CITY OF NEWPORT BEACH **3300 Newport Boulevard** **P.O. Box 1768** **Newport Beach, CA 92658-8915** **(949) 644-3200**	# NOTICE OF DETERMINATION
To: ☒ Office of Planning and Research P.O. BOX 3044 Sacramento, CA 95812-3044	**From:** City of Newport Beach Planning Department 3300 Newport Boulevard P.O. Box 1768 Newport Beach, CA 92658-8915
☒ County Clerk, County of Orange Public Services Division Santa Ana, CA 92702	Date received for filing at OPR/County Clerk:

FILED DEC 2 0 2011 TOM DALY, CLERK-RECORDER By: DEPUTY

Subject: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

1 Big Canyon, Newport Beach CA 926[illegible]

Project Name:	Big Canyon Subdivision	**Applicant:**	Big Canyon Country Club
State Clearinghouse Number	**Lead Agency Contact Person** *Makana Nova, Assistant Planner*		**Area Code/Telephone/Extension** *949/644-3249*
Project Location (include county):	The project site is located in Orange County. The project site is located within the Big Canyon Planned Community (BCPC) which is surrounded by four arterial streets: Jamboree Road, Ford Road, MacArthur Boulevard, and San Joaquin Hills Road. The project site is located on the north side of Big Canyon Drive, between Rue Biarritz and Rue Villars.		

Project Description: The City of Newport Beach has completed a subsequent initial study and Mitigated Negative Declaration No. ND2010-006 (PA2010-092) for the Big Canyon Residential Lot Grading. Mitigated Negative Declaration No. ND2008-003 was approved for General Plan Amendment No. GP2007-008, Planned Community Text Amendment No. PD2007-008, and Parcel Map No. NP2007-029 (PA2007-210) to allow the creation of a new single-family residential parcel at 10 Big Canyon. The applicant proposes additional grading to raise the existing grade on the project site by 10 feet to improve the integrity of the currently wet alluvial soils and create a pad for future development of a single-family residence on the subject property within the PC-8 (Big Canyon Planned Community) Zoning District). Approximately 12,000 cubic yards of soil will be removed and spread over a 1.8 acre area on the northern portion of the subject property and across the Big Canyon Golf Course (1850 Jamboree Road) adjacent to the subject property to the northwest. An additional 7,000 cubic yards of soil will be exported to a spoils site located at the east end of the golf course adjacent to MacArthur Boulevard (1850 Jamboree Road). Following removal of soil from the project site, 45,000 cubic yards of soil will be imported from the Orange County Sanitation District (10844 Ellis Avenue, Fountain Valley, CA) to replace unusable soil with "clean" imported fill and will raise the pad for subsequent development of the project site. Project grading is expected to occur over a 60-day period beginning in March of 2012. Included in the grading project is the enclosure of 175 square feet (0.004 acre) of the existing relict drainage feature into a single, 48-inch corrugated metal pipe to redirect the drainage feature on the Big Canyon Golf Course.

This is to advise that the **City of Newport Beach** has approved the above described project on **December 19, 2011** and has made the following determinations regarding the above described project:

1. The City is [☑ Lead Agency ☐ Responsible Agency] for the project.
2. The project [☐ will ☑ will not] have a significant effect on the environment.
3. ☐ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
   ☑ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
4. Mitigation measures [☑ were ☐ were not] made a condition of the approval of the project.
5. A mitigation reporting or monitoring plan [☑ was ☐ was not] adopted for this project.
6. A Statement of Overriding Considerations [☐ was ☑ was not] adopted for this project.
7. Findings [☐ were ☑ were not] made pursuant to the provisions of CEQA.

The final EIR or Negative Declaration and record of project approval is available for review at the City of Newport Beach Planning Department located at 3300 Newport Boulevard, Newport Beach, CA 92658-8915; 949/644-3200

POSTED DEC 2 0 2011 TOM DALY, CLERK-RECORDER By DEPUTY

Makana Nova, Assistant Planner

Date 12/20/11

Recorded in Official Records, Orange County
Tom Daly, County Recorder
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SUBSEQUENT MITIGATED NEGATIVE DECLARATION

BIG CANYON RESIDENTIAL LOT GRADING

ND2010-006 (PA2010-092)

State Clearinghouse No. 2011061084

Lead Agency

City of Newport Beach
3300 Newport Boulevard
Newport Beach, CA 92658-8915

Contact: Makana Nova, Assistant Planner
949-644-3249
mnova@newportbeachca.gov

Project Applicant

Big Canyon Country Club
One Big Canyon Drive
Newport Beach, CA 92660

Environmental Consultant

Phil Martin & Associates
3002 Dow Avenue, Suite 520
Tustin, CA 92780
714-544-1944

DECEMBER 20, 2011 FINAL

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1.0 PROJECT INFORMATION AND CHECKLIST

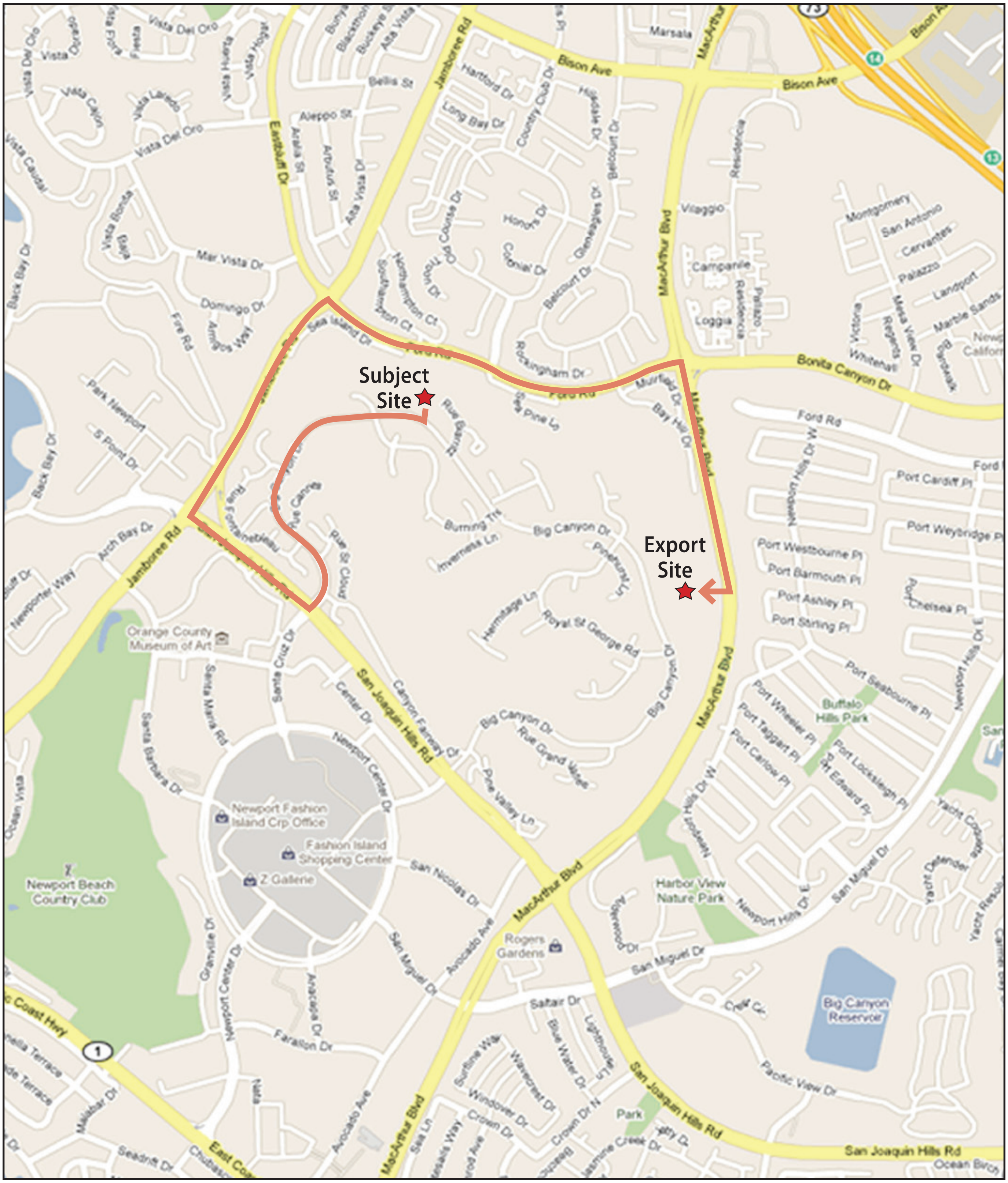
1.	Project Title:	**Big Canyon Residential Lot Grading**
2.	Lead Agency Name and Address:	**City of Newport Beach** **Planning Department** **3300 Newport Boulevard** **Newport Beach, CA 92658-8915**
3.	Contact Person and Phone Number:	**Makana Nova, Planning Department** **(949) 644-3249**
4.	Project Location:	**1 Big Canyon Drive** **Newport Beach, CA**
5.	Project Sponsor's Name and Address:	**Big Canyon Country Club**
6.	General Plan Designation**:**	**Residential**
7.	Zoning:	**Big Canyon Planned Community**

8. Description of Project:

The project site, located at 10 Big Canyon in Newport Beach, California, consists of a single-family residential property on a 1.9-acre parcel in the PC-8 (Big Canyon Planned Community) zoning district. The location of the project site is shown in Figure 1, Local Vicinity Map. The applicant proposes additional grading to raise the existing grade on the project site by 10 feet to improve the integrity of the currently wet alluvial soils and create a pad for future development of a single-family residence on the subject property.

The project site was previously graded in 2000. In 2009, the City of Newport Beach approved General Plan Amendment No. GP2007-008, Planned Community Development Plan Amendment No. PD2007-005, Mitigated Negative Declaration (MND) No. 2008-003, and Parcel Map No. NP2007-029 (County Parcel Map No. 2008-111) to create a new residential lot on a portion of the Big Canyon Golf Course. The project requires a subsequent mitigated negative declaration to assess impacts associated with the scope of work beyond that which was addressed in the original MND (Mitigated Negative Declaration No. ND2008-003) and the approval of a grading permit from the City of Newport Beach.

This Draft Subsequent Mitigated Negative Declaration (Subsequent MND) is prepared for the Big Canyon Residential Lot Grading in accordance with the California



Source: *Google Maps*

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Figure 1
Local Vicinity Map

Environmental Quality Act (CEQA). This Subsequent MND is prepared pursuant to CEQA Guidelines Section 15162. In compliance with Sections 15162(a)(1-3(A,B) this Subsequent MND contains additions and revisions to the Big Canyon Subdivision MND previously completed by the City.

The project includes the removal of 19,000 cubic yards of unusable soil from the site. Approximately 12,000 cubic yards of this soil will be spread over 1.8 acres on the northern portion of the subject property and on the Big Canyon Golf Course (1850 Jamboree Road) to the northwest of the subject property. The portion of the golf course over which the soil will be spread includes a 10-foot wide sewer and storm drain easement that is managed by the City of Newport Beach. In addition, this area includes a 185-foot long relict drainage feature that ranges from 0.5 to 2 feet in width. The drainage feature is fed by a 48-inch corrugated metal pipe and a 12-inch plastic pipe that carries storm water. Southwest of the project site, lays a downstream area on the golf course that was previously created as 935 square feet of wetland and riparian mitigation for another project in 2006. Figure 2 is an aerial photograph of the site.

The remaining 7,000 cubic yards of spoils will be exported and stockpiled off-site for later use. Figure 3 is an aerial photograph of the proposed stockpile site where the 7,000 cubic yards of spoils will be stockpiled and used throughout the golf course for fill dirt as needed over the next three to five years. The stockpile will be approximately 10 feet high, 130 feet wide and 500 feet long with 2:1 slopes as shown in Figure 4, Stockpile Grading Plan. The stockpile site is located at the east end of the golf course adjacent to MacArthur Boulevard (1850 Jamboree Road). The stockpile will be elevated 22 to 31 feet above MacArthur Boulevard.

Following removal of soil from the project site, 45,000 cubic yards of soil will be imported from the Orange County Sanitation District (10844 Ellis Avenue, Fountain Valley, CA) to replace unusable soil with “clean” imported fill and will raise the pad for subsequent development of the project site. Project grading is expected to occur over a 60-day period beginning in March of 2012. Included in the grading project is the enclosure of 175 square feet (0.004 acre) of the existing relict drainage feature into a single, 48-inch corrugated metal pipe to redirect the drainage feature on the Big Canyon Golf Course. In addition, the grading project includes the development of a new access road along the length of the existing sewer easement to allow for adequate maintenance of the storm drain located on the adjacent Big Canyon Golf Course (1850 Jamboree Road). The grading plan for the proposed residential site is shown in Figure 5, Proposed Grading Plan. The proposed building pad and existing sewer easement are shown in Figure 6, Parcel Map 2008-III. Photographs of the site are shown in Figure 7, Site Photographs.

9. Surrounding Land Uses:

Surrounding the property are single-family detached dwellings to the east and west. South of the site is Big Canyon Drive with single-family detached residences beyond.

Source: City of Newport Beach

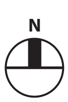

Figure 2
Aerial Photo

Source: Google Maps, 2010

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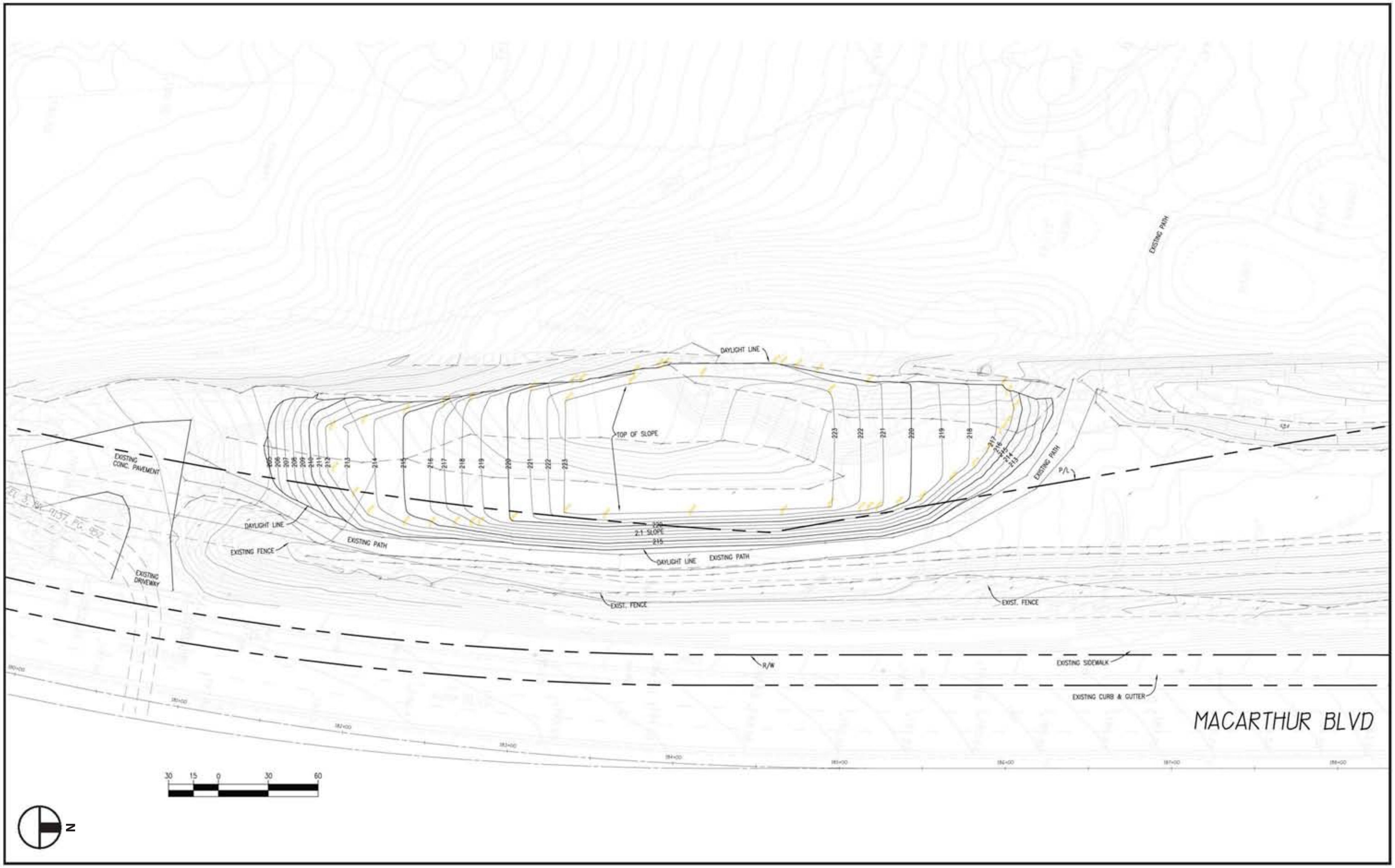
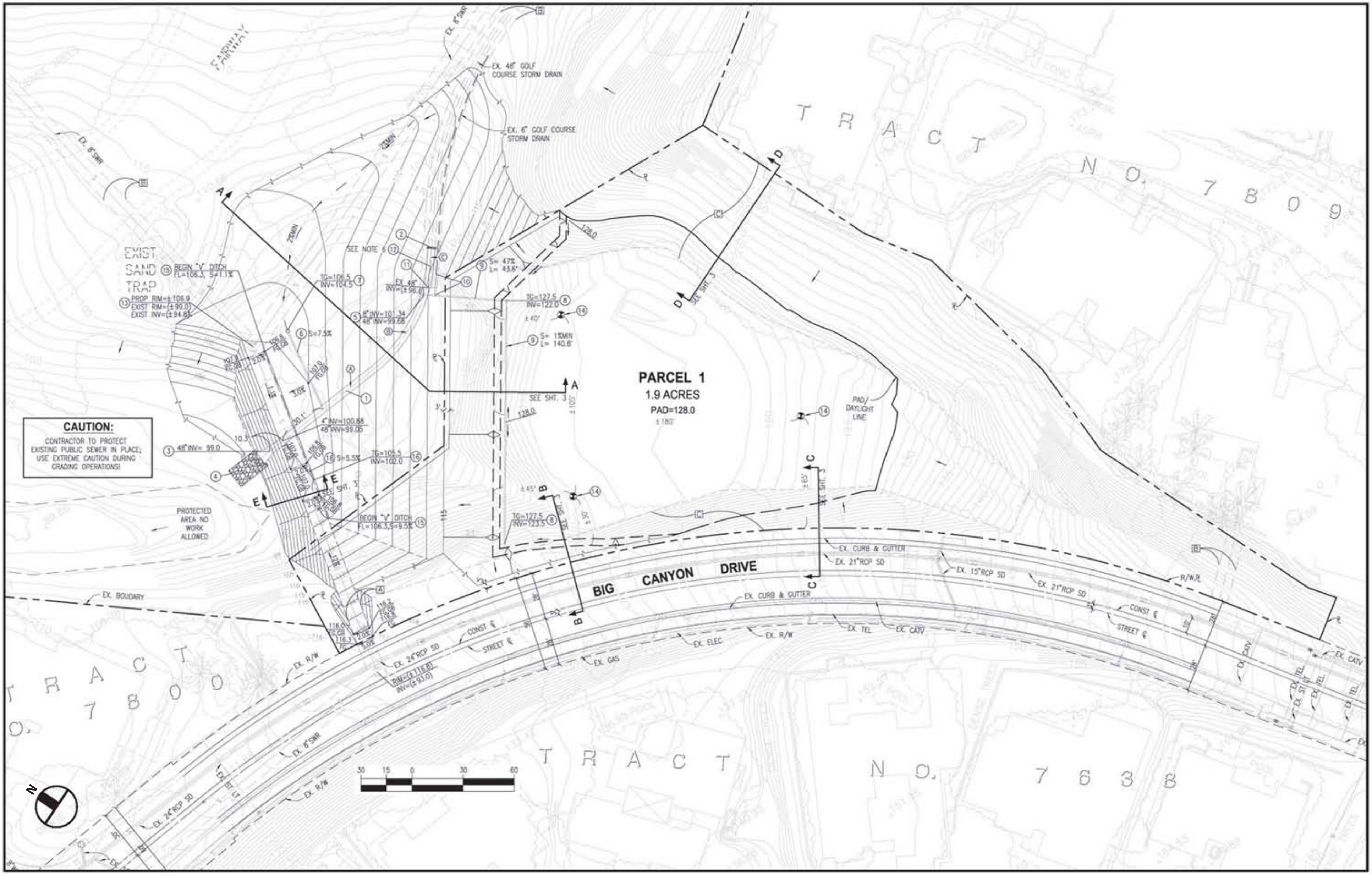
Figure 3
Stockpile Aerial



Source: Walden & Associates

Figure 4
Stockpile Grading Plan



Source: Walden & Associates

Figure 5
Proposed Grading Plan

Source: Walden & Associates

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Figure 6

Parcel Map No. 2008-III

Looking southwest across the site from the site access road.

Looking north across the site from the site access road.

Looking at the golf course northwest of the site where dirt will be spread.

Looking southeast at the site from the golf course.

Figure 7
Site Photos

Source: Phil Martin & Assoc.

North and adjacent to the project site is the Big Canyon Golf Course and further north are single-family detached residences that front the golf course.

Current Development:	**Golf course**
To the north:	Golf course with single-family detached dwellings beyond
To the east:	Single-family detached dwellings
To the south:	Big Canyon Drive with single-family detached dwellings beyond
To the west:	Single-family detached dwellings

10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)

    The U.S. Army Corps of Engineers, California Department of Fish and Game and the Regional Water Quality Control Board – Santa Ana Region.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture & Forest Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology & Soils
☐ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials	☐ Hyrdology & Water Quality
☐ Land Use & Planning	☐ Mineral Resources	☐ Noise
☐ Population & Housing	☐ Public Services	☐ Recreation
☐ Transportation/ Circulation	☐ Utilities & Service Systems	☐ Mandatory Findings of Significance

DETERMINATION:

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment and a NEGATIVE DECLARATION will be prepared. ☐

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent.

