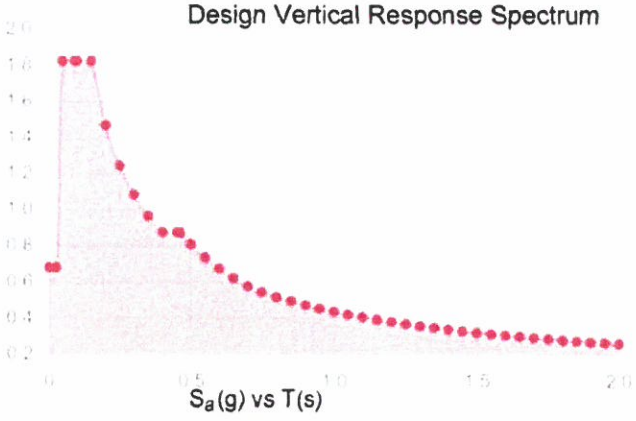
Design Response Spectrum



MCE$_R$ Vertical Response Spectrum



Design Vertical Response Spectrum



Data Accessed: Tue Dec 15 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

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The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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