A MITIGATED NEGATIVE DECLARATION will be prepared. ☑

I find that the proposed project MAY have a significant effect on the environment and ENVIRONMENTAL IMPACT REPORT is required. ☐

I find that the proposed project MAY have a significant effect(s) on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets, if the effect is a "potentially significant impact" or "potentially significant unless mitigated." An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed. ☐

I find that although the proposed project could have a significant effect on the environment, there WILL NOT be a significant effect in this case because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards and (b) have been avoided or mitigated pursuant to that earlier EIR, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required. ☐

Prepared by: Makana Nova, Assistant Planner	Signature	December 20, 2011 Date
Prepared by: Phil Martin – Phil Martin & Associates	Signature	December 20, 2011 Date

ENVIRONMENTAL CHECKLIST

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
I.	**AESTHETICS.** Would the project:				
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☑
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☑
c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☑	☐
d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☑
II.	**AGRICULTURE RESOURCES.** Would the project:				
a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☑
b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☑
c)	Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☑

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
d) Result in the loss of forest land or conversion of forest land to non-forest use	☐	☐	☐	☑
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☐	☑
III. AIR QUALITY. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☑	☐	☐
b) Violate any air quality standard or contribute to an existing or projected air quality violation?	☐	☑	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☑	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☑	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☑	☐
IV. BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☑	☐

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☑	☐
c)	Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☑	☐
d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☑	☐
e)	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☑
f)	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☑
V.	**CULTURAL RESOURCES.** Would the project:				
a)	Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☑
b)	Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☑	☐	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☑	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☑
VI. GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☑	☐	☐
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☑	☐	☐
ii) Strong seismic ground shaking?	☐	☑	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☑	☐	☐
iv) Landslides?	☐	☑	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☑	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☑	☐	☐
d) Be located on expansive soil, as defined in Table 18- 1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☑	☐	☐

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
e)	Have soils incapable of adequately supporting the use septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☑
VII. GREENHOUSE GAS EMISSIONS					
Would the project:					
a)	Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☑	☐
b)	Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☑	☐
VIII. HAZARDS AND HAZARDOUS MATERIALS.	Would the project:				
a)	Create a significant hazard to the public or the environment through routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☑
b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☑	☐
c)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☑	☐
d)	Be located on a site which is included on a list of hazardous materials sites which complied pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☑

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
e) For a project within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☑	☐
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☑
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☑
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☑
IX. HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☑	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☑	☐

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
c)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☑	☐	☐
d)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of a course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off-site?	☐	☐	☑	☐
e)	Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☑	☐
f)	Otherwise substantially degrade water quality?	☐	☐	☑	☐
g)	Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☑
h)	Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☑
i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☑
j)	Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☑
X. LAND USE AND PLANNING.	Would the proposal:				
a)	Physically divide an established community?	☐	☐	☐	☑

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☑
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☑
XI. MINERAL RESOURCES.				
Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☑
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☑
XII. NOISE. Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☑	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☑	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☑

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
d)	A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☑	☐
e)	For a project located within an airport land use land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑
f)	For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑
XIII.	**POPULATION AND HOUSING.** Would the project:				
a)	Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☑
b)	Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑
c)	Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
XIV. PUBLIC SERVICES. Would the project:				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☑	☐
Police protection?	☐	☐	☑	☐
Schools?	☐	☐	☑	☐
Other public facilities?	☐	☐	☑	☐
XV. RECREATION.				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☑
b) Does the project include recreational facilities or require the construction of or expansion of recreational facilities which might have an adverse physical effect on the environment? opportunities?	☐	☐	☐	☑
XVI. TRANSPORTATION/TRAFFIC. Would the project:				

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a)	Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☑	☐
b)	Conflict with an applicable congestion management program, including, but not limited to level of service standard and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☑	☐
c)	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☑
d)	Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☑	☐	☐
e)	Result in inadequate emergency access?	☐	☐	☑	☐
f)	Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	☑
XVII.	**UTILITIES & SERVICE SYSTEMS.** Would the project:				
a)	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☑

		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
b)	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☑
c)	Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☑	☐
d)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☑	☐
e)	Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☑
f)	Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☑	☐
g)	Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☑

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE.		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a)	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major period of California history or prehistory?	☐	☑	☐	☐
b)	Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☐	☑	☐	☐
c)	Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☑	☐	☐

EARLIER ANALYSES.

Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, one or more effects have been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D).

a) Earlier analyses used. General Plan Amendment No. GP2007-008, Planned Community Development Plan Amendment No. PD2007-005, Mitigated Negative Declaration (MND) No. 2008-003, and Parcel Map No. NP2007-029 (County Parcel Map No. 2008-111)

b) Impacts adequately addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

c) Mitigation measures. For effects that are "Less than Significant with Mitigation Incorporated," describe the mitigation measures, which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

The earlier analysis referenced in “a)” above recommended four mitigation measures to reduce potential impacts of the project proposed at that time to less than significant. The four mitigation measures are provided below with a discussion following each measure to describe how each measures is or is not applicable to the current proposed project.

All of the effects in the above checklist, with the exception of air quality, biological resources, greenhouse gases, noise, and traffic were adequately addressed in the previously referenced in the earlier document (MND No. 2008-003). Due to the quantity of grading that is proposed for the proposed project, additional analysis to that provided in MND No. 2008-003 is required for the current project. As a result, technical studies and updated discussion and analysis to the previous Mitigated Negative Declaration are provided, including updated air quality, biological resources, greenhouse gases, noise, and traffic analysis.

The mitigation measures that were proposed in MND No. 2008-003 for the previous project are applicable to and carried forward for the current project proposal. Those mitigation measures are listed below.

Biological Resources

Mitigation Measure. The project site has some potential to support nesting migratory birds. Impacts to such species are prohibited under the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code. In order to ensure that the proposed project will not impact nesting migratory birds, the following mitigation measure is recommended:

- If vegetation is to be removed during the nesting season, recognized from February 1 through August 31, a qualified biologist will conduct a nesting bird survey of potentially suitable nesting vegetation no more than three days prior to vegetation removal. If active nests are identified during nesting bird surveys, then the nesting vegetation will be avoided until the nesting event has completed and the juveniles can survive independently from the nest. The biologist will flag the active nesting vegetation, and will establish an adequate buffer around the nesting vegetation of 300 feet (500 feet for raptors). If active nests are identified, clearing/grading shall not occur within the buffer until the nesting event has completed.

Response – The mitigation measure was proposed for the original site so that any vegetation removed was properly surveyed for nesting migratory birds. The site has vegetation, therefore, this mitigation measure is applicable to the proposed project.

Cultural Resources

Mitigation Measure. Prior to approval of a grading plan, the property owner/developer shall submit a letter to the Planning Department showing that a qualified archaeologist has been hired to ensure that the following actions are implemented.

- The archaeologist must be present at the pre-grading conference in order to establish procedures for temporarily halting or redirecting work to permit the sampling, identification, and evaluation of artifacts if potentially significant artifacts are uncovered. If artifacts are uncovered and determined to be significant, the archaeological observer shall determine appropriate actions in cooperation with the property owner/developer for exploration and/or salvage.
- Specimens that are collected prior to or during the grading process will be donated to an educational or research institution.
- Any archaeological work at the site shall be conducted under the direction of the certified archaeologist. If any artifacts are discovered during grading operations when the archaeological monitor is not present, grading shall be diverted around the area until the monitor can survey the area.
- A final report detailing the findings and disposition of the specimens shall be submitted to the City Engineer. Upon Completion of the grading, the archaeologist shall notify the City as to when the final report will be submitted.

Mitigation Measure. The property owner/develop shall submit a letter to the Planning Department showing that a certified paleontologist has been hired to ensure that the following actions are implemented:

- The paleontologist must be present at the pre-grading conference in order to establish procedures to temporarily halt or redirect work to permit the sampling, identification, and evaluation of fossils. If potentially significant materials are discovered, the paleontologist shall determine appropriate actions in cooperation with the property owner/developer for exploration and/or salvage.
- Specimens that are collected prior to or during the grading process will be donated to an appropriate educational or research institution.
- Any paleontological work at the site shall be conducted under the direction of the certified paleontologist. If any fossils are discovered during grading operations when the paleontological monitor is not present, grading shall be diverted around the area until the monitor can survey the area.
- A final report detailing the findings and disposition of the specimens shall be submitted. Upon the completion of the grading, the paleontologist shall notify the City as to when the final report will be submitted.

Response: These two mitigation measures were applicable to the site since the original site was to be disturbed to construct the existing pad. As part of the grading activity to construct the existing pad the original site would be disturbed below the surface to prepare the ground for fill material. As such, there was the potential for archaeological and/or paleontological resource impacts. The current project proposes to remove and disturbed soil that was previously imported to the site that may contain paleontological or archaeological resources. Any grading with the proposed project that occurs below the previously imported soil could encounter archaeological or paleontological resources, if present. Thus, the previous mitigation measures to protect archaeological and paleontological resources are applicable to the current project proposal.

Transportation/Traffic

Mitigation Measure. The Traffic Engineer will require during the plan check review phase that the proposed project to be designed to accommodate vehicular turnaround on-site. Backing out on to Big Canyon Drive is prohibited.

Response: Since dump trucks will be exporting and importing dirt from and to the site, respectively, this measure is applicable to the current proposed project and will be incorporated by reference.

SOURCE LIST

The following enumerated documents are available at the offices of the City of Newport Beach, Planning Department, 3300 Newport Boulevard, Newport Beach, California 92660.

1. Final Program EIR – City of Newport Beach General Plan
2. General Plan, including all its elements, City of Newport Beach.
3. Title 20, Zoning Code of the Newport Beach Municipal Code.
4. City Excavation and Grading Code, Newport Beach Municipal Code.
5. Chapter 10.28, Community Noise Ordinance of the Newport Beach Municipal Code.
6. General Plan Amendment No. GP2007-008, Planned Community Development Plan Amendment No. PD2007-005, Negative Declaration (MND) No. 2008-003, and Parcel Map No. NP2007-029 (County Parcel Map No. 2008-111), January 27, 2009

2.0 ENVIRONMENTAL ANALYSIS

I. AESTHETICS.

a) Have a substantial adverse effect on a scenic vista?

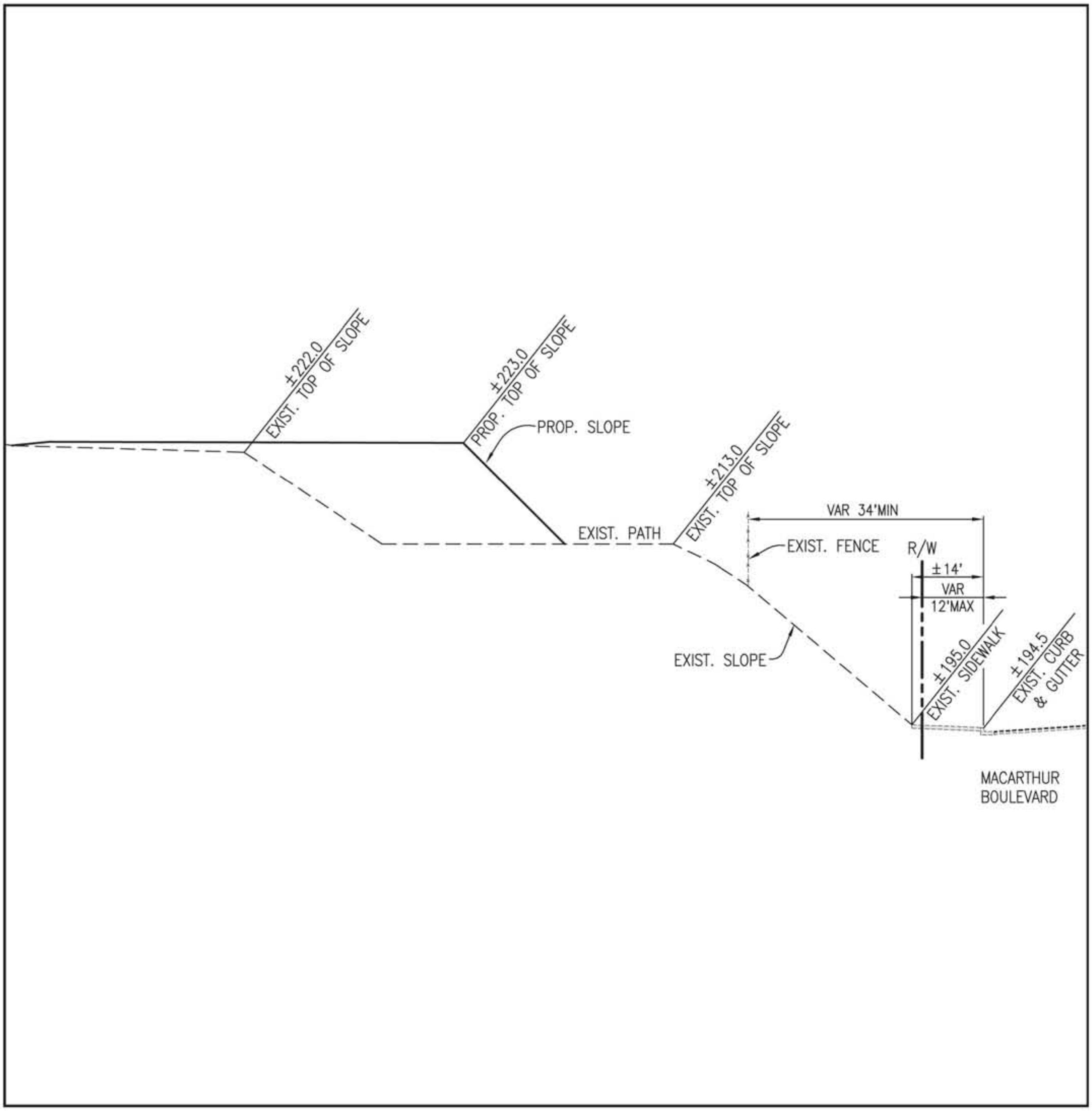
No Impact. The 1.9-acre site is located north of Big Canyon Drive in the Big Canyon Planned Community. The existing pad on the site is approximately 48 feet lower in elevation than the residential properties adjacent to the site on the east, south and west. The Big Canyon golf course is adjacent to and north of the project site and approximately 20 feet lower in elevation than the proposed residential pad. North of the golf course, are single-family detached homes that front the golf course.

The site is only visible to the residents immediately adjacent to the site. City policies do not protect private views and the view of the site from Big Canyon Drive is not designated as a scenic vista.

The project site consists of a graded pad surrounded by disturbed areas that are part of the Big Canyon golf course and Big Canyon residential development. A steep slope east of the site is vegetated primarily with mixed sage scrub, ruderal, and ornamental species. The project proposes to raise the existing residential pad 10 feet in height from the existing pad elevation. Because the residential pad is located in a small canyon and protected from most off-site adjacent views, increasing the pad height will not significantly increase its visibility from any of the adjacent surrounding residences. The height of the pad will remain approximately 45 feet lower than the existing residence to the east. Although the new pad will be 18 feet higher than the residence to the west the existing trees and vegetation along the west project boundary will partially block direct views of the site from the residences to the west.

The stockpile is approximately 20 feet higher in elevation than MacArthur Boulevard as shown in Figure 8, Stockpile Cross-Section. The slope between MacArthur Boulevard and the stockpile site is landscaped with a variety of trees and bushes that will obstruct some of the views of the stockpile by motorists on MacArthur Boulevard. Photographs of the landscaped slope between MacArthur Boulevard and the proposed stockpile are shown in Figure 9, Stockpile Photographs. Figure 10, Photo Orientation Map, shows the location of the photos in Figure 9. The vegetation will partially obstruct direct views of the stockpile from the residents that are approximately 400 feet east of the site, east of MacArthur Boulevard. There are no city designated scenic vistas or aesthetic features adjacent to or in the vicinity of the stockpile site that would be aesthetically impacted.

The project will not have a significant impact to a scenic vista since the site is not located within any designated scenic vista as shown in Figure NR3 *Coastal Views* of the General Plan (see Appendix A). The nearest coastal view designated by the General



Source: Walden & Associates

Figure 8

Stockpile Cross Section

1 – Looking at MacArthur Boulevard from near the stockpile.

2 – Looking at the landscaping on the slope adjacent to MacArthur Boulevard.

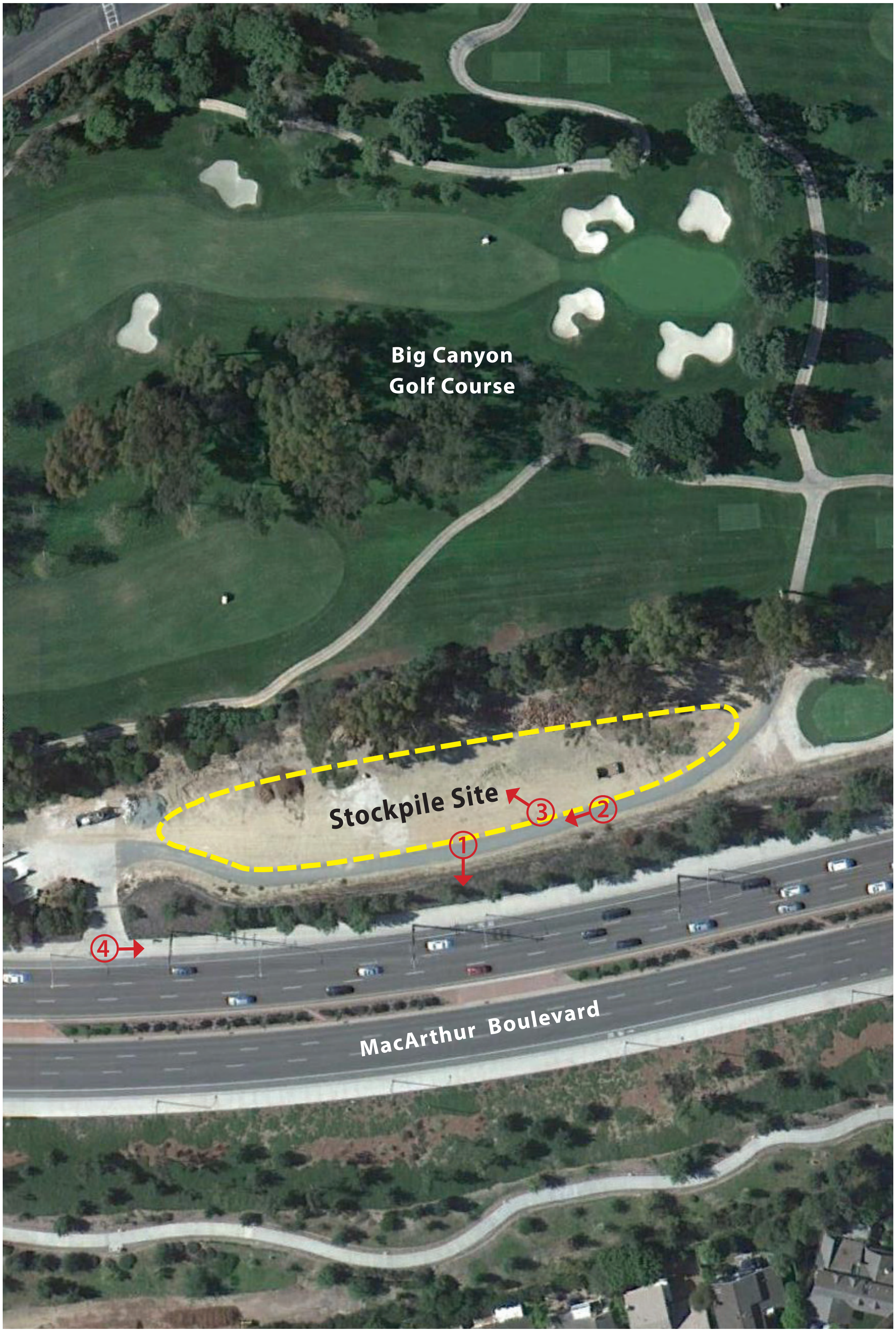
3 – Looking at the proposed stockpile site.

4 – Looking at the landscaping on the slope between the stockpile site and MacArthur Boulevard.

Figure 9

Stockpile Site Photos

Source: Phil Martin & Assoc.



Source: Google Maps, 2010

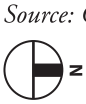


Figure 10

Stockpile Photo Orientation Map

Plan is located adjacent to Upper Newport Bay and more than a mile from the project site and the stockpile site. No scenic vista impacts would occur.

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

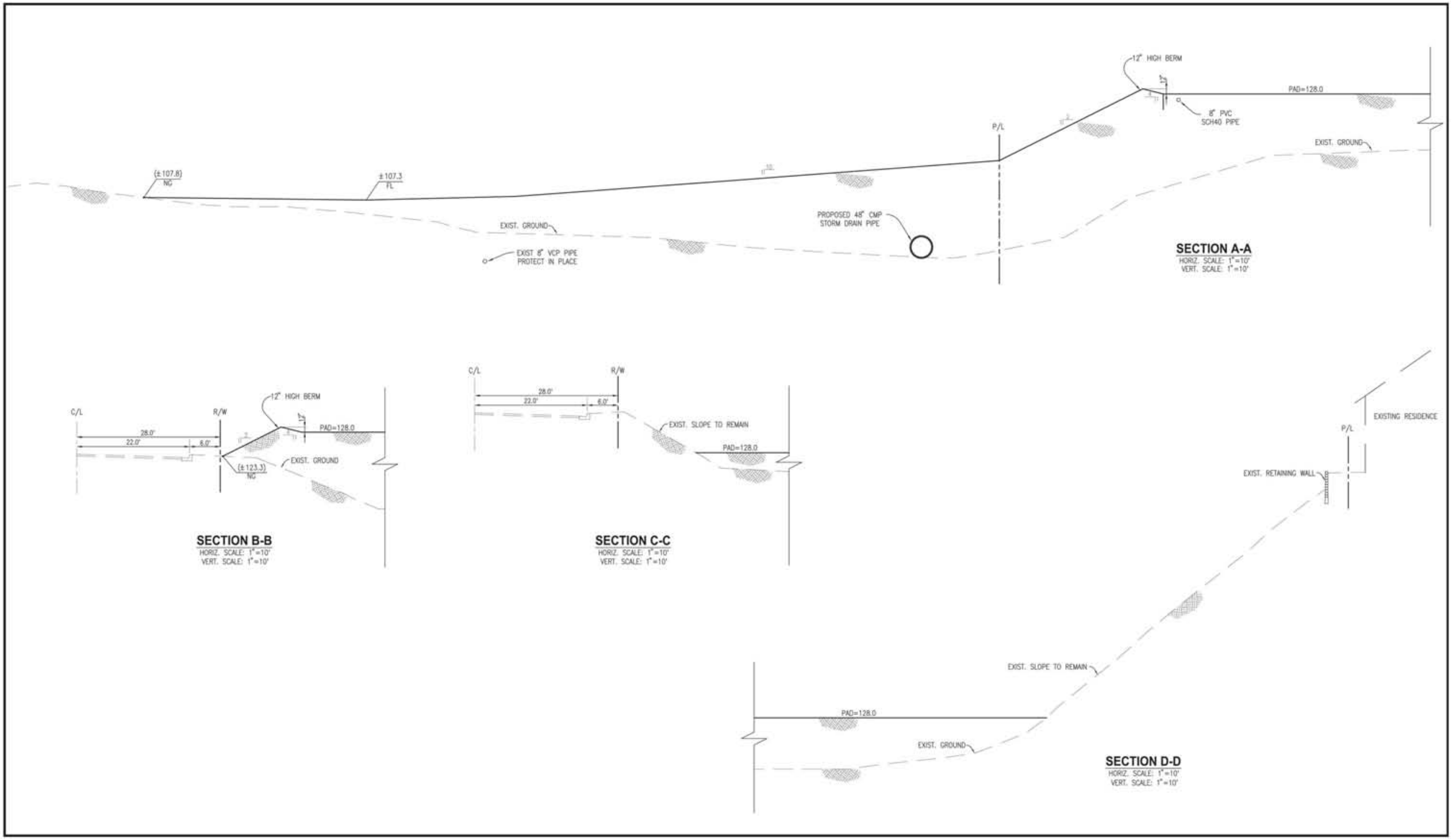
No Impact. According to the California Scenic Highway Mapping System of the California Department of Transportation, the project site and the stockpile site are not located within or near a major state-designated scenic highway. The closest officially designated state scenic highway is State Route 1 (SR-1), which is also known as Pacific Coast Highway and located approximately one mile south of the project. Due to the distance and topography difference the project site and the stockpile site are not visible from State Route 1. Moreover, neither the project site nor the stockpile site has any scenic resources, including, but not limited to rock outcroppings or historic buildings. While there are several willow trees on the project site that will be removed during grading, the removal of the willow trees will not result in any significant impact. No trees will be removed to place dirt for the stockpile site. No scenic resource impacts within a state scenic highway would occur.

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

Less Than Significant Impact. The existing visual character of the project site consists of a graded residential pad with native and non-native species both on and surrounding the pad. The character of the area surrounding the site is a suburban neighborhood with large single-family detached residences. The residential dwellings are one and two stories in height with well-maintained landscaping. The existing surface pad elevation is approximately 118 feet above sea level. The finish pad elevation upon completion of the grading operation would be 128 feet above sea level, an increase of 10 feet. The pad elevations of the residences adjacent to the site are approximately 176 feet above sea level to the east and 111 feet above sea level for the residence west of the site. The elevation of Big Canyon Drive adjacent to the site ranges from 145 feet above sea level at the intersection of the site driveway with Big Canyon Drive to approximately 115 feet west of the site.

Raising the height of the existing residential pad 10 feet would not have a significant impact on the existing visual character of the site or its surroundings because the site is relatively isolated from direct views by surrounding residences due to existing vegetation and topography differences. Cross-sections showing the proposed grading for the residential pad are shown in Figure 11, Site Plan Cross-Sections. The cross-sections refer to the proposed grading plan shown previously in Figure 5, Proposed Grading Plan.

The stockpile will be elevated and be approximately 22 feet to 31 feet above MacArthur Boulevard, which is east of the stockpile site. The stockpile is setback approximately



Source: Walden & Associates

Figure 11
Site Plan Cross-Section

30 feet from the fence line that extends along the east boundary of the golf course. The stockpile cross-section shows the elevation of the stockpile site in relation to MacArthur Boulevard. There is existing vegetation, including trees up to approximately twenty feet in height, on the slope between the east project boundary and MacArthur Boulevard. As shown previously in Figure 9 the existing landscape material on the slope between MacArthur Boulevard and the stockpile site would provide some screening and buffering of the stockpile to motorists on MacArthur Boulevard. The existing landscape materials would provide some buffering for the residents that are approximately 400 feet east of the stockpile site, east of MacArthur Boulevard. The Stockpile Cross-Section shows the relationship of the stockpile site in comparison to MacArthur Boulevard. Because the stockpile is elevated, setback from MacArthur Boulevard, and somewhat screened from motorists on MacArthur Boulevard and residents to the east by existing vegetation, the stockpile is not anticipated to significantly degrade and impact the visual character of the area. The visual quality impacts would be less than significant.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

No Impact. Raising the height of the residential pad would not create any new sources of light or glare and therefore, would not affect day or nighttime views by existing residences adjacent to or in close proximity to the site. No light or glare impacts would occur.

II. AGRICULTURE & FOREST RESOURCES.

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

No Impact. The project site and the stockpile site are not designated as prime farmland or any other type of important farmland according to the California Resource Agency's Department of Conservation Important Farmland Map for Orange County (2006). Rather, the sites are designated "Urban and Built-Up" land by the Department of Conservation. The site is located in an urban area surrounded by a golf course and single-family detached dwellings. Similarly, the proposed stockpile site is not used for agricultural purposes and not designated as farmland. No farmland impacts would occur.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

No Impact. The project and the stockpile sites are zoned PC-8 (Big Canyon Planned Community) and are located within the Low Density Residential and Golf Course sub-areas, respectively. The zoning designations do not allow agricultural use. The project site, the land surrounding the site, and the stockpile site are not in a Williamson Act contract. No agriculture zoning or Williamson Act impacts would occur.

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

No Impact. The project and the stockpile sites are zoned PC-8 (Big Canyon Planned Community). The project does not propose to change the existing zoning designation. The City does not have any forest or timberland zoning. No forest land or timberland zoning impacts would occur.

d) Result in the loss of forest land or conversion of forest land to non-forest use

No Impact. The project site and the stockpile site are located in an urban area with no forest land on or adjacent to either site. No forest land to non-forest land use impacts would occur.

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?

No Impact. The project site is vacant and zoned for single-family residential use. The project is located in an urban area and farmland and agricultural activities are not allowed. Because no farmland or agricultural activities exist on the site or within the Big Canyon development, the project would not convert any farmland to nonagricultural use. The stockpile site is vacant with the exception of a small amount of firewood and compost material. The proposed stockpile site would not convert any farmland to non-agricultural use and have no impacts. No conversion of farmland to non-agricultural use impacts would occur.

III. AIR QUALITY.

An air quality analysis was conducted by Mestre Greve Associates to evaluate the air emissions that would be generated by the project. A copy of the air quality report is included in Appendix B. Potential air quality emission impacts of the project are based on South Coast Air Quality Management District (SCAQMD) thresholds and included as Appendix C.

a) Conflict with or obstruct implementation of the applicable air quality plan?

Less Than Significant With Mitigation Incorporated. An air quality analysis was prepared to determine if importing and exporting dirt to and from the site and the grading operations to raise the height of the pad would conflict with or obstruct the implementation of the SCAQMD Air Quality Management Plan (AQMP).

Short Term Construction Emissions Analysis

In its analysis, Mestre Greve Associates determined the project would emit short-term construction emissions that exceed the SCAQMD's air quality significance thresholds. The six criterion pollutants of concern are: reactive organic gases (ROG), oxides (NO_X), carbon monoxide (CO), sulfur dioxide (SO_2), and particulates smaller than 10 microns in size (PM_{10}), and particles smaller than or equal to 2.5 microns ($PM_{2.5}$). As shown in Table 1, Peak Construction Emissions – Pounds/Day, the project would exceed the SCAQMD daily NOx threshold due to the operation of grading equipment and haul trucks. Exceeding the SCAQMD NOx threshold for the project would interfere with the District's implementation of the AQMP.

Table 1
Peak Construction Emissions – Pounds/Day

Activity	Daily Emissions (lbs/day)					
	CO	**NO_x**	**VOC**	**PM_{10}**	**$PM_{2.5}$**	**SO_x**
Mass Grading	20.8	44.9	4.9	12.5	3.9	0.0
Haul Trucks	23.0	62.5	4.7	2.8	2.3	0.1
Combined:	*43.8*	*<u>107.4</u>*	*9.6*	*15.3*	*6.2*	*0.1*
Significance Threshold	**550**	**100**	**75**	**150**	**55**	**150**
Exceed Threshold?	No	Yes	No	No	No	No

Note: Underline data indicates exceedance. Construction emissions include standard mitigation as required by SCAQMD rules. Particulate (PM_{10} and $PM_{2.5}$) emissions include a 50% reduction from watering at least twice daily as required by SCAQMD Rules.

Because the project would exceed the significance threshold for NOx emissions the following measure is recommended to reduce project grading NOx emissions to less than the SCAQMD significant threshold.

Mitigation Measure No. 1 All diesel powered construction equipment shall use diesel oxidation catalyst.

Local Significance Thresholds Analysis

Local Significance Thresholds (LSTs) represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard. LSTs are developed based on the ambient concentrations of that pollutant for each source receptor area. The LST mass rate look-up tables determine if the daily emissions for proposed construction or operational activities could result in significant localized air quality impacts.

The LST methodology presents mass emission rates for each source/receptor area (SRA), project sizes of 1, 2, and 5 acres, and nearest receptor distances of 25, 50, 100, 200, and 500 meters. For project sizes between the values given, or with receptors at distances between the given receptors, the methodology uses linear interpolation to determine the thresholds. If receptors are within 25 meters of the site, the methodology document says that the threshold for the 25-meter distance should be used.

The project is located in Source Receptor Area (SRA) 18. The nearest existing homes are located on Rue Biarritz, the cul-de-sac to the north. The distances to the nearest homes are located as close as 50 feet from the edge the project site to approximately 150 feet at the midpoint of the project site.

As shown in Table 2, On-Site Emissions by Construction Activity, the project would generate particulates during construction that exceed District LST thresholds for PM_{10} due to the operation of construction equipment and vehicles on the project site (within the project boundary).

Table 2
On-Site Emissions by Construction Activity

Activity	***Distance Feet***	**Daily Emissions (lbs/day) CO**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
Mass Grading	--	0.2	0.4	10.8	2.3
Haul Trucks	--	0.2	0.5	0.0	0.0
Combined:		0.4	0.9	10.8	2.3
Significance Threshold	*50*	**930.5**	**127.1**	**6.7**	**4.8**
Exceed LST?		No	No	Yes	No
Significance Threshold	*150*	**1,032.8**	**124.9**	**17.9**	**6.5**
Exceed LST?		No	No	No	No

The PM_{10} emissions would exceed adopted thresholds at a distance of 50 feet without mitigation measures. The following measures are recommended to reduce PM_{10} emissions to acceptable levels.

Mitigation Measure No. 2 To reduce daily PM_{10} emissions, the on-site cut/fill activities shall be limited to a maximum of 400 cubic yards per day, when grading activities are within 25 meters (82 feet) of the nearest homes. The grading in this area would involve approximately 5,000 cubic yards and take approximately 13 days. Once the grading activities are outside the 25 meter zone, the on-site cut/fill activities shall be operated at a maximum 1,422 cubic yards per day. The grading for the remaining project area (outside 25 meters) would total ~~14~~59,000 cubic yards, and take approximately ~~10~~ 42 days.

Mitigation Measure No. 3	Soil stabilizers shall be applied to inactive areas, and ground cover shall be replaced in disturbed areas that are inactive within five days.
Mitigation Measure No. 4	All exposed dirt surfaces shall be watered three times daily.
Mitigation Measure No. 5	Water shall be provided while loading and unloading dirt to reduce visible dust plumes.
Mitigation Measure No. 6	The speed of construction equipment on unpaved roads shall be less than 15 mph.
Mitigation Measure No. 7	Haul road dust shall be watered three times daily.

With the implementation of these mitigation measures, emissions would be reduced to a level that is less than significant and the proposed project would not interfere with the SCAQMD Air Quality Management Plan. The impacts to the air quality plan would be less than significant with mitigation incorporated.

b) Violate any air quality standard or contribute to an existing or projected air quality violation?

Less Than Significant With Mitigation Incorporated. As discussed in "Section III a)" above, the project will generate short-term NO_x and PM_{10} air emissions that will exceed air emission thresholds. The emissions from the operation of diesel powered heavy construction equipment to remove and re-compact soil to grade the pad to its proposed height, generation of dust, and trucks importing and exporting dirt to and from the site would exceed District thresholds for NOx, and PM_{10} particulates. However, the implementation of the mitigation measures listed in "Section III a)" above would reduce project air emissions to a level that is below the District thresholds for NOx and PM_{10}. As a result, the project NOx, and PM_{10} emissions would be less than significant and no mitigation measures in addition to the measures listed in "Section III a)" above are required. The impacts to air quality standards would be less than significant with mitigation incorporated.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Less Than Significant With Mitigation Incorporated. In accordance with SCAQMD methodology, any project that does not exceed or can be mitigated to less than the daily threshold values does not add significantly to a cumulative impact. The South Coast Air Basin (SoCAB) is designated as a non-attainment area for ozone and particulates (PM10 and PM2.5) under the state and federal Ambient Air Quality Standards (AAQS).

As provided in the air quality assessment, the air pollutant modeling for construction emissions demonstrates that the short-term grading activities would exceed District NOx and PM10 thresholds. Mitigation Measures 1-7 would reduce short-term project generated NOx, and PM_{10} emissions and reduce emissions to a level that is below the District thresholds. The cumulatively considerable pollutant impacts would be less than significant with mitigation incorporated.

d) Expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant With Mitigation Incorporated. There are sensitive receptors (i.e., residences) in close proximity to the site. The project is calculated to generate NOx, and PM_{10} emissions that exceed District particulate thresholds and could impact sensitive receptors in close proximity to the site. However, Mitigation Measures 1-7 are recommended to reduce LST particulate emissions to less than District thresholds. The incorporation of the mitigation measures would reduce particulate emissions to a level that is below the District thresholds. The impacts to sensitive receptors would be less than significant with mitigation incorporated. .

e) Create objectionable odors affecting a substantial number of people?

Less Than Significant Impact. According to the SCAQMD CEQA Air Quality Handbook, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. Odors at the project site would be generated from the exhaust emissions of the grading equipment and trucks importing and exporting dirt. Any odors from the operation of construction equipment would be largely restricted to the project site. The closest residence to the site is approximately 60 feet to the east and 48 feet higher in elevation than the project site residential pad. Any odors from the grading equipment would be localized, generally confined to the project site, and are not anticipated to have any significant odor impacts to residents due to the distance and difference in elevation. Additionally, the odors would be temporary, occurring only when equipment is operating. By the time odors reach any off-site sensitive receptor they would be diluted to well below any level of air quality concern. The odors from trucks hauling dirt to and from the site would be dispersed during travel time and not significantly impact people.

Construction activities associated with the project would be required to comply with SCAQMD Rule 402 – Nuisance[1] Through mandatory compliance with SCAQMD rules, no construction activities are proposed that would create a significant level of objectionable odors. The objectionable odor impacts would be less than significant.

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[1] Rule 402 – Nuisance - A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to

IV. BIOLOGICAL RESOURCES.

A biological survey of a relict drainage area on the site was prepared by Glenn Lukos Associates. A copy of the biological site survey and analysis is included as Appendix D.

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Less Than Significant Impact. Based on the site survey, coyote brush scrub is present and occupies approximately 0.23 acre of the vacant site. The remainder of the pad is dominated by ruderal vegetation. Because of the disturbed character of the existing habitat, its proximity to non-native ornamental vegetation and the limited size of the existing on-site vegetation, the area does not exhibit the potential to support any special-status species. The habitat modification impacts would be less than significant.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Less Than Significant. A relict drainage feature that extends along the north end of the site is proposed to be disturbed by the project. The drainage feature was evaluated for characteristics consistent with the presence of waters of the United States, which are regulated by the U.S. Army Corps of Engineers (Corps) pursuant to Section 404 of the Clean Water Act and waters of the State of California, which are regulated by the California Department of Fish and game (CDFG) pursuant to Section 1602 of the Fish and Game Code.

The relict drainage feature is located along the eastern edge of the golf course fairway between the fairway and the existing residential pad. The feature is not a natural drainage course, but rather was constructed to collect water from a storm-drain outlet and carry it between the golf course fairway and adjacent slope in a westerly direction to another storm drain inlet. In order to direct water to downstream areas that have been created as wetland mitigation, water from an existing 48-inch corrugated metal pipe and 12-inch plastic pipe, that previously discharged into the relict channel will now be captured in a 48-inch corrugated metal pipe and carried under the golf course fairway discharging to the existing wetland mitigation area.

The relict drainage feature is typically dry and exhibits no signs of recent flow. Where a channel is observable, it varies in width from 0.5 to 2 feet. The substrate consists primarily of coarse sands and gravels with areas of clay inclusions, consistent with the artificial character of the feature. The relict channel bottom is sparsely vegetated and the bank closest to the golf course fairway supports a predominance of native and non-native species typical of wetland or riparian areas. It is important to note however, that the vegetation concentrated on the bank closest to the fairway is clearly supported by irrigation runoff as the adjacent turf area was saturated by irrigation and the turf area also supported many of the species on the banks of the drainage. Dominant species that are present include arroyo willow (*Salix lasiolepis*, FACW), mugwort (*Artemisia douglasiana*, FACW), tall umbrella sedge (*Cyperus eragrostis*, FACW), bristly ox-tongue (*Picris echioides*, FAC), and tall horseweed (*Conyza Canadensis*, FAC), none of which are rare, endangered, or threatened species.

California Department of Fish and Game

Pursuant to Division 2, Chapter 6, Sections 1600-1603 of the California Fish and Game Code, the CDFG regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake, which supports fish or wildlife.

CDFG defines a "stream" (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation CDFG jurisdiction within altered or artificial waterways is based upon the value of those waterways to fish and wildlife.

CDFG jurisdictional limits closely mirror those of the Corps. Exceptions are CDFG's exclusion of isolated wetlands (those not associated with a river, stream, or lake), the addition of artificial stock ponds and irrigation ditches constructed on uplands, and the addition of riparian habitat supported by a river, stream, or lake regardless of the riparian area's federal wetland status.

As part of its evaluation, Glenn Lukos Associates conducted a site visit with CDFG on October 4, 2010 to discuss the drainage feature. The relict drainage feature does exhibit characteristics consistent with the presence of a “bed and bank” albeit the indicators are weak at best. During their October 4, 2010 site visit, CDFG determined that the relict channel exhibited sufficient indicators to warrant a determination that it would be regulated under Section 1602 of the California Fish and Game Code.

While CDFG determined that the relict drainage would be eligible for regulation under Section 1602 of the Fish and Game Code, the preliminary determination from CDFG was that impacts were so small (0.004 acre [174 square feet] of ephemeral streambed with no wetlands present) that mitigation would not be required. See the CDFG letter and email in Appendix E.

Due to the determinations of the Corps and the California Department of Fish and Game, the habitat modification impacts would be less than significant.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Less Than Significant Impact. Based on the Glenn Lukos Associates site visit and discussions with the resource agencies, the relict drainage area is not defined as wetland. While the project will remove approximately 0.004 acres of drainage, the relict drainage feature is not protected wetland as defined by Section 404 of the Clean Water Act. The wetland habitat impacts would be less than significant.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less Than Significant Impact. The project site is located adjacent to a golf course and within an existing planned residential development. The site does not provide fish habitat. The coyote brush and ruderal vegetation on the property is not sufficient to support a migratory wildlife corridor or a wildlife nursery. The project would not significantly impact the movement of any native fish, wildlife species, wildlife corridors, or native wildlife nursery sites. The wildlife habitat and movement impacts would be less than significant.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No Impact. The proposed project does not contain any biological resources that are protected by local policies. There are no City of Newport Beach policies or ordinances that protect coyote brush and ruderal vegetation on the site. The proposed project site has several ornamental trees. According to the City of Newport Beach General Plan, Natural Resources Element, the proposed project site is not located in an area where sensitive and rare terrestrial and marine resources occur. While several willow trees (0.04 acre) currently grow on the project site, the project would not have conflicts with any biological or tree preservation policies or ordinances. No biological resource policies or ordinances impacts would occur.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. The project is not located within or part of any Habitat Conservation Plan, Natural Community Conservation Plan, or any other approved habitat conservation plan. No Habitat Conservation Plan impacts would occur.

V. CULTURAL RESOURCES.

a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

No Impact. Section 10564.5 defines historic resources as resources listed or determined to be eligible for listing by the State Historical Resources Commission, a local register of historical resources, or the lead agency. Generally, a resource is considered to be "historically significant" if it meets one of the following criteria:

i) Is associated with events that have made a significant contribution to the patterns of California's history and culture heritage;

ii) Is associated with the lives of persons important in our past;

iii) Embodies the distinctive characteristics of a type, period, region or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

iv) Has yielded, or may be likely to yield, information important in prehistory or history.

The project site is vacant and there are no structures on the property. Figure HR1, *Historic Resources*, of the Historic Resources Element of the City's General Plan update (See Appendix F) does not identify any historic resources listed on local, state, or federal historic resource lists or structures on or adjacent to the site that are eligible for such lists. Before the development of the Big Canyon Planned Community, the land was used as a ranch owned by the Irvine Company and did not contain any significant structures. The residential lot was graded in 2000 and no historical resources were discovered during the previous grading operations. The area to be graded at the project site and the spoils site were never included as part of the golf course design or construction. The project would not impact any historical resources since there are no historical resources either on or adjacent to the site. No historical impacts would occur.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Less Than Significant with Mitigation Incorporated. The project site was previously disturbed to grade the existing residential pad. Since the site has been disturbed it is unlikely that any significant archaeological resources would be discovered during the proposed grading operations. If any archaeological resources are discovered, CEQA Guidelines §15064.5 must be met, which requires all construction activity to cease until the resource is properly evaluated by a qualified archaeologist and a decision to the significance of the resource determined so that proper measures can be taken to protect the resource as applicable. The implementation of CEQA Guidelines §15064.5 as required would reduce any potential archaeological resource impacts to a less than significant level. In addition, a mitigation measure from Mitigated Negative Declaration 2008-003 will be carried forward to this project that will require an on-site archaeological monitor during grading activities to halt grading should archaeological, or suspected archaeological resources, be present. The archaeological resource impacts would be less than significant with mitigation incorporated.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less Than Significant with Mitigation Incorporated. As stated in "Section V b)" above, the project site was previously disturbed and graded. No paleontological resources were discovered during the previous grading operations. Removing and replacing the soil and importing soil to increase the pad height as proposed is unlikely to destroy or impact any unique paleontological resources or unique geologic features since none were previously discovered. Although no significant paleontological resource impacts are anticipated, a mitigation measure from Mitigated Negative Declaration 2008-003 will be carried forward to this project that will require an on-site paleontological monitor during grading activities to halt grading should paleontological, or suspected paleontological resources, be present. The implementation of CEQA Guidelines §15064.5 and a required paleontological monitor during grading will reduce potential paleontological resource impacts to less than significant. Therefore, no mitigation measures in addition to the mitigation measure that is carried over from Mitigated Negative Declaration 2008-003 are required by CEQA. The paleontological resource impacts would be less than significant with mitigation incorporated.

d) Disturb any human remains, including those interred outside of formal cemeteries?

No Impact. No human remains were uncovered during the previous grading operations on the site. The dirt that will be imported to the site will not be from any areas that are known or suspected of having human remains. In the rare event that unknown human remains are discovered, the contractor shall comply with the State Health and Safety Code 7050.5, which requires that all soil disturbance shall cease until the county coroner has been contacted and makes a determination of the origin and disposition of the remains pursuant to Public Resources Code 5097.98. No human remain or cemetery impacts would occur.

VI. GEOLOGY AND SOILS

A geotechnical report for the proposed rough grading of the site, dated June 25, 2010, was prepared by Associated Soils Engineering. A copy of the geotechnical report is included as Appendix G. This section is based on information contained in the geotechnical report and the City of Newport Beach General Plan.

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

ii) Strong seismic ground shaking?

iii) Seismic-related ground failure, including liquefaction?

iv) Landslides?

Less Than Significant with Mitigation Incorporated. (i-iv) Less Than Significant Impact. All of Southern California, including the City of Newport Beach is located in a seismically active area and is subject to strong seismic ground shaking. The city of Newport Beach is located in the northern part of the Peninsular Ranges Province, an area that is exposed to risk from multiple earthquake fault zones. The highest risks originate from the Newport-Inglewood fault zone, the Whittier fault zone, the San Joaquin Hills fault zone, and Elysian Park fault zone, each with the potential to cause moderate to large earthquakes that would cause ground shaking in Newport Beach and nearby communities.

Policies contained in the Newport Beach General Plan would ensure that adverse effects caused by seismic and geologic hazards such as strong seismic ground shaking are minimized. For example, Policy S4.1 requires regular updates to building and fire codes to provide for seismic safety and design and Policies S4.4 and S4.5 ensure that new development is not located in areas that would be affected by seismic hazards. Additionally, new development would be required to comply with the building design standards for the California Building Code, Chapter 33 for construction of new buildings and/or structures, and specific engineering design and construction measures would be implemented to anticipate and avoid the potential for adverse impacts.

All grading would occur in accordance with the building and safety standards of the City Building Division. All grading would be in compliance with the most up-to-date codes and plans and would be reviewed and approved in compliance with the latest earthquake-resistant design available prior to construction.

The site is not within an Earthquake Fault Zone as designated by the State of California in the Alquist-Priolo Earthquake Zoning Act. While several active and potentially active faults exist in the area, none of the faults are within three miles of the site. The project site is not considered to be at a greater seismic risk than any other site within the Big Canyon area.

Based on Figure S2, *Seismic Hazards, of the Safety Element* of the Newport Beach General Plan (See Appendix H), the potential for both liquefaction and landslides does exist. The slope adjacent to and west of the site is subject to landslide potential. The area east of the site is subject to liquefaction potential. In addition, the geotechnical report [2] states that a portion of the site lies within a State of

[2] Associated Soils Engineering, Inc. Geotechnical Review of Rough Grading Plan for Parcel 1of Parcel Map No. 2008-11, Big Canyon Country Club, Newport Beach, CA, June 25, 2010.

California Seismic Hazard Zone of required investigation for liquefaction. Thus, the site is subject to liquefaction. Because the site is subject to liquefaction, the following measure is recommended to reduce the potential for liquefaction. The seismic impacts would be less than significant with mitigation incorporated.

Mitigation Measure No. 8 The underlying soils shall be removed and compacted per the grading recommendations in the Associated Soils Engineering Geotechnical Plan dated June 25, 2010 and to the satisfaction of the City Engineer prior to the issuance of a grading permit.

b) Result in substantial soil erosion or the loss of topsoil?

Less Than Significant Impact. The grading activities for the project would leave soil exposed to wind and rainfall erosion. The City will require the project applicant to prepare an erosion control plan and drainage plan to reduce soil erosion. The project applicant has incorporated City approved Best Management Practices (BMPs) into the project grading plan. The BMPs incorporated into the project are listed in Appendix I and include gravel bag berms, silt fence, fiber rolls, as well as other soil erosion protection measures to reduce soil erosion and the loss of topsoil. The approval of the project grading plan with all City required BMPs to minimize soil erosion. The soil erosion impacts would be less than significant.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Less Than Significant With Mitigation Incorporated. The geotechnical report[3] states that a portion of the site lies within the State of California Seismic Hazard Zone of required investigation for liquefaction potential. The implementation of Mitigation Measure No. 8 above is recommended to mitigate liquefaction potential to a level that is less than significant. The geologic impacts would be less than significant with mitigation incorporated.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Less Than Significant With Mitigation Incorporated. The expansive tests that were conducted as part of the geotechnical report identified a “high” expansive soil classification. The geotechnical report provides recommendations that when implemented would reduce potential expansive soil impacts to less than significant. The implementation of Mitigation Measure 8 above would reduce potential expansive soil impacts to a level that is less than significant. The expansive soil impacts would be less than significant with mitigation incorporated.

[3] Ibid, page 3.

e) **Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?**

No Impact. The project is restricted to grading activities only at this time. A portable toilet will be provided for the construction workers. The ultimate construction of a house on the site would require a connection to the existing wastewater line adjacent to the site. The City of Newport Beach would not allow the use of a septic tank or alternative wastewater disposal system. The project would not have any impact to soils for septic tanks or any other alternative waste water disposal system. No septic tank or alternative waste water disposal impacts would occur.

VII. GREENHOUSE GASES

A greenhouse gas (GHG) analysis was prepared by Mestre Greve Associates to evaluate the greenhouse gas emissions that would be generated by the project. A copy of the greenhouse gas report is included in Appendix J.

a) **Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?**

Less Than Significant Impact. Temporary greenhouse gas emission impacts will occur due to construction activities. The primary source of GHG emissions generated by construction activities is the use of diesel-powered construction equipment and other combustion sources (i.e., generators, worker vehicles, materials delivery, etc.). The GHG air pollutants emitted by construction equipment are primarily carbon dioxide.[4]

The typical emission rates for construction equipment were obtained from URBEMISv9.2.4 (Urban Emissions Model Version 9.2.4). URBEMIS is a computer program that is used to estimate emissions including operation (vehicle and area) sources, as well as construction activities associated with land development projects in California.

While the URBEMISv9.2.4 model does not include other GHG emissions that will be generated by the project (such as CH4, N_2O, and Fluorinated Gases) the CO_2 emissions comprise approximately 99.6 percent of the GHG emissions generated with the burning of diesel fuel. As a result, non-CO_2 GHG emissions represent a very small percentage (approximately 0.4 percent) of the total short-term construction GHG emissions and would not represent a significant source of the GHG emissions that will be generated by the project during construction. Therefore, the non-CO_2 GHG construction emissions have not been quantified in the analysis.

[4] When one gallon of diesel fuel is burned it produces 22.384 pounds of CO_2, 0.000534 pounds of CH_4, and 0.0001928 pounds N_2O. Based on the global warming potential of 21 for CH_4 and 310 for N_2O relative to CO_2, the total pounds of CO_2-equivalent (CO_2EQ) emissions from diesel fuel is 22.455 CO_2EQ/gallon, which is 99.6 percent of the total emissions. Bay Area Air Quality Management District (BAAQS), *Source Inventory of Bay Area Greenhouse Gas Emissions*, November 2006.

The primary source of project air quality emissions will be primarily from the grading, import and export of soil. The project grading activities include importing and exporting dirt. According to the City of Newport Beach, approximately 12,000 cubic yards of dirt will be moved to the golf course adjacent to the site, approximately 7,000 cubic yards of dirt will be exported to the east side of the golf course near MacArthur Boulevard and approximately 45,000 cubic yards of dirt will be imported from the Orange County Sanitary District in the City of Fountain Valley. Trucks with a capacity of 10 cubic yards will haul dirt to and from the site resulting in grading for a period of approximately 60 days.

According to the SCAQMD's CEQA Handbook (Greenhouse Gas CEQA Significance Threshold Stakeholder Working Group #5, August 27, 2008), construction emissions are amortized over the life of the project, defined by SCAQMD as 30 years. Thus, the project's annualized construction emission will be compared to the applicable GHG significance threshold. Table 3, Construction CO_2 Emissions, shows the results of the URBEMIS2007 model that estimates the annual CO_2 construction emissions generated by the project.

Table 3
Construction CO_2 Emissions

Activity	**MT CO_2**
Mass Grading	0
Haul Trucks (including worker trips)	561
Amortized 30 years (CO2MT/Year)	**19**

MT = metric tons

The construction amortized emissions are calculated to be below the SCAQMD screening threshold of 3,000 MTCO2EQ/year. The greenhouse gas emission impacts would be less than significant.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Less Than Significant Impact. Presently there are no adopted federal plans, policies, regulations or laws setting a mandatory limit on GHG emissions. The City of Newport Beach does not have any plans, policies, regulations, significance thresholds or laws addressing climate change at this time. As discussed in section "VII.a." above, the estimated CO_2 greenhouse gas emissions by the project will be below and not exceed SCAQMD screening threshold of 3,000 MTCO2EQ/year.

The project will not conflict with any adopted greenhouse gas plan, policy or regulation. The impacts with greenhouse gas policies and regulations would be less than significant.

VIII. HAZARDS AND HAZARDOUS MATERIALS.

a) Create a significant hazard to the public or the environment through routine transport, use, or disposal of hazardous materials?

No Impact. Grading the site as proposed will not require the use of any hazardous materials or the disposal of any hazardous materials of reportable quantities. The project will not have any hazardous material impacts. No disposal or use of hazardous material impacts would occur.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Less Than Significant Impact. The only hazardous materials that would be present during grading include diesel fuel, lubricants and grease to run and maintain the grading equipment. Their use and storage by the grading contractor must comply with all applicable state and federal laws. The potential for the upset or accidental release of any of these materials that would cause a significant hazard is less than significant due to the small scale of the project and the short construction period. The release of hazardous material impacts would be less than significant.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Less Than Significant Impact. There are no schools within one-quarter mile of the project. The nearest school is Our Lady Queen of Angels School, located at 750 Domingo Drive, Newport Beach, which is approximately one third of a mile from the site. The grading activities associated with the project would not emit any hazardous emissions or handle any hazardous materials that could impact the Our Lady Queen of Angeles School or any other school. The hazardous emissions to an existing or proposed school impacts would be less than significant.

d) Be located on a site which is included on a list of hazardous materials sites which complied pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

No Impact. The project site is not listed in the Department of Toxic Substances Control's (DTSC) hazardous wastes and substances list, which includes the Federal Superfund sites (National Priority List), State Response Sites, Voluntary Cleanup Sites, School Cleanup Sites, Permitted Sites, and Corrective Actions Sites. The proposed grading activities would not create a significant hazard to the public or the environment. No hazardous materials site impacts would occur.

e) For a project within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

Less Than Significant Impact. The project site is located approximately three miles south of the John Wayne Airport and within the limits of its Airport Environs Land Use Plan (AELUP) as established by the Orange County Airport Land Use Commission (ALUC). The John Wayne Airport AELUP has established various zones surrounding the airport including the Noise Impact Zone and Runway Protection Zone.

The Noise Impact Zone establishes land uses that are "normally acceptable", "conditionally acceptable", and normally unacceptable" within each noise impact zone delineated by the respective Community Noise Equivalent Level (CNEL) noise contour derived from studies of aircraft flight operations into and out of the John Wayne Airport. The project site is not within the Noise Impact Zone. Noise from operations at John Wayne Airport would not significantly impact the grading activity proposed for the site.

The Runway Protection Zone (also known as the Clear Zone) as shown in Figure S5 of the General Plan (See Appendix K) identifies areas within the direct pathway of the runways that should remain relatively clear of development. The project site is not within the Runway Protection Zone as the project site is located approximately three miles south of the nearest runway. Although the project is within the AELUP of John Wayne Airport, the project will not have any project safety hazard impacts with regards to its location to the John Wayne Airport. The airport land use plan impacts would be less than significant.

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

No Impact. The project is not located within the vicinity of a private airstrip. The nearest airstrip is John Wayne Airport, which is approximately three miles north of the site. The project will not expose construction workers to any safety hazards associated with airport operations at the John Wayne Airport. There is no private airstrip in the vicinity of the project area. No private airstrip impacts would occur.

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

No Impact. The project is located in the Big Canyon Country Club, which is a planned private development. Emergency access to the site is provided from San Joaquin Hills Road. Within Big Canyon Country Club, emergency access is provided directly to the site by Big Canyon Drive, which is adjacent to and south of the site. The project does not propose to change or alter the existing access routes to the site. Thus, the project would not have any impact to the City's emergency response plan or evacuation plan of the site in the event of an emergency. No emergency response plan impacts would occur.

h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

No Impact. The project site is located in an area that is designated by the City of Newport Beach General Plan Safety Element, Figure S4, *Wildfire Hazards*, (See Appendix K) as "Low/None" in terms of fire susceptibility. The project would not expose people or structures to a wildland fire. No wildland fire impacts would occur.

IX. HYDROLOGY AND WATER QUALITY.

a) Violate any water quality standards or waste discharge requirements?

Less Than Significant Impact. Pursuant to Section 420 of the Clean Water Act, the Environmental Protection Agency (EPA) has regulations under the National Pollutant Discharge Elimination System (NPDES) program to control direct storm water discharges. In California, the State Water Resources Control Board (SWRCB) administers the NPDES permitting program and is responsible to develop NPDES permit requirements. For Orange County, the Santa Ana Regional Water Quality Control Board (SARWQCB) is responsible to implement the NPDES requirements. The NPDES program regulates pollutant discharges, including, those from construction activities on sites larger than one acre. Because the site is 1.9 acres in area, all grading activities would be required to meet and comply with the NPDES program. As part of its NPDES compliance, the grading contractor will be required to install and maintain throughout the grading period all Best Management Practices (BMP's) necessary to reduce soil erosion and subsequent siltation to the local storm water system. The implementation of all applicable BMPs required by the City will reduce potential water quality impacts due to soil erosion to less than significant. The proposed project BMPs are shown in Appendix I. The water quality standards impacts would be less than significant.

Newport Bay is 303d listed as impaired for selenium by the Regional Water Quality Control Board. Selenium is a bioaccumulative compound that occurs naturally in the Big Canyon Community and can cause reproductive harm in fish and birds. Surface waters and groundwater in the Big Canyon Wash watershed are known to be high in selenium. Any discharge causing or contributing to an exceedence of the water quality objectives for selenium (5µg/L as indicated in the comment letter from the RWQCB) is in violation of the Regional Board's Basin Plan, the California Water Code, and the Clean Water Act. A water bore test was conducted on the project site and is denoted by B-1 in Appendix S. The water sample was tested for selenium and the test identified a selenium concentration of 4.3µ/L, which is below the RWQCB Basin Plan's water quality objective. Water sample results are provided as Appendix T.

The project proposes to cut approximately 50 feet below the existing grade level then fill the site and raise the existing residential pad approximately 10 feet in height above the existing grade level. The water bore test on the project site encountered ground water at a depth of 24 feet. Dewatering will be conducted as part of the grading process and will be permitted to discharge into the watershed. Groundwater discharges from the site will be monitored during the grading process in accordance with the requirements of the Regional Water Quality Control Board Permit. If groundwater samples contain materials that exceed allowable levels, grading operations will cease until allowed to resume under the RWQCB permit.

The project involves the import of 45,000 cubic yards of "clean" soil from the Orange County Sanitation District, which assumes the soil will be tested to ensure that it does not contain proscribed materials in excess of allowable levels.

As part of its NPDES compliance, the grading contractor will be required to install and maintain throughout the grading period all Best Management Practices (BMP's) necessary to reduce soil erosion and subsequent siltation to the local storm water system. The project will comply with applicable provisions of the Construction General Permit; Dewatering General Permit; the regional NPDES permit requirements, including the DAMP; and any other federal, State, or local requirements that have been incorporated into construction-phase BMP's. The required BMP's will be specified in terms and conditions of the project's specifications. The proposed project BMPs are shown in Appendix I.

As a result of the standard permit requirements for a grading project as listed above, the proposed project is not expected to violate any water quality standards and waste discharge requirements. Thus, project impacts will remain less than significant.

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

Less Than Significant Impact. Ground water discharge expected during the dewatering process is estimated at a rate of 198 gallons per minute and will be conducted in two time frames of two weeks totaling four weeks. Ground water in the Big Canyon area is not used at nearby wells and the volume of water expected during the dewatering process would not substantially lower the local groundwater table level or deplete groundwater supplies.

The project proposes to raise the existing residential pad approximately 10 feet in height, which will not affect or impact groundwater supplies. The project would use water for dust control during excavation and grading. No other water usage would be required. Raising the site 10 feet would not impact groundwater supplies or interfere with current groundwater recharge. The project does not propose any activities that would deplete or interfere substantially with current groundwater recharge by on-site percolation and lower the groundwater table; however,the ~~. The~~ groundwater supply impacts would be less than significant.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

Less Than Significant with Mitigation Incorporated. The project proposes to enclose and realign approximately 185 linear feet of an existing open relict drainage feature that extends along the north side of the existing pad. The existing relict drainage feature starts at the end of an existing 48-inch corrugated metal pipe (CMP) and ~~a~~ 12-inch plastic pipe near the northeast corner of the site and extends westerly along the toe of the north slope of the existing pad. The relict drainage feature would be enclosed into a single 48-inch CMP and realigned approximately sixty feet north of its present alignment and discharge water onto the golf course near its present discharge point. Once enclosed and realigned, the 48 inch CMP would be covered with 7 to 14 feet of dirt. Figure 12, Location of Artificial Drainage Feature shows the location of the realigned drainage feature. The water that is discharged from the realigned pipes will flow onto turf of the existing golf course within 40 feet of its current location. While the existing relict drainage feature will be realigned, the existing drainage pattern of the site and the immediate area of the site will mostly be retained and as a result, no substantial erosion or siltation is anticipated.

Once grading is completed, all slope areas will be landscaped or covered with soil erosion protection including burlap, straw, silt curtains, and other soil erosion protection measures acceptable to the City and required by law.

U.S. Army Corps of Engineers Jurisdiction

Pursuant to Section 404 of the Clean Water Act, the Corps regulates the discharge of dredged and/or fill material into waters of the United States. The term "waters of the United States" is defined in Corps regulations at 33 CFR Part 328.3(a).[5] In the absence of wetlands, the limits of Corps jurisdiction in non-tidal waters, such as intermittent streams, extend to the Ordinary High Water Mark (OHWM) which is defined at 33 CFR 328.3(e) as: *...that line on the shore established by the fluctuation of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*

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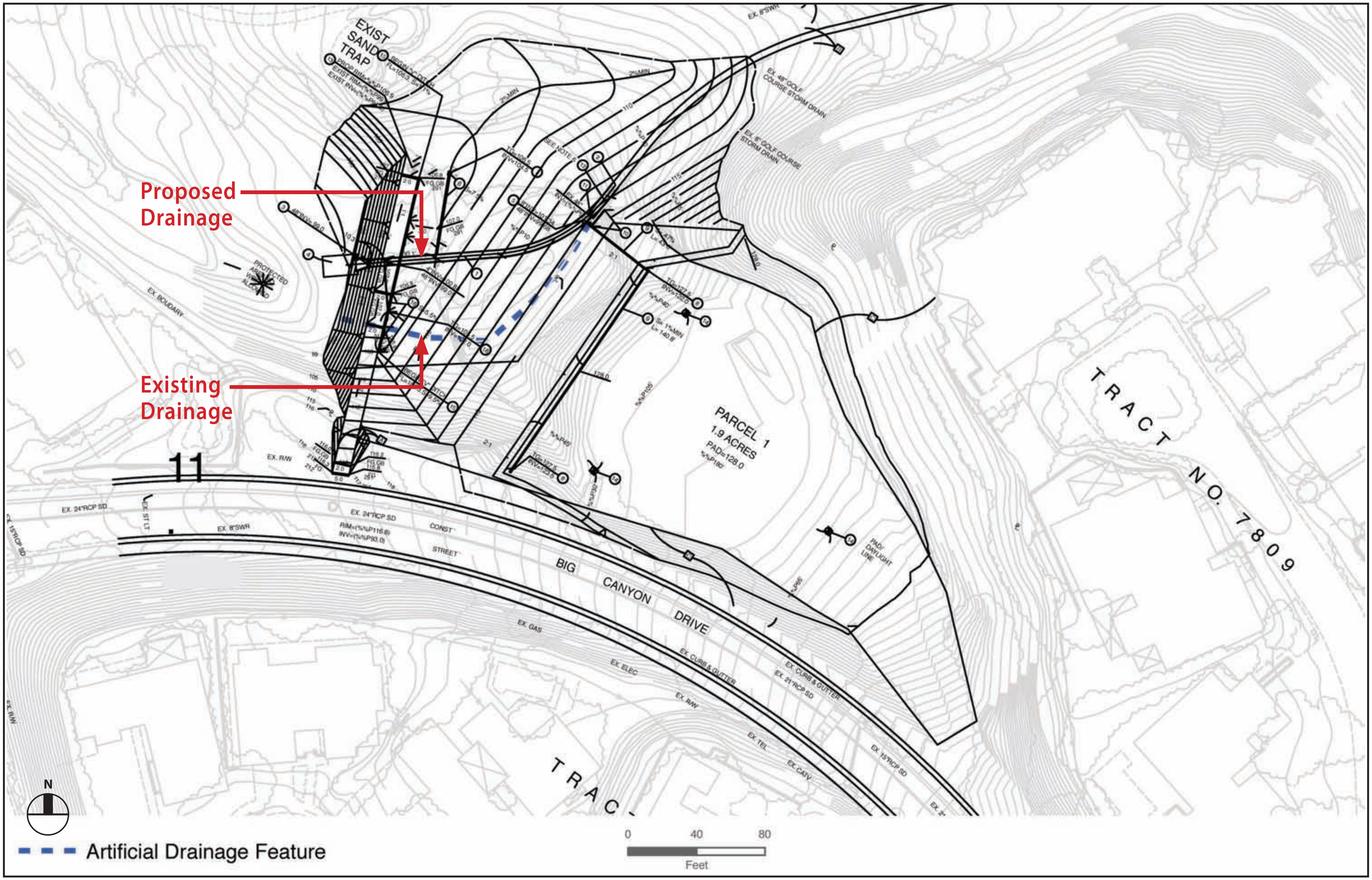
[5] See Glenn Lukos Associates December 14, 2010 memorandum, page 2, U.S. Army Corps of Engineers Jurisdiction for “waters of the United States” definition.



Source: Glenn Lukos Assoc.

Figure 12
Artificial Drainage Feature

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of a course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off-site?

Less Than Significant Impact. As discussed in "Section VIII c)" above, the project proposes to enclose and realign approximately 185 linear feet of an existing relict drainage feature that extends along the north side of the existing pad. The proposed changes to the relict drainage feature, including realignment and enclosure within a 48-inch CMP, would not substantially alter the existing drainage patterns and result in downstream flooding. The volume of water that would be discharged from the realigned pipes would be the same as is presently discharged and would not increase where it exits the site. The project would not substantially alter the existing drainage patterns on the site or propose any alterations to the existing or planned storm drain system in the Big Canyon Country Club. The project would not substantially alter the existing drainage patterns of the site or cause flooding impacts either on or off-site. The drainage pattern impacts would be less than significant.

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Less Than Significant Impact. Raising the height of the existing residential pad by 10 feet would not increase the quantity of storm water that is presently generated from the site. The 48-inch CMP that will enclose the existing relict drainage feature has more than sufficient capacity to handle the existing surface water upstream of the site along with the surface water that will be collected from the raised pad. The City will require the project applicant to submit for approval an erosion control plan, including BMPs.

Once approved, the project applicant will be required to install erosion control measures prior to the start of construction and maintain those erosion control measures during and after project construction to reduce polluted runoff. The project will not generate surface water that will exceed the capacity of the existing storm drain system downstream of the site or provide additional sources of polluted runoff. The drainage system capacity impacts would be less than significant.

f) Otherwise substantially degrade water quality?

Less Than Significant Impact. See response to section VIII. "a)" above. The project will comply with all federal and State requirements regarding water quality. A Storm Water Pollution Prevention Plan (SWPPP) and Notice of Intent (NOI) will be prepared to comply with the General Permit for Construction Activities, submitted to the State Water Resources Control Board (SWRCB) for approval, and made part of the construction program. In addition, permit coverage will be obtained for a general construction permit from the State Water Board under Construction Permit No. 2009-0009-DWQ.

As part of the plan check process, a qualified Geotechnical Engineer will review the final grading plans and specifications when available to verify that all Project Design Features have been appropriately considered and incorporated into final plan development. The new drainage outlet will be designed to the satisfaction of the Water Quality Division in the Public Works Department so that stagnant ponding does not occur. Storm drains will be located within the site to collect on-site and off-site runoff and route these flows into the subdrain system and the CMP within the storm drain easement.

The project will not substantially degrade water quality. The water quality impacts would be less than significant.

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

No Impact. The project site is not located within a 100-year flood plain as shown in Figure S3: *Flood Hazards* of the General Plan (See Appendix L). Therefore, the project will not place housing in a 100-year flood hazard area. No flooding impacts would occur.

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

No Impact. The project site is not located within a 100-year flood plain and as a result, will not impede or redirect flood flows. No flooding impacts would occur.

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

No Impact. The project site is not located within a 100-year flood plain as shown in Figure S3: Flood Hazards of the General Plan (See Appendix L). The closest dam or levee to the site is the Big Canyon Dam. The failure of Big Canyon Dam will not impact the project because it is more than a mile southwest and downstream of the site. There are no other water bodies in the project area that could impact the site by flooding due to the failure or a levee or dam. No flooding due to the failure of a levee or dam impacts would occur.

j) Inundation by seiche, tsunami, or mudflow?

No Impact. The project site is not located in the immediate vicinity of a reservoir, harbor, lake, or storage tank that could impact the site due to a seiche. The closest body of water is Upper Newport Bay which is approximately one mile to the west. Due to the distance and the 128-foot elevation difference between the Upper Newport Bay and the project site, inundation of the project site by a seiche is highly unlikely.

As shown in *Tsunami Run-Up Areas* of the Newport Beach Emergency Management Plan (See Appendix M) identifies the City of Newport Beach evacuation routes in the event of a tsunami. The City also has a tsunami contingency plan and evacuation routes in place. The project site is located approximately two and one-half miles north of the Pacific Ocean and approximately 128 feet above sea level. The potential for inundation of the project site by a tsunami is highly unlikely due to the elevation difference and the distance from the ocean.

The existing slope adjacent to and northeast of the site is considered to be grossly stable[7]. While some erosion or surficial failure of the slope could occur, the City approved BMPs will be required to be installed prior to the start of grading to protect the project site from soil erosion and other material due to surficial slope failure. No seiche, tsunami or mudflow impacts would occur.

X. LAND USE AND PLANNING.

a) Physically divide an established community?

No Impact. The project site is located in a residential, golf course community. Increasing the height of the existing pad by 10 feet or the stockpiling of the export soil at the spoils location will not create a physical division of or between the established Big Canyon Residential Community and the Big Canyon Country Club. No established community impacts would occur.

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

No Impact. The Land Use Element of the General Plan designates the main portion of the project site for Single-Unit Residential Detached (RS-D) and the golf course portion of the project site and the spoils site as Parks and Recreation (PR) land uses. The Zoning is PC-8 (Big Canyon Planned Community District). The project site is not located within the coastal zone. Raising the height of the existing residential lot is a permitted activity by the Big Canyon Planned Community District Regulations. The stockpiling of soil is an allowed permitted activity under the Big Canyon Planned Community District Regulations. The grading on the portion of the golf course (adjacent to 10 Big Canyon) and the spoils site, which are both designated Parks and Recreation (PR) by the General Plan, will not interfere with the operations of the existing golf course. The proposed grading activities to raise the height of the residential lot and stockpiling of soil will not conflict with land use plans, policies, or zoning of the City of Newport Beach. No land use policy or plan impacts would occur.

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[7] Associated Soils Engineering, Inc. Geotechnical Review of Rough Grading Plan for Parcel 1of Parcel Map No. 2008-11, Big Canyon Country Club, Newport Beach, CA, June 25, 2010, page 4, 3.6 Slope Stability.

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?

No Impact. As pointed out earlier in Section IV (Biological Resources) of this document, the project sites are not within a habitat conservation area that supports any specific species of flora or fauna on the property. The overall project will not conflict with any applicable habitat conservation plan or natural community conservation plan. No habitat conservation impacts would occur.

XI. MINERAL RESOURCES.

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

No Impact. According to the City of Newport Beach General Plan, Natural Resources Element, the Mineral Resource Zones (MRZ) in the City are either classified as containing no significant mineral deposits (MRZ-1), or the significance of mineral deposits has not been determined (MRZ-3). The proposed project is located in an area designated as MRZ-3 by the California Department of Conservation as shown in Figure 4.5-4 *Mineral Resource Zones* of the General Plan EIR (See Appendix N).

The City of Newport Beach's General Plan does not identify any minerals on the project site or portions of Big Canyon surrounding the site. The project will not result in the loss of a known mineral resource that would be of state, regional, or local value. In addition, the proposed project site is surrounded by land uses that are not compatible with pit mining (residential and roads), all of which would preclude it from being developed as a mine, even if there is indeed an extractable mineral resource present. No mineral resource impacts would occur.

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

No Impact. The project site is not delineated as a locally-important resource recovery site in the City's General Plan. The project will not have any locally important mineral resource impacts. No mineral resource recovery impacts would occur.

XII. NOISE.

A noise analysis was prepared by Mestre Greve Associates to determine if the project will have any potential noise impacts. A copy of the noise analysis is provided in Appendix O.

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less Than Significant Impact. The project proposes to export 7,000 cubic yards of soil from the site to the spoils site within the Big Canyon Country Club. The project proposes to import 45,000 cubic yards of dirt from the Orange County Sanitation Districts in Fountain Valley to raise the height of the existing residential pad. The operation of grading equipment, trucks exporting and importing dirt, and workers commuting to and from the site would generate noise.

Existing noise measurements were taken on July 21, 2010 between 10:30 AM to 12:00 PM to determine the existing noise levels on and near the site. The existing measured noise levels were used as background noise levels to estimate the future noise levels that would be generated during grading and hauling dirt to and from the site. As shown in Figure 13, Noise Measurement Locations, Noise Measurement Location No. 1 was in the Rue Biarritz cul-de-sac, approximately 60 feet northeast of the site and noise measurement location 2 was approximately 50 feet southwest of the flat surface pad on the site. The noise levels at the two locations are shown in Table 4, Existing Noise Measurement Results.

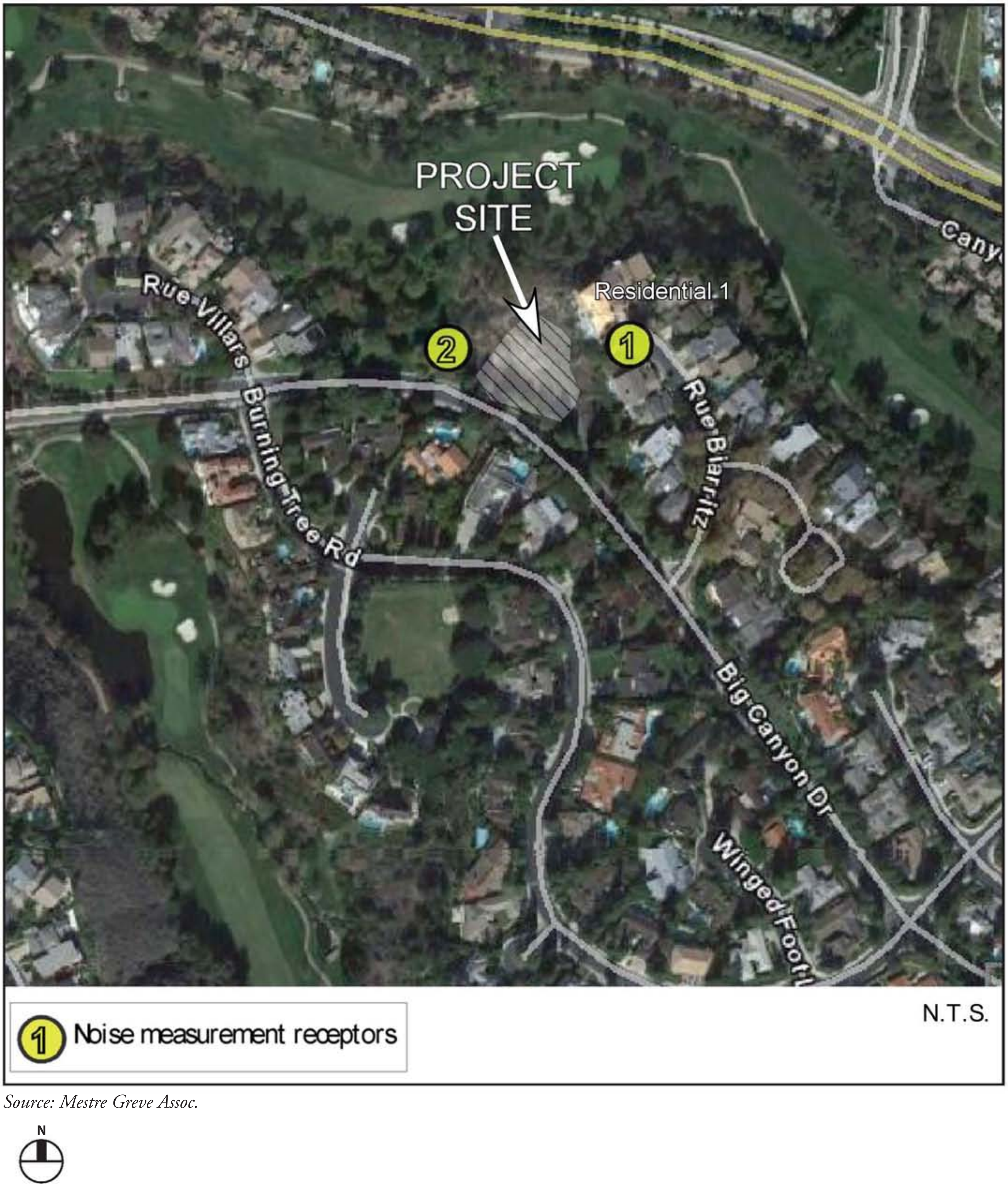
Table 4
Existing Noise Measurement Results (dBA)

Site	Time	Leq	Lmax	Lmin	L1.7	L8.3	L25	L50	L90	L99
1	10:35 am	49.5	61.7	40.9	58.5	52.5	48.5	45.5	42.5	41.5
	10:47 am	50.3	64.3	40.2	58.5	54.5	49.0	45.5	42.0	41.0
2	11:02 am	49.4	61.4	36.6	57.0	55.0	48.0	44.0	40.0	38.0
	11:14 am	46.9	53.8	37.0	50.5	49.5	48.0	46.0	42.5	38.5

Site 1 is located on Rue Biarritz at the north end of the cul-de-sac overlooking the project site. Traffic on Big Canyon Road and Jamboree Road, which is approximately 1,700 feet to the west, was the main sources of noise. An occasional vehicle on the cul-de-sac also contributed secondary noise. Other contributing noise sources include air planes overhead from John Wayne Airport, the operation of landscape maintenance equipment, people and trash trucks.

Site 2 is located on the project site near Big Canyon Road adjacent to the property line between the site and the golf course. Big Canyon Road is approximately 3 to 5 feet higher than the noise monitor. Infrequent traffic on Big Canyon Road and the operation of landscape maintenance equipment on the golf course were the dominant noise sources. Traffic on Jamboree Road and golf carts on the golf course were secondary noise contributors. Air planes overhead and other urban noise also contributed to the ambient noise at this noise measurement location.

The closest residence is north of the site on Rue Biarritz and overlooks the project site. Construction activities from the project may occur approximately 50 feet from this home. At this distance the construction noise level is estimated to reach up to 90 dBA.



Source: Mestre Greve Assoc.

Figure 13
Noise Measurement Location Map

The average noise level from construction equipment operating on the site could be in the range of 74 and 82 dBA at the nearest residence.

The peak noise levels generated by on-site construction activities could be in excess of the City's daytime noise standard of 75 dBA Lmax (Municipal Code Section 10.26.025). Section 10.26.035.D of the Newport Beach Municipal Code exempts construction equipment from the daytime noise standards and requires construction activity to comply with Section 10.28.040 of the Code that restricts the hours of construction to the hours of 7:00 a.m. to 6:30 p.m. Monday through Friday and 8:00 a.m. to 6:00 p.m. on Saturday. Noise generating construction activities are not allowed on Sundays or holidays. The project does not propose any construction activities outside of the hours of construction allowed by the Newport Beach Municipal Code. As a result, the project would not result in a significant noise impact to local residents.

The trucks that import and export dirt will generate truck noise along the selected haul routes. Within Big Canyon Country Club, trucks would only travel on and would be restricted to Big Canyon Road. The haul route to export dirt from the site to the stockpile area at the east side of Big Canyon Country Club was shown previously in Figure 1, Local Vicinity Map. As shown, trucks will travel on Big Canyon, San Joaquin Hills Road, Jamboree Road, Ford Road, and MacArthur Road to haul dirt to the stockpile site at the east side of Big Canyon Country Club. Dirt that is imported from the Orange County Sanitation Districts in Fountain Valley would require trucks to travel on the San Diego Freeway, Jamboree Road, San Joaquin Hills Road, and Big Canyon Drive.

Project grading is anticipated to take approximately 60 days. During that time there would be a maximum of 142 one-way truck trips per day. The CNEL noise levels on Big Canyon Road due to a maximum of 142 truck trips a day would be approximately 61 dBA at the front of the typical home within Big Canyon (approximately 40 feet from the centerline). This noise level is below the City's 65 CNEL noise standard and would not be considered a significant noise impact. The truck traffic generated by the project would not have any significant noise impacts to the public roadways outside of Big Canyon due to the amount of existing traffic on those roadways.

Five workers would commute to the site daily during the 60 day construction period and generate 10 daily trips. The noise that would be generated by the workers commuting to the site would not exceed the City's 65 CNEL noise standard.

The project would not generate any short-term construction noise that would expose people to noise levels that exceed the City's Noise Ordinance and have significant noise impacts. The exposure of people to excess noise standards impacts would be less than significant.

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Less Than Significant Impact. The noise that would be generated by the project is determined to be less than significant as discussed in "Section XII a)" above. Vibration intensive activities such as pile-driving or sheet piles are not proposed by the project. Compaction equipment such as bulldozers will be used to compact the soil as it is placed to raise the residential pad. Because the project will use compaction equipment that is typically associated with the type of grading proposed, no excessive ground borne noise or vibration impacts are anticipated. The exposure of people to excessive groundborne vibration impacts would be less than significant

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

No Impact. As noted in "Section XII a)" above, the project would increase short-term noise impacts during construction. Once the grading activities are completed, all construction noise on the site would cease. No permanent noise impacts would occur.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Less Than Significant Impact. As stated above in "Section XII a)", the proposed project would result in a temporary increase in noise levels during on-site construction activities. The CNEL noise levels on Big Canyon Road due to a maximum of 142 truck trips a day would be approximately 61 dBA at the front of the typical home within Big Canyon (approximately 40 feet from the centerline). However, the Newport Beach Municipal Code exempts construction equipment from the provision of the Noise Ordinance provided that it occurs only between the hours of 7:00 a.m. and 6:30 p.m., Monday through Friday, and 8:00 a.m. and 6:00 p.m. on Saturday and at no time on federal holidays or Sundays. The project does not propose any construction activities outside of the hours of construction allowed by the Municipal Code. The temporary ambient noise impacts would be less than significant.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. The project site is located approximately three miles west of John Wayne Airport and outside of the 60 dBA CNEL Noise Contour of the John Wayne AELUP as established by the Orange County ALUC (See Figures N2 *Existing Noise Contours* and Figure N5 *Future Noise Contours* of the General Plan, Appendix P). Because the project is outside the 60 dBA CNEL Noise Contour of the John Wayne AELUP the project will not expose construction workers to excessive noise levels associated with the airport. No airport noise impacts would occur.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. There are no private airstrips within at least five miles of the project site. As a result, the project will not expose construction workers to excessive noise levels from a private airstrip. No private airstrip noise impacts would occur.

XIII. POPULATION AND HOUSING.

a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

No Impact (a – c). The project proposes to raise the height of an existing vacant residential lot by 10 feet. No development is proposed that would induce or increase the population growth in Newport Beach or surrounding areas. Because the site is vacant, the project will not displace any existing housing or people that would require the construction of replacement housing. No population or housing impacts would occur.

XIV. PUBLIC SERVICES

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

- **Fire protection?**
- **Police protection?**
- **Schools?**
- **Other public facilities?**

Less Than Significant Impact. The construction activities necessary to raise the height of the residential pad are not anticipated to have significant impacts to existing public services that serve the site. The public services that could be needed by the project during grading include emergency medical and/or fire protection services or police service calls for vandalism or theft of construction equipment. The need for emergency medical, fire or police protection services is not anticipated to significantly impact the current levels of service provided by the fire and police departments. The project would not generate any students directly or indirectly or impact any public facilities. The project is not anticipated to have any significant impacts to any public services during the project's 60 day construction period. The public service impacts would be less than significant.

XV. RECREATION

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

b) Does the project include recreational facilities or require the construction of or expansion of recreational facilities which might have an adverse physical effect on the environment?

No Impact (a - b). There are no activities associated with the project that would impact recreational facilities nor require the construction or expansion of any recreational facilities. The grading on the portion of the golf course (adjacent to 10 Big Canyon) and the soils site, which are both designated Parks and Recreation (PR) by the General Plan, will not interfere with the useability of the existing golf course. No recreation impacts would occur.

XVI. TRANSPORTATION/TRAFFIC

a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

Less Than Significant Impact. The project will not generate traffic that will exceed the capacity of any of the streets that will serve the project. During grading of the project site, importing of the 45,000 cubic yards of soil will result in a maximum of 142 one-way or 284 round-trip trips per day. Project traffic will not exceed the City's acceptable level of service (LOS D) of any area intersections or the carrying capacity of the streets. As a result, the project will not conflict with any ordinance or city policy that establishes a performance level of city roads. The circulation system, plan and policy impacts would be less than significant.

b) **Conflict with an applicable congestion management program, including, but not limited to level of service standard and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?**

Less Than Significant Impact. The project is estimated to generate approximately 5,200 one-way truck trips over 60 days to export and import dirt to and from the site. Of these, approximately 700 one-way trips will be required to haul 7,000 cubic yards of dirt from the project site to the stockpile site at the east side of the Big Canyon Golf Course. Due to air quality emission thresholds restrictions it will take approximately 15 days to haul the 7,000 cubic yards of dirt to the stockpile site, which includes 40 one-way truck trips per day for thirteen days and 142 one-way truck trips over two days. The truck trips to export dirt to the stockpile site would occur on Big Canyon Drive, San Joaquin Hills Road, Jamboree Road, and MacArthur Boulevard. Importing 45,000 cubic yards of dirt from the Orange County Sanitation District would result in approximately 142 one-way or 284 round-trip truck trips per day over a period of approximately 32 days based on 10 cubic yards/truck trip. In addition, there will be five workers at the site on a daily basis to operate the grading equipment. The five workers will generate 10 daily traffic trips to the area roadways.

The City of Newport Beach's Traffic Engineer has reviewed the proposed project's anticipated trip generation, and concluded the project will not result in any significant impacts to the traffic load and capacity of the local roadway system, levels of service, or result in an increase in traffic levels that will result in a safety risk on the existing roads that serve the site during construction. The congestion management program impacts would be less than significant.

c) **Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?**

No Impact. The project is approximately three miles south of John Wayne Airport, which is the closest airport to the site. While the project is located within the boundary of the John Wayne AELUP, there are no activities associated with the project that would cause or result in changes in the existing or planned air traffic patterns or increases in air traffic levels at John Wayne Airport. No air traffic impacts would occur.

d) **Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?**

Less Than Significant with Mitigation Incorporated. The single potential traffic safety impact would be if trucks or construction equipment back onto Big Canyon Drive from the project site. The following measure is recommended to mitigate potential impacts for trucks or construction equipment backing onto Big Canyon Drive from the site. The design feature impacts would be less than significant with mitigation incorporated.

Mitigation Measure No. 10 Prior to the issuance of a grading permit, an adequate vehicular turnaround area shall be provided on-site, suitable to the City Traffic Engineer. All trucks and construction equipment shall drive forward from the site onto Big Canyon Drive. Backing onto Big Canyon Drive from the site shall be prohibited.

e) Result in inadequate emergency access?

Less Than Significant Impact. The existing site access road provides adequate emergency access from Big Canyon Drive. Prior to the issuance of a grading permit the Newport Beach Police and Fire Departments will review the grading plan to ensure that adequate emergency site access is maintained during construction. The proposed grading activities will not change or alter the existing site access from Big Canyon Drive. The project will maintain adequate emergency site access throughout construction without any significant impacts. The emergency access impacts would be less than significant.

f) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

No Impact. The proposed construction activities will not conflict with any City adopted policies, plans, or programs supporting alternative transportation because the City's Transportation Demand Management (TDM) Ordinance does not apply to residential projects. No alternative transportation impacts would occur.

XVII. UTILITIES & SERVICE SYSTEMS

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

No Impact. Wastewater would not be generated directly from the site during the grading project. A portable toilet would be provided for the workers during the grading period. The toilet would be serviced by the company that provides the toilet, and all wastewater generated by the toilet would be transported to a public wastewater treatment plant for treatment. The wastewater indirectly generated by the project would not exceed any wastewater treatment requirements of the Santa Ana Regional Water Quality Control Board. No wastewater treatment requirement impacts would occur.

b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

No Impact. Water would be required for dust control both on the site and along Big Canyon Drive. However, new water facilities would not be required because the small volume of water required by the project for dust control could be provided by existing water facilities and supplies. As discussed in “Section XVI a)” above, the project would not generate wastewater that would impact wastewater treatment facilities. No water or wastewater facility expansion impacts would occur.

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Less Than Significant Impact. The project proposes to extend an existing 48-inch corrugated metal pipe (CMP) and a 12-inch plastic pipe to enclose an existing open relict drainage feature that extends along the north end of the residential pad so the height of the pad can be raised 10 feet. The existing relict feature would be enclosed into a single 48-inch corrugated metal pipe and connected to the existing 48-inch CMP and 12-inch plastic pipe upstream of the site. Surface water collection facilities are proposed for the north slope of the pad to collect surface water runoff. The surface water from the slope would be discharged into the new 48-inch CMP. The construction of the 48-inch CMP and the storm drain collection facilities on the pad slope would not cause or result in any significant environmental effects. The storm drain facilities impacts would be less than significant.

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

Less Than Significant Impact. Water will be required to control dust and provide suitable moisture content of the soil for compaction as directed by the soils engineer. The volume of water that will be required to control dust and provide proper soil moisture content for soil compaction will not be significant and can be provided by existing water supplies (without requiring new water supplies or expanded entitlements). The water supply impacts would be less than significant.

e) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project’s projected demand in addition to the provider's existing commitments?

No Impact. The construction workers that will be working at the site would generate wastewater during the 60 day grading period. A portable toilet will be provided for the workers during the grading period. The toilet would be serviced by a private company and the wastewater transported to a public wastewater treatment plant for treatment. The wastewater that would be generated by the five construction workers at the site would not significantly impact the capacity of a wastewater treatment plant. No wastewater treatment capacity impacts would occur.

f) **Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?**

Less Than Significant Impact. The majority of residential solid waste generated in the City of Newport Beach is collected by the City's Refuse Division. Remaining solid waste is collected by waste haulers and transported to a City-owned transfer station. Refuse is consolidated and transported to a materials recovery facility where recyclable materials are sorted from refuse by machines and other methods. Currently, only the Frank R. Bowerman Sanitary Landfill serves the City of Newport Beach.

Construction waste generated by the proposed project would result in a temporary increase in construction and demolition waste. The Frank R. Bowerman landfill currently has a remaining capacity of 44,560,000 tons and is expected to be able to accommodate the increase in solid waste generated by construction and operation of the project. The landfill impacts would be less than significant.

g) **Comply with federal, state, and local statutes and regulations related to solid waste?**

No Impact. Solid waste produced by the proposed grading project would be picked up by either the City of Newport Beach or a commercial provider licensed by the City of Newport Beach. The proposed project would comply with all federal, state, and local statutes and regulations related to solid waste, such as the California Integrated Waste Management Act and city recycling programs. No federal, state or local solid waste regulation impacts would occur.

VIII. MANDATORY FINDINGS OF SIGNIFICANCE.

a) **Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major period of California history or prehistory?**

Less Than Significant with Mitigation Incorporated. The project proposes to enclose approximately 185 linear feet of an open relict drainage feature that according to the U.S. Army Corps of Engineers is eligible for regulation under Section 404 of the Clean Water Act. The relict drainage is also determined by the California Department of Fish and Game to be eligible for regulation under Section 1602 of the Fish and Game code. Mitigation Measures No. 9 is recommended to mitigate the impact of covering 175 square feet of relict drainage on the site should any of the resource agencies determine that it is necessary.

Due to the disturbed character of the site, the proximity of non-native ornamental vegetation, and the limited patch size of Coyote Sage Scrub on-site, the project site does not exhibit potential for supporting any special-status species. No rare, endangered, or threatened fish or wildlife populations or habitat will be disturbed or impacted by the project. The site was disturbed in the past for the placement of dirt as a stockpile site. Other than the disturbance of the relict drainage feature, which can be mitigated, the project will not have any significant biological impacts. The biological and cultural resource impacts would be less than significant with mitigation incorporated.

b) **Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)**

Less Than Significant with Mitigation Incorporated. The analysis of cumulative projects addresses only those environmental issues that have the potential to be affected by combined cumulative projects. A list of the cumulative projects considered for this environmental analysis is included as Appendix Q. Only project impacts that are deemed cumulatively considerable are considered potentially significant impacts in the context of this analysis.

The city is divided into Statistical Areas that specify land use categories, types of uses, and for certain categories, the densities/intensities to be permitted with each statistical area. The project site is located in Statistical Area L2, which encompasses the area bounded by Ford Road on the north, MacArthur Boulevard on the east, San Joaquin Hills Road on the south and Jamboree Boulevard on the west.

None of the cumulative projects listed in Appendix Q are located within Statistical Area L2. The North Newport Center Planned Community that is located in Statistical Area L1 is south of and the closest cumulative project to Statistical Area L2. Presently there are no proposed development or construction projects in Statistical Area L1 and as a result it is unlikely there would be any construction of projects in L1 concurrently with the proposed project. As a result, there would not be any cumulative impacts with the proposed project and development in Statistical Area L1.

Since none of the other cumulative projects that are listed in Appendix Q are adjacent to Statistical Area L2, the one potentially significant cumulative impact that could occur is air quality because it can extend beyond the boundary of Statistical Area L2. As provided in the project air quality assessment, the air pollutant modeling for construction emissions demonstrates that the short-term grading activities would exceed District NOx and PM10 thresholds. Mitigation Measures 1-7 would reduce short-term project generated NOx, and PM_{10} emissions and reduce air quality emissions to a level below the District thresholds. As a result, the cumulatively considerable pollutant impacts by the project would be less than significant and no additional mitigation measures are required.

The project will not have any significant cumulative impacts. All identified project impacts are less that significant or can be mitigated to a level of insignificance with implementation of the recommended mitigation measures. The cumulative impacts would be less than significant with mitigation incorporated.

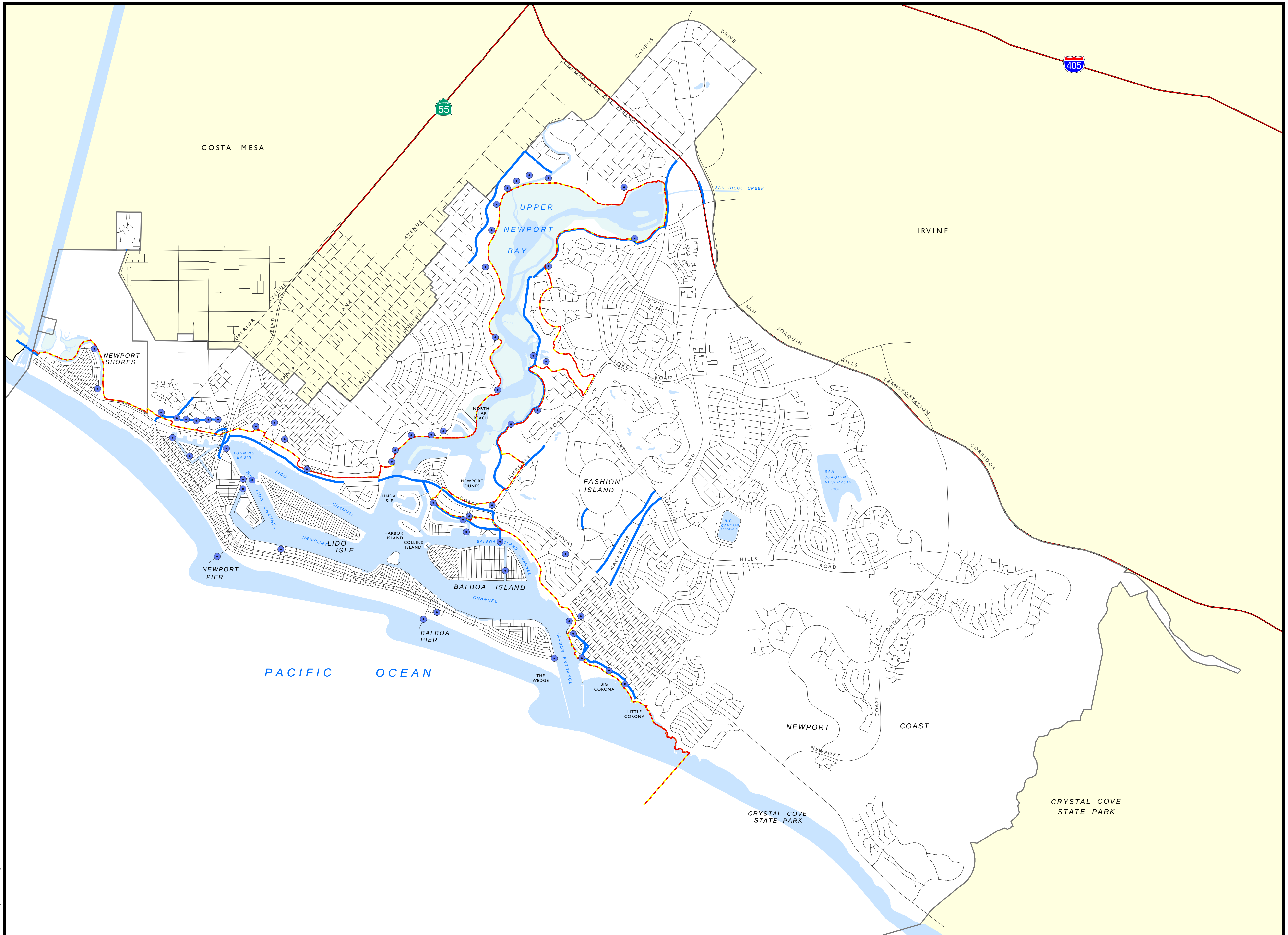
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less Than Significant with Mitigation Incorporated. While project impacts have been identified, no significant adverse impacts have been identified. Although construction of the proposed project is expected to create temporary adverse effects related to construction noise and air quality, Mitigation Measures No. 1-10 and the mitigation measures that are carried over from MND 2008-003 are recommended to reduce the impacts to less than significant levels. The environmental effects to human impacts would be less than significant with mitigation incorporated.

APPENDICES

APPENDIX A

Figure NR3: Coastal Views



CITY of NEWPORT BEACH
GENERAL PLAN

Figure NR3
COASTAL VIEWS

Legend

- Public View Point
- Coastal View Road
- Shoreline Height Limitation Zone
- City Boundary
- County

0 0.5 1 Miles

Source: City of Newport Beach, 2005
PROJECT NUMBER: 10579-01
Date: 07/24/06

EIP ASSOCIATES

N:/GISProjects/NewportBeach_10579/coastal_views.mxd

APPENDIX B

Mestre Greve Associates Air Quality Analysis

2.0 AIR QUALITY ANALYSIS

Temporary impacts will result from project construction activities. Air pollutants will be emitted by construction equipment and fugitive dust will be generated during grading activities as well as importing and exporting of soil.

Short-term air pollutant emissions due to construction were calculated using the URBEMIS2007 program (version 9.4.2). URBEMIS is a computer program generated by the California Air Resources Board (CARB) that calculates emissions for construction and operation of development projects. Default URBEMIS2007 variables were used for the calculations. The six criterion pollutants of concern are: reactive organic gasses (ROG), oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), and PM_{10}, (particles smaller than 10 microns in size) and $PM_{2.5}$ (particles smaller than or equal to 2.5 microns).

Short-term Construction Emissions

The project will need to comply with the SCAQMD significant thresholds. The SCAQMD significance thresholds for short-term construction are presented in Table 4.

Table 4
SCAQMD Regional Pollutant Emission Thresholds of Significance

	Pollutant Emissions (lbs/day)					
	CO	**VOC**	**NOx**	**PM10**	**PM2.5**	**SOx**
Construction	*550*	*75*	*100*	*150*	*55*	*150*

The primary source of air quality emissions would primarily from the grading, import and export of soil. Table 5 presents the results of the URBEMIS2007 model showing the maximum daily air pollutant emissions projected. The project emissions will be compared to the Significant Thresholds established by the South Coast Air Quality Management District (SCAQMD) shown above. The specific data utilized in calculating the emissions, and output files from the URBEMIS2007 program are provided in the appendix.

Table 5
Peak Construction Emissions - Pounds per day

Activity	Daily Emissions (lbs/day) CO	NO_x	VOC	PM_{10}	$PM_{2.5}$	SO_x
Mass Grading	20.8	44.9	4.9	12.5	3.9	0.0
Haul Trucks	23.0	62.5	4.7	2.8	2.3	0.1
Combined:	43.8	107.4	9.6	15.3	6.2	0.1
Significance Threshold	**550**	**100**	**75**	**150**	**55**	**150**
Exceed Threshold?	No	Yes	No	No	No	No

NOTE: Underline data indicates exceedance. Construction emissions include standard mitigation as required by SCAQMD rules. Particulate (PM_{10} and $PM_{2.5}$) emissions include a 60% reduction from watering three times daily as required by SCAQMD Rules.

Table 5 shows that unmitigated construction emissions would be above the Significance Emission Thresholds established by the SCAQMD, specifically for NOx. In general, the primary source of NO_x emissions would be from construction equipment and haul trucks importing and exporting material. Mitigation measures to reduce construction emissions to a level that is under the significance threshold such as the use of construction equipment with diesel oxidation catalyst are recommended in Section 3.0 (Mitigation Measures).

Localized LST Analysis

In accordance with Governing Board direction, SCAQMD staff developed localized significance threshold (LST) methodology and mass rate look-up tables by Source Receptor Area (SRA) that can be used to determine whether or not a project may generate significant adverse localized air quality impacts. LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard, and are developed based on the ambient concentrations of that pollutant for each source receptor area. The LST methodology is described in "Final Localized Significance Threshold Methodology" updated on October 21, 2009 by the SCAQMD and is available at the SCAQMD website (http://aqmd.gov/ceqa/handbook/LST/LST.html).

The LST mass rate look-up tables provided by the SCAQMD allow one to determine if the daily emissions for proposed construction or operational activities could result in significant localized air quality impacts. If the calculated on-site emissions for the proposed construction or operational activities are below the LST emission levels found on the LST mass rate look-up tables and no potentially significant impacts are found to be associated with other environmental issues, then the proposed construction or operation activity is not significant for air quality.

The LST mass rate look-up tables are applicable to the following pollutants only: oxides of nitrogen (NO_x), carbon monoxide (CO), and particulate matter (PM_{10} and $PM_{2.5}$). LSTs are derived based on the location of the activity (i.e., the source/receptor area); the emission rates of NO_x, CO, PM_{10}, and $PM_{2.5}$; and the distance to the nearest exposed individual.

The LST methodology presents mass emission rates for each SRA, project sizes of 1, 2, and 5 acres, and nearest receptor distances of 25, 50, 100, 200, and 500 meters. For project sizes between the values given, or with receptors at distances between the given receptors, the methodology uses linear interpolation to determine the thresholds. If receptors are within 25 meters of the site, the methodology document says that the threshold for the 25-meter distance should be used.

The project is located in SRA 18. The nearest existing homes are located on Rue Biarritz the cul-de-sac to the north. The homes are referred to as Residential 1 as shown in Exhibit 1. The distances to the nearest homes could be located as close as 50 feet from the edge the project site to approximately 150 feet when the grading occurs towards the midpoint of the project site. The LSTs are the same for receptors closer than 25 meters (82 feet). Table 6 summarizes the LSTs for construction.

Table 6 also lists the thresholds to determine if construction of the project results in a significant local air quality impact. The thresholds listed in Table 6 are based on a 1.9 acre construction site with an adjacent receiver approximately 50 feet from the closest home, to approximately 150 feet at the general midpoint of the project site. A project with daily emission rates below the thresholds during operation is considered to have a less than significant effect on local air quality.

Table 6
Localized Significance Thresholds at the Nearest Receptors

	Distance	Localized Significance Threshold (lbs/day)			
	Feet	CO	NO_x	PM_{10}	$PM_{2.5}$
Construction	*50*	930.5	127.1	6.7	4.8
Construction	*150*	1,032.8	124.9	17.9	6.5

The emissions presented in Table 7 below are those that would be emitted from activity within the project site, including the emissions from construction trucks and vehicles traveling on-site (inside the project boundaries). The on-site worker trips were estimated using URBEMIS default calculations, while each on-road construction vehicle or diesel trip would have a 0.2 mile component within the project site. The total on-site construction emissions are compared to the Localized Significance Thresholds (LSTs). The LSTs are the same for distances less than 25 meters (82 feet), and are slightly less stringent for distances greater than 25 meters. Worksheets showing the emission calculations are presented in the appendix.

Table 7
On-site Emissions By Construction Activity

Activity	*Distance Feet*	Daily Emissions (lbs/day) CO	NO_x	PM_{10}	$PM_{2.5}$
Mass Grading	--	0.2	0.4	10.8	2.3
Haul Trucks	--	0.2	0.5	0.0	0.0
Combined:		0.4	0.9	10.8	2.3
Significance Threshold	*50*	**930.5**	**127.1**	**6.7**	**4.8**
Exceed LST?		No	No	Yes	No
Significance Threshold	*150*	**1,032.8**	**124.9**	**17.9**	**6.5**
Exceed LST?		No	No	No	No

The emissions will be above the LSTs even with mitigation measures required by SCAQMD rules, specifically for PM_{10} at the closest distance of 50 feet. Additional mitigation to reduce fugitive dust is recommended in Section 3.0.

3.0 Mitigation Measures

3.0.1 Noise

No significant noise impacts are anticipated. The project will have to comply with the City's Noise Ordinance which limits hours of construction.

3.0.2 Air Quality

NOx and PM_{10} emissions would be above the significant thresholds without mitigation measures. Therefore, mitigation measures required by SCAQMD Rules should be implemented to the greatest extent possible. Mitigation to reduce NOx, PM_{10} and PM_{25} emission are recommended below.

The following measures are recommended:

- To reduce daily NOx emissions, the use of construction equipment with diesel oxidation catalyst are recommended.

- To reduce daily PM_{10} emissions, the on-site cut/fill activities shall be limited to a maximum of 400 cubic yards per day, when grading activities are within 25 meters (82 feet) of the nearest homes. The grading in this area would involve approximately 5,000 cubic yards and take approximately 13 days. Once the grading activities are outside the 25 meter zone, the on-site cut/fill activities shall be operated at a maximum 1,422 cubic yards per day. The grading for the remaining project area (outside 25 meters) would total 14,000 cubic yards, and take approximately 10 days.

- Apply soil stabilizers to inactive areas, and replace ground cover in disturbed areas quickly. Water exposed surfaces three times daily.

- Provide water while loading and unloading to reduce visible dust plumes. Reduce speed on unpaved roads to less than 15 mph.

- Manage haul road dust by watering three times daily. Haul trucks related to the import of 45,000 cubic yards per day is anticipated to take approximately 32 days.

With these mitigation measures, emissions would be reduced to levels below all significance thresholds for construction activities.

APPENDIX
(Urbemis Modeling)

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: C:\Documents and Settings\tmoon\My Documents\Dropbox\L&B WORK\BigCanyon AQ_NZ NB2\big canyon nb 022811.urb924

Project Name: Big Canyon Lot

Project Location: Orange County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011 TOTALS (lbs/day unmitigated)	9.64	107.44	43.75	0.09	178.13	4.23	182.36	37.24	3.89	41.13	14,172.27
2011 TOTALS (lbs/day mitigated)	9.64	107.44	43.75	0.09	11.07	4.23	15.30	2.35	3.89	6.24	14,172.27

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 2/1/2011-4/4/2011 Active Days: 45	**9.64**	**107.44**	**43.75**	**0.09**	**178.13**	**4.23**	**182.36**	**37.24**	**3.89**	**41.13**	**14,172.27**
Mass Grading 02/01/2011-04/04/2011	9.64	107.44	43.75	0.09	178.13	4.23	182.36	37.24	3.89	41.13	14,172.27
Mass Grading Dust	0.00	0.00	0.00	0.00	177.80	0.00	177.80	37.13	0.00	37.13	0.00
Mass Grading Off Road Diesel	4.90	44.86	19.39	0.00	0.00	1.80	1.80	0.00	1.65	1.65	4,288.19
Mass Grading On Road Diesel	4.71	62.51	22.98	0.09	0.32	2.43	2.75	0.11	2.23	2.34	9,697.46
Mass Grading Worker Trips	0.04	0.08	1.38	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.62
Time Slice 6/1/2011-6/30/2011 Active Days: 22	2.04	17.28	7.65	0.00	0.00	0.88	0.88	0.00	0.81	0.81	1,868.41
Building 06/01/2011-06/30/2011	2.04	17.28	7.65	0.00	0.00	0.88	0.88	0.00	0.81	0.81	1,868.41
Building Off Road Diesel	2.04	17.28	7.65	0.00	0.00	0.88	0.88	0.00	0.81	0.81	1,868.41
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 8/2/2011-8/15/2011 Active Days: 10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating 08/02/2011-08/15/2011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Phase Assumptions

Phase: Mass Grading 2/1/2011 - 4/4/2011 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 1.9

Maximum Daily Acreage Disturbed: 1

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 1422 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 2288

Off-Road Equipment:

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

2 Other Material Handling Equipment (191 hp) operating at a 0.59 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Building Construction 6/1/2011 - 6/30/2011 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Architectural Coating 8/2/2011 - 8/15/2011 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 2/1/2011-4/4/2011 Active Days: 45	**9.64**	**107.44**	**43.75**	**0.09**	11.07	**4.23**	15.30	2.35	**3.89**	6.24	**14,172.27**
Mass Grading 02/01/2011-04/04/2011	9.64	107.44	43.75	0.09	11.07	4.23	15.30	2.35	3.89	6.24	14,172.27
Mass Grading Dust	0.00	0.00	0.00	0.00	10.74	0.00	10.74	2.24	0.00	2.24	0.00
Mass Grading Off Road Diesel	4.90	44.86	19.39	0.00	0.00	1.80	1.80	0.00	1.65	1.65	4,288.19
Mass Grading On Road Diesel	4.71	62.51	22.98	0.09	0.32	2.43	2.75	0.11	2.23	2.34	9,697.46
Mass Grading Worker Trips	0.04	0.08	1.38	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.62
Time Slice 6/1/2011-6/30/2011 Active Days: 22	2.04	17.28	7.65	0.00	0.00	0.88	0.88	0.00	0.81	0.81	1,868.41

Building 06/01/2011-06/30/2011	2.04	17.28	7.65	0.00	0.00	0.88	0.88	0.00	0.81	0.81	1,868.41
Building Off Road Diesel	2.04	17.28	7.65	0.00	0.00	0.88	0.88	0.00	0.81	0.81	1,868.41
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 8/2/2011-8/15/2011 Active Days: 10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating 08/02/2011-08/15/2011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Mass Grading 2/1/2011 - 4/4/2011 - Default Mass Site Grading/Excavation Description

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stablizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: C:\Documents and Settings\tmoon\My Documents\Dropbox\L&B WORK\BigCanyon AQ_NZ NB2\big canyon nb 022811 mitg.urb924

Project Name: Big Canyon Lot

Project Location: Orange County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011 TOTALS (lbs/day unmitigated)	9.64	107.44	43.75	0.09	178.13	4.23	182.36	37.24	3.89	41.13	14,172.27
2011 TOTALS (lbs/day mitigated)	9.64	96.23	43.75	0.09	11.07	4.23	15.30	2.35	3.89	6.24	14,172.27

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 2/1/2011-4/4/2011 Active Days: 45	**9.64**	**107.44**	**43.75**	**0.09**	**178.13**	**4.23**	**182.36**	**37.24**	**3.89**	**41.13**	**14,172.27**
Mass Grading 02/01/2011-04/04/2011	9.64	107.44	43.75	0.09	178.13	4.23	182.36	37.24	3.89	41.13	14,172.27
Mass Grading Dust	0.00	0.00	0.00	0.00	177.80	0.00	177.80	37.13	0.00	37.13	0.00
Mass Grading Off Road Diesel	4.90	44.86	19.39	0.00	0.00	1.80	1.80	0.00	1.65	1.65	4,288.19
Mass Grading On Road Diesel	4.71	62.51	22.98	0.09	0.32	2.43	2.75	0.11	2.23	2.34	9,697.46
Mass Grading Worker Trips	0.04	0.08	1.38	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.62
Time Slice 6/1/2011-6/30/2011 Active Days: 22	2.04	17.28	7.65	0.00	0.00	0.88	0.88	0.00	0.81	0.81	1,868.41
Building 06/01/2011-06/30/2011	2.04	17.28	7.65	0.00	0.00	0.88	0.88	0.00	0.81	0.81	1,868.41
Building Off Road Diesel	2.04	17.28	7.65	0.00	0.00	0.88	0.88	0.00	0.81	0.81	1,868.41
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 8/2/2011-8/15/2011 Active Days: 10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating 08/02/2011-08/15/2011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Phase Assumptions

Phase: Mass Grading 2/1/2011 - 4/4/2011 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 1.9

Maximum Daily Acreage Disturbed: 1

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 1422 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 2288

Off-Road Equipment:

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

2 Other Material Handling Equipment (191 hp) operating at a 0.59 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Building Construction 6/1/2011 - 6/30/2011 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Architectural Coating 8/2/2011 - 8/15/2011 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 2/1/2011-4/4/2011 Active Days: 45	**9.64**	96.23	**43.75**	**0.09**	11.07	**4.23**	15.30	2.35	**3.89**	6.24	**14,172.27**
Mass Grading 02/01/2011-04/04/2011	9.64	96.23	43.75	0.09	11.07	4.23	15.30	2.35	3.89	6.24	14,172.27
Mass Grading Dust	0.00	0.00	0.00	0.00	10.74	0.00	10.74	2.24	0.00	2.24	0.00
Mass Grading Off Road Diesel	4.90	33.64	19.39	0.00	0.00	1.80	1.80	0.00	1.65	1.65	4,288.19
Mass Grading On Road Diesel	4.71	62.51	22.98	0.09	0.32	2.43	2.75	0.11	2.23	2.34	9,697.46
Mass Grading Worker Trips	0.04	0.08	1.38	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.62

Time Slice 6/1/2011-6/30/2011 Active Days: 22	2.04	17.28	7.65	0.00	0.00	0.88	0.88	0.00	0.81	0.81	1,868.41
Building 06/01/2011-06/30/2011	2.04	17.28	7.65	0.00	0.00	0.88	0.88	0.00	0.81	0.81	1,868.41
Building Off Road Diesel	2.04	17.28	7.65	0.00	0.00	0.88	0.88	0.00	0.81	0.81	1,868.41
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time Slice 8/2/2011-8/15/2011 Active Days: 10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating 08/02/2011-08/15/2011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Mass Grading 2/1/2011 - 4/4/2011 - Default Mass Site Grading/Excavation Description

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stablizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Rubber Tired Dozers, the Diesel Oxidation Catalyst 25% mitigation reduces emissions by:

NOX: 25%

For Water Trucks, the Diesel Oxidation Catalyst 25% mitigation reduces emissions by:

NOX: 25%

For Excavators, the Diesel Oxidation Catalyst 25% mitigation reduces emissions by:

NOX: 25%

For Other Material Handling Equipment, the Diesel Oxidation Catalyst 25% mitigation reduces emissions by:

NOX: 25%

3/17/2011 05:31:04 PM

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: C:\Documents and Settings\tmoon\My Documents\Dropbox\L&B WORK\BigCanyon AQ_NZ NB2\big canyon nb 022811 mitg 50'.urb924

Project Name: Big Canyon Lot

Project Location: Orange County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011 TOTALS (lbs/day unmitigated)	8.16	77.93	34.19	0.02	54.93	3.29	58.22	11.48	3.03	14.51	8,781.13
2011 TOTALS (lbs/day mitigated)	8.16	66.71	34.19	0.02	3.40	3.29	6.69	0.72	3.03	3.75	8,781.13

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 2/1/2011-5/31/2011 Active Days: 86	6.12	60.65	26.55	0.02	54.93	2.41	57.34	11.48	2.22	13.70	6,912.72
Mass Grading 02/01/2011-10/07/2011	6.12	60.65	26.55	0.02	54.93	2.41	57.34	11.48	2.22	13.70	6,912.72
Mass Grading Dust	0.00	0.00	0.00	0.00	54.84	0.00	54.84	11.45	0.00	11.45	0.00
Mass Grading Off Road Diesel	4.90	44.86	19.39	0.00	0.00	1.80	1.80	0.00	1.65	1.65	4,288.19
Mass Grading On Road Diesel	1.18	15.71	5.78	0.02	0.08	0.61	0.69	0.03	0.56	0.59	2,437.91
Mass Grading Worker Trips	0.04	0.08	1.38	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.62
Time Slice 6/1/2011-6/30/2011 Active Days: 22	8.16	77.93	34.19	0.02	54.93	3.29	58.22	11.48	3.03	14.51	8,781.13
Building 06/01/2011-06/30/2011	2.04	17.28	7.65	0.00	0.00	0.88	0.88	0.00	0.81	0.81	1,868.41
Building Off Road Diesel	2.04	17.28	7.65	0.00	0.00	0.88	0.88	0.00	0.81	0.81	1,868.41
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading 02/01/2011-10/07/2011	6.12	60.65	26.55	0.02	54.93	2.41	57.34	11.48	2.22	13.70	6,912.72
Mass Grading Dust	0.00	0.00	0.00	0.00	54.84	0.00	54.84	11.45	0.00	11.45	0.00
Mass Grading Off Road Diesel	4.90	44.86	19.39	0.00	0.00	1.80	1.80	0.00	1.65	1.65	4,288.19
Mass Grading On Road Diesel	1.18	15.71	5.78	0.02	0.08	0.61	0.69	0.03	0.56	0.59	2,437.91
Mass Grading Worker Trips	0.04	0.08	1.38	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.62
Time Slice 7/1/2011-8/1/2011 Active Days: 22	6.12	60.65	26.55	0.02	54.93	2.41	57.34	11.48	2.22	13.70	6,912.72
Mass Grading 02/01/2011-10/07/2011	6.12	60.65	26.55	0.02	54.93	2.41	57.34	11.48	2.22	13.70	6,912.72
Mass Grading Dust	0.00	0.00	0.00	0.00	54.84	0.00	54.84	11.45	0.00	11.45	0.00
Mass Grading Off Road Diesel	4.90	44.86	19.39	0.00	0.00	1.80	1.80	0.00	1.65	1.65	4,288.19
Mass Grading On Road Diesel	1.18	15.71	5.78	0.02	0.08	0.61	0.69	0.03	0.56	0.59	2,437.91
Mass Grading Worker Trips	0.04	0.08	1.38	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.62
Time Slice 8/2/2011-8/15/2011 Active Days: 10	6.12	60.65	26.55	0.02	54.93	2.41	57.34	11.48	2.22	13.70	6,912.72
Coating 08/02/2011-08/15/2011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading 02/01/2011-10/07/2011	6.12	60.65	26.55	0.02	54.93	2.41	57.34	11.48	2.22	13.70	6,912.72
Mass Grading Dust	0.00	0.00	0.00	0.00	54.84	0.00	54.84	11.45	0.00	11.45	0.00
Mass Grading Off Road Diesel	4.90	44.86	19.39	0.00	0.00	1.80	1.80	0.00	1.65	1.65	4,288.19
Mass Grading On Road Diesel	1.18	15.71	5.78	0.02	0.08	0.61	0.69	0.03	0.56	0.59	2,437.91
Mass Grading Worker Trips	0.04	0.08	1.38	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.62
Time Slice 8/16/2011-10/7/2011 Active Days: 39	6.12	60.65	26.55	0.02	54.93	2.41	57.34	11.48	2.22	13.70	6,912.72
Mass Grading 02/01/2011-10/07/2011	6.12	60.65	26.55	0.02	54.93	2.41	57.34	11.48	2.22	13.70	6,912.72
Mass Grading Dust	0.00	0.00	0.00	0.00	54.84	0.00	54.84	11.45	0.00	11.45	0.00
Mass Grading Off Road Diesel	4.90	44.86	19.39	0.00	0.00	1.80	1.80	0.00	1.65	1.65	4,288.19
Mass Grading On Road Diesel	1.18	15.71	5.78	0.02	0.08	0.61	0.69	0.03	0.56	0.59	2,437.91
Mass Grading Worker Trips	0.04	0.08	1.38	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.62

Phase Assumptions

Phase: Mass Grading 2/1/2011 - 10/7/2011 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 1.9

Maximum Daily Acreage Disturbed: 1

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 380 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 575.2

Off-Road Equipment:

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

2 Other Material Handling Equipment (191 hp) operating at a 0.59 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Building Construction 6/1/2011 - 6/30/2011 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Architectural Coating 8/2/2011 - 8/15/2011 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 2/1/2011-5/31/2011 Active Days: 86	6.12	49.44	26.55	0.02	3.40	2.41	5.81	0.72	2.22	2.94	6,912.72
Mass Grading 02/01/2011-10/07/2011	6.12	49.44	26.55	0.02	3.40	2.41	5.81	0.72	2.22	2.94	6,912.72
Mass Grading Dust	0.00	0.00	0.00	0.00	3.31	0.00	3.31	0.69	0.00	0.69	0.00
Mass Grading Off Road Diesel	4.90	33.64	19.39	0.00	0.00	1.80	1.80	0.00	1.65	1.65	4,288.19
Mass Grading On Road Diesel	1.18	15.71	5.78	0.02	0.08	0.61	0.69	0.03	0.56	0.59	2,437.91
Mass Grading Worker Trips	0.04	0.08	1.38	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.62
Time Slice 6/1/2011-6/30/2011 Active Days: 22	8.16	66.71	34.19	0.02	3.40	3.29	6.69	0.72	3.03	3.75	8,781.13
Building 06/01/2011-06/30/2011	2.04	17.28	7.65	0.00	0.00	0.88	0.88	0.00	0.81	0.81	1,868.41
Building Off Road Diesel	2.04	17.28	7.65	0.00	0.00	0.88	0.88	0.00	0.81	0.81	1,868.41
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading 02/01/2011-10/07/2011	6.12	49.44	26.55	0.02	3.40	2.41	5.81	0.72	2.22	2.94	6,912.72
Mass Grading Dust	0.00	0.00	0.00	0.00	3.31	0.00	3.31	0.69	0.00	0.69	0.00
Mass Grading Off Road Diesel	4.90	33.64	19.39	0.00	0.00	1.80	1.80	0.00	1.65	1.65	4,288.19
Mass Grading On Road Diesel	1.18	15.71	5.78	0.02	0.08	0.61	0.69	0.03	0.56	0.59	2,437.91
Mass Grading Worker Trips	0.04	0.08	1.38	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.62
Time Slice 7/1/2011-8/1/2011 Active Days: 22	6.12	49.44	26.55	0.02	3.40	2.41	5.81	0.72	2.22	2.94	6,912.72
Mass Grading 02/01/2011-10/07/2011	6.12	49.44	26.55	0.02	3.40	2.41	5.81	0.72	2.22	2.94	6,912.72
Mass Grading Dust	0.00	0.00	0.00	0.00	3.31	0.00	3.31	0.69	0.00	0.69	0.00
Mass Grading Off Road Diesel	4.90	33.64	19.39	0.00	0.00	1.80	1.80	0.00	1.65	1.65	4,288.19
Mass Grading On Road Diesel	1.18	15.71	5.78	0.02	0.08	0.61	0.69	0.03	0.56	0.59	2,437.91
Mass Grading Worker Trips	0.04	0.08	1.38	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.62
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Coating 08/02/2011-08/15/2011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading 02/01/2011-10/07/2011	6.12	49.44	26.55	0.02	3.40	2.41	5.81	0.72	2.22	2.94	6,912.72
Mass Grading Dust	0.00	0.00	0.00	0.00	3.31	0.00	3.31	0.69	0.00	0.69	0.00
Mass Grading Off Road Diesel	4.90	33.64	19.39	0.00	0.00	1.80	1.80	0.00	1.65	1.65	4,288.19
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Mass Grading 02/01/2011-10/07/2011	6.12	49.44	26.55	0.02	3.40	2.41	5.81	0.72	2.22	2.94	6,912.72
Mass Grading Dust	0.00	0.00	0.00	0.00	3.31	0.00	3.31	0.69	0.00	0.69	0.00
Mass Grading Off Road Diesel	4.90	33.64	19.39	0.00	0.00	1.80	1.80	0.00	1.65	1.65	4,288.19
Mass Grading On Road Diesel	1.18	15.71	5.78	0.02	0.08	0.61	0.69	0.03	0.56	0.59	2,437.91
Mass Grading Worker Trips	0.04	0.08	1.38	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.62

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Mass Grading 2/1/2011 - 10/7/2011 - Default Mass Site Grading/Excavation Description

For Soil Stablizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stablizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Rubber Tired Dozers, the Diesel Oxidation Catalyst 25% mitigation reduces emissions by:

NOX: 25%

For Water Trucks, the Diesel Oxidation Catalyst 25% mitigation reduces emissions by:

NOX: 25%

For Excavators, the Diesel Oxidation Catalyst 25% mitigation reduces emissions by:

NOX: 25%

For Other Material Handling Equipment, the Diesel Oxidation Catalyst 25% mitigation reduces emissions by:

NOX: 25%

APPENDIX C

SCAQMD Thresholds

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • www.aqmd.gov

SCAQMD Air Quality Significance Thresholds

Mass Daily Thresholds [a]		
Pollutant	**Construction [b]**	**Operation [c]**
NOx	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
PM2.5	55 lbs/day	55 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day

Toxic Air Contaminants (TACs), Odor, and GHG Thresholds	
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic & Acute Hazard Index ≥ 1.0 (project increment)
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402
GHG	10,000 MT/yr CO2eq for industrial facilities

Ambient Air Quality Standards for Criteria Pollutants [d]	
NO2 1-hour average annual arithmetic mean	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (state) 0.03 ppm (state) and 0.0534 ppm (federal)
PM10 24-hour average annual average	10.4 μg/m^3 (construction)[e] & 2.5 μg/m^3 (operation) 1.0 μg/m^3
PM2.5 24-hour average	10.4 μg/m^3 (construction)[e] & 2.5 μg/m^3 (operation)
SO2 1-hour average 24-hour average	0.25 ppm (state) & 0.075 ppm (federal – 99th percentile) 0.04 ppm (state)
Sulfate 24-hour average	25 μg/m^3 (state)
CO 1-hour average 8-hour average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)
Lead 30-day Average Rolling 3-month average Quarterly average	1.5 μg/m^3 (state) 0.15 μg/m^3 (federal) 1.5 μg/m^3 (federal)

[a] Source: SCAQMD CEQA Handbook (SCAQMD, 1993)
[b] Construction thresholds apply to both the South Coast Air Basin and Coachella Valley (Salton Sea and Mojave Desert Air Basins).
[c] For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.
[d] Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.
[e] Ambient air quality threshold based on SCAQMD Rule 403.

KEY: lbs/day = pounds per day; ppm = parts per million; μg/m^3 = microgram per cubic meter; ≥ = greater than or equal to; MT/yr CO2eq = metric tons per year of CO2 equivalents; > = greater than

APPENDIX D

Glenn Lukos Associates Biological Survey

MEMORANDUM

GLENN LUKOS ASSOCIATES

Regulatory Services

PROJECT NUMBER: 08660002PERM

TO: Phil Martin

FROM: Tony Bomkamp

DATE: December 14, 2010

SUBJECT: Results of Site Biological and Regulatory Site Visits Conducted for Big Canyon Country Club Single Family Residential Lot

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On July 27, 2010 I conducted a site visit to evaluate an artificial relict drainage feature to determine whether the feature exhibits characteristics consistent with the presence of waters of the United States, which are regulated by the U.S. Army Corps of Engineers (Corps) pursuant to Section 404 of the Clean Water Act or waters of the State, which are regulated by the California Department of Fish and game (CDFG) pursuant to Section 1602 of the Fish and Game Code.

In addition, I conducted a review of the existing fill area that comprises a substantial portion of the building pad to determine whether conditions have changed since previous surveys were completed as documented in the Glenn Lukos Associates (GLA) report dated August 25, 2008.[1]

Following the July 27, 2010 site visits, GLA requested confirmation from both the Corps and CDFG regarding the jurisdictional status of the relict drainage feature. A site visit was conducted with CDFG October 4, 2010 and a separate site visit was conducted with the Corps on October 12, 2010. The results of the site visits are discussed below.

RELICT DRAINAGE FEATURE

The relict drainage feature is located along the eastern edge of the golf course fairway between the fairway and the previously approved building pad. The feature is not a natural drainage course but rather was constructed to collect water from a storm-drain outlet and carry it between the golf course fairway and adjacent slope in a westerly direction to another storm drain inlet. In order to direct water to downstream areas that have been created as wetland mitigation, water from the 36-inch corrugated metal pipe, that previously discharged into the relict channel is now captured by a 12-inch plastic pipe [Exhibit 1, Photograph 1] and carried under the golf course fairway discharging to the wetland mitigation area.

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[1] Glenn Lukos Associates. August 25, 2008. Letter Report addressed to Mr. Larry Tucker: *Results of Biological/Regulatory Overview Conducted for the 1.9-Acre Proposed Residential Lot Located in the Big Canyon Community, Newport Beach, Orange County, California.*

At the time of the site visit, the relict drainage feature was dry and exhibited no signs of recent flow. Where a channel was observable, it varied in width from 0.5 to 2 feet. The substrate consisted primarily of coarse sands and gravels with areas of clay inclusions, consistent with the artificial character of the feature. The relict channel bottom is sparsely vegetated and the bank closest to the golf course fairway supports a predominance of native and non-native species typical of wetland or riparian areas [Exhibit 1, Photograph 2]. It is important to note however, that the vegetation concentrated on the bank closest to the fairway is clearly support by irrigation runoff as the adjacent turf area was clearly saturated by irrigation and the turf area also supported many of the species on the banks of the drainage.[2] Dominant species include arroyo willow (*Salix lasiolepis*, FACW), mugwort (*Artemisia douglasiana*, FACW), tall umbrella sedge (*Cyperus eragrostis*, FACW), bristly ox-tongue (*Picris echioides*, FAC), and tall horseweed (*Conyza Canadensis*, FAC).

U.S. Army Corps of Engineers Jurisdiction

Pursuant to Section 404 of the Clean Water Act, the Corps regulates the discharge of dredged and/or fill material into waters of the United States. The term "waters of the United States" is defined in Corps regulations at 33 CFR Part 328.3(a) as:

> *(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;*
> *(2) All interstate waters including interstate wetlands;*
> *(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect foreign commerce including any such waters:*
> *(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or*
> *(ii) From which fish or shell fish are or could be taken and sold in interstate or foreign commerce; or*
> *(iii) Which are used or could be used for industrial purpose by industries in interstate commerce...*
> *(4) All impoundments of waters otherwise defined as waters of the United States under the definition;*
> *(5) Tributaries of waters identified in paragraphs (a) (1)-(4) of this section;*
> *(6) The territorial seas;*

[2] Although the fairway is mowed, many of the species on the banks of the channel have migrated into the fairway and were easily identified despite the recent mowing.

> *(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1)-(6) of this section.*

In the absence of wetlands, the limits of Corps jurisdiction in non-tidal waters, such as intermittent streams, extend to the Ordinary High Water Mark (OHWM) which is defined at 33 CFR 328.3(e) as:

> *...that line on the shore established by the fluctuation of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*

Site Characteristics Relative to Above Definition

The relict channel does not meet the definition of waters of the United States as set forth in subparagraphs 1-4 or 6 and 7 above. The only avenues by which the Corps could potentially assert jurisdiction over the relict channel would be by asserting that it is "tributary" (subparagraph 5) to the Pacific Ocean. The feature does exhibit at least minimal characteristics for the presence of an OHWM including shelving. However, the presence of an OHWM is not sufficient to bring an ephemeral channel under Corps jurisdiction.

In order to make the assertion that the relict channel is subject to jurisdiction under Section 404, the Corps, in accordance with the recent Supreme Court ruling in *Rapanos v. United States* and *Carabell v. United States* ("Rapanos") would have to find that a "significant nexus" exists between the relict drainage feature and downstream navigable waters (i.e., the Pacific Ocean), which means that the subject relict drainage feature contributes to natural functions within the Pacific Ocean. It is GLA's opinion that there is no significant nexus between the relict drainage channel and the Pacific Ocean; however, only the Corps can make a final determination should such a determination be required.

The Corps also has one other potential avenue for asserting jurisdiction over the relict drainage feature: the downstream wetland mitigation area. Often, the Corps asserts jurisdiction over Corps-approved mitigation areas, particularly where such mitigation areas exhibit wetland characteristics. In order to make such a determination, the Corps would also have to find a "significant nexus" between the relict channel and the wetland mitigation area. Given the proximity of the channel to the wetland mitigation area, during the site visit of October 12, 2010 the Corps in fact determined that the relict channel does have a nexus with the downstream wetland, and would be regulated as a Water of the United States.

<u>California Department of Fish and Game</u>

Pursuant to Division 2, Chapter 6, Sections 1600-1603 of the California Fish and Game Code, the CDFG regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake, which supports fish or wildlife.

CDFG defines a "stream" (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation

CDFG jurisdiction within altered or artificial waterways is based upon the value of those waterways to fish and wildlife. CDFG Legal Advisor has prepared the following opinion:

- Natural waterways that have been subsequently modified and which have the potential to contain fish, aquatic insects and riparian vegetation will be treated like natural waterways...

- Artificial waterways that have acquired the physical attributes of natural stream courses and which have been viewed by the community as natural stream courses, should be treated by [CDFG] as natural waterways...

- Artificial waterways without the attributes of natural waterways should generally not be subject to Fish and Game Code provisions...

Thus, CDFG jurisdictional limits closely mirror those of the Corps. Exceptions are CDFG's exclusion of isolated wetlands (those not associated with a river, stream, or lake), the addition of artificial stock ponds and irrigation ditches constructed on uplands, and the addition of riparian habitat supported by a river, stream, or lake regardless of the riparian area's federal wetland status.

Site Characteristics Relative to Above Definition

The relict channel does exhibit characteristics consistent with the presence of a “bed and bank” albeit the indicators are weak at best. During the site visit on October 4, CDFG determined that the relict channel exhibited sufficient indicators to warrant a determination that it would be regulated under Section 1602 of the California Fish and Game Code.

<u>Potential Changes on Building Pad</u>

Since the initial surveys were conducted in August 2008, coyote brush (*Baccharis pilularis*), a component of Coastal Sage Scrub has further expanded on the pad. In the August 25, 2008 report, this species was reported on the pad but did not occur in sufficient densities to warrant designation as Coastal Sage Scrub habitat. The pad remains dominated by ruderal vegetation as previously described; however, the southwest portion of the pad (estimated 40-percent) now supports disturbed coyote brush scrub, totaling 0.23 acre [Exhibit 2 is the 2010 vegetation map overlain with the recently delineated coyote brush scrub]. Because of the disturbed character of the habitat, the proximity of non-native ornamental vegetation and the limited patch size, this area does not exhibit potential for supporting any special-status species, including the California gnatcatcher. The loss of 0.23 acre of disturbed coyote brush scrub would not be considered a significant impact and would not require mitigation.

DISCUSSION/CONLUSIONS

Potential impacts to the disturbed coyote brush scrub would not result in a determination of significant impacts and would not trigger mitigation requirements.

Regarding the drainage feature, GLA provides the following comments.

Corps Jurisdiction

While the Corps determined that the relict drainage would be eligible for regulation under Section 404 of the Clean Water Act, the preliminary determination from the Corps was that impacts were so small (0.004 acre [174 square feet] of ephemeral streambed with no wetlands present) that mitigation would not be required. Based on this determination, the impacts would not be considered significant pursuant to the California Environmental Quality Act and mitigation would not be required.

CDFG Jurisdiction

While CDFG determined that the relict drainage would be eligible for regulation under Section 1602 of the Fish and Game Code, the preliminary determination from CDFG was that impacts were so small (0.004 acre [174 square feet] of ephemeral streambed with no wetlands present) that mitigation would not be required. Based on this determination, the impacts would not be considered significant pursuant to the California Environmental Quality Act and mitigation would not be required.

GLA will be submitting applications to the Corps, CDFG as well as to the Regional Water Quality Control Board (Santa Ana Regional Board). Should any of these agencies determine that the impacts are significant, mitigation would be required and would be provided at a 1:1 basis (due to the low value of the relict drainage) either onsite or offsite at an agency-approved mitigation bank or in-lieu-fee program.

PHOTOGRAPH 1: View of 36-inch pipe discharging to 12-inch pipe at northern end of relict drainage feature.

PHOTOGRAPH 2: View of relict drainage feature looking north. Note lack of well defined channel or signs of flow.

GLENN LUKOS ASSOCIATES

Exhibit 1

BIG CANYON
RESIDENTIAL LOT PROPOSAL

Site Photographs

Legend

- Project Boundary
- Disturbed Coyote Brush Scrub (0.23 ac)

Vegetation Type and Code

- Disturbed, 16.1
- Mixed Sage Scrub/Chenopod Scrub, 2.3.10/2.7
- Ornamental, 15.5
- Ruderal, 4.6
- Ruderal/Ornamental, 4.6/15.5
- Southern Willow Scrub, 7.2

N

0 25 50 100

Feet

BIG CANYON RESIDENTIAL LOT PROPOSAL

2010 Updated Vegetation Map

GLENN LUKOS ASSOCIATES

Exhibit 2

APPENDIX E

CDFG Letter and Email

SCANNED

866 - 2 PERM
permit

Tony Bomkamp

From:	Russell Barabe [RBarabe@dfg.ca.gov]
Sent:	Thursday, January 20, 2011 11:20 AM
To:	dvoorhees@bigcanyoncc.org; tbomkamp@wetlandpermitting.com
Subject:	Big Canyon Residential Lot Proposal

Mr. Voorhees and Mr. Bombkamp,

The changes to the original project (increasing the jurisdictional impact from 0.002 ac to 0.004 ac) are acceptable to CDFG. I have amended the file, and included the documents Mr. Bombkamp provided.

I suggest you print a copy of this e-mail, and keep it with the original op-law letter. That way, if asked for you CDFG permit, you will be in compliance.

If you have any questions, please do not hesitate to contact me.

Thank you.

Russell Barabe
Environmental Scientist
CA Department of Fish and Game
4949 Viewridge Ave, SD, CA 92123
858-467-2717

Pursuant to the Governor's Executive Order S-12-10, I am required to take three furlough days per month.

SCANNED

866-2 PERM permit

California Natural Resources Agency
DEPARTMENT OF FISH AND GAME
South Coast Region
4949 Viewridge Avenue
San Diego, CA 92123
(858) 467-4201
www.dfg.ca.gov

ARNOLD SCHWARZENEGGER, Governor
JOHN McCAMMAN, Director

December 13, 2010

Mr. David Voorhees
Big Canyon Country Club
1 Big Canyon Drive
Newport Beach, CA 92660

Subject: Notification of Lake or Streambed Alteration No. 1600-2010-0265-R5
Big Canyon Residential Lot Proposal

Dear Mr. David Voorhees:

As the Department of Fish and Game (Department) explained in a previous letter to you dated September 30, 2010, the Department had until December 3, 2010 to submit a draft Lake or Streambed Alteration Agreement (Agreement) to you or inform you that an Agreement is not required. The Department did not meet that date. As a result, by law, you may now complete the project described in your notification without an Agreement.

Please note that pursuant to Fish and Game Code section 1602(a)(4)(D), if you proceed with this project, it must be the same as described and conducted in the same manner as specified in the notification and any modifications to that notification received by the Department in writing prior to December 3, 2010. This includes completing the project within the proposed term and seasonal work period and implementing all avoidance and mitigation measures to protect fish and wildlife resources specified in the notification. If the term proposed in your notification has expired, you will need to re-notify the Department before you may begin your project. Beginning or completing a project that differs in any way from the one described in the notification may constitute a violation of Fish and Game Code section 1602.

Also note that while you are entitled to complete the project without an Agreement, you are still responsible for complying with other applicable local, state, and federal laws. These include, but are not limited to, the state and federal Endangered Species Acts and Fish and Game Code sections 5650 (water pollution) and 5901 (fish passage).

Finally, if you decide to proceed with your project without an Agreement, you must have a copy of this letter <u>and</u> your notification with all attachments available at all times at the work site. If you have any questions regarding this matter, please contact me at (858) 467-2717 or rbarabe@dfg.ca.gov.

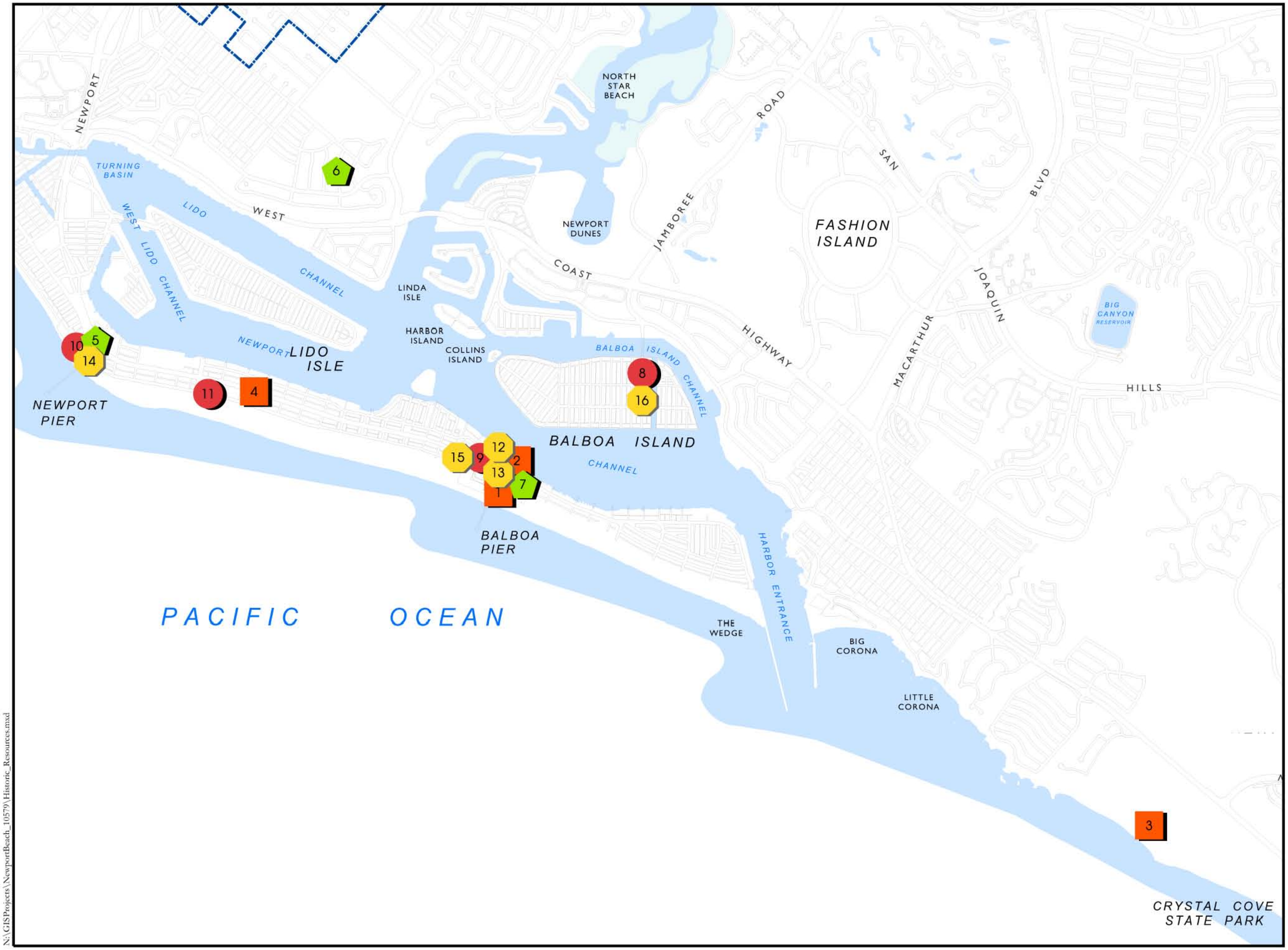
Sincerely,

Russell Barabe

Russell Barabe
Environmental Scientist

APPENDIX F

Figure HR1: Historic Resources



CITY of NEWPORT BEACH
GENERAL PLAN
Figure HR1
HISTORIC RESOURCES

Sites on National Register of Historic Places
1 Balboa Inn
2 Balboa Pavillion
3 Crystal Cove Historic District
4 Lovell Beach House

California Historical Landmarks
5 McFadden Wharf
6 Old Landing
7 Site of First Water-to-Water Flight

Other Historic Sites or Potentially Historic Sites in the CHRIS Database
8 Balboa Island Fire House #4
9 Bank of Balboa/Bank of America
10 B K Stone Building
11 Our Lady Mount Carmel

Other Historic Sites in the City Register
12 Balboa Saloon
13 Balboa Theater
14 Dory Fishing Fleet
15 Rendezvous Ballroom Site
16 Wilma's Patio (formerly Pepper's Restaurant)

0 0.125 0.25 0.5 Miles

Source: City of Newport Beach and EIP Associates
PROJECT NUMBER: 10579-01
Date: 9/12/06

EIP

N:\GISProjects\NewportBeach_10579\Historic_Resources.mxd

APPENDIX G

Associated Soils Engineering Geotechnical Report

2860 WALNUT AVE. - SIGNAL HILL, CALIF. 90755 - PHONE 562/426-7990 - FAX 562/426-1842

ASSOCIATED SOILS ENGINEERING, INC.
Consulting Geotechnical Engineers

Project No. 09-6169
June 25, 2010

Big Canyon Country Club
One Big Canyon Drive
Newport Beach, California 92660

Attention: Mr. William Stampley

Subject: Geotechnical Review of Rough Grading Plan for Parcel 1 of Parcel Map No. 2008-11, Big Canyon Country Club, Newport Beach, California.

Gentlemen:

Associated Soils Engineering, Inc. (ASE) has completed a review of the 30-scale Rough Grading Plan for Parcel 1 of Parcel Map No. 2008-11, Big Canyon Country Club, Newport Beach, California prepared by Walden & Associates. This report presents a summary of our findings, conclusions and recommendations for rough grading of the site. This report includes all pertinent information presented in our Preliminary Geotechnical Investigation report dated January 21, 2010.

It is ASE's opinion that the subject site can be graded for residential development as shown on the reviewed plans, provided that the grading is completed in compliance with the recommendations presented in this report.

We thank you for the opportunity of working with you on this project. If you have any questions or require additional information, please contact the undersigned.

Respectfully submitted,
ASSOCIATED SOILS ENGINEERING, INC.

REGISTERED PROFESSIONAL ENGINEER
LAWRENCE J. D. CHANG
No. 2881
EXP. 6/30/11
GEOTECHNICAL
STATE OF CALIFORNIA

REGISTERED GEOLOGIST
JOHN R. WHITNEY
No. 1929
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Lawrence J. D. Chang, P.E.
Geotechnical Engineer, RGE 2881

John R. Whitney, P.G.
Engineering Geologist, CEG 1929

LC/JRW:jw

Distribution: (3) Addressee
(3) David Bacon, Walden & Associates

1.0 INTRODUCTION

This report presents the results of our geotechnical investigation and review of the Rough Grading Plan for Parcel 1 of Map 2008-11, Big Canyon Country Club, Newport Beach, CA. The 30-scale plan was prepared by Walden & Associates. A copy of Sheet 2 of the reviewed Rough Grading Plan is included herewith as Plate A-1 (Geotechnical Map & Cross Sections). This report presents a summary of our findings with conclusions and recommendations regarding the proposed rough grading.

The excavation logs, laboratory test results, CPT soil probe data and list of references, upon which our evaluation and recommendations are based, are presented in the appendices to this report.

Since building plans have yet to be formulated, this report does not include specific recommendations for precise grading, foundations, or other site improvements.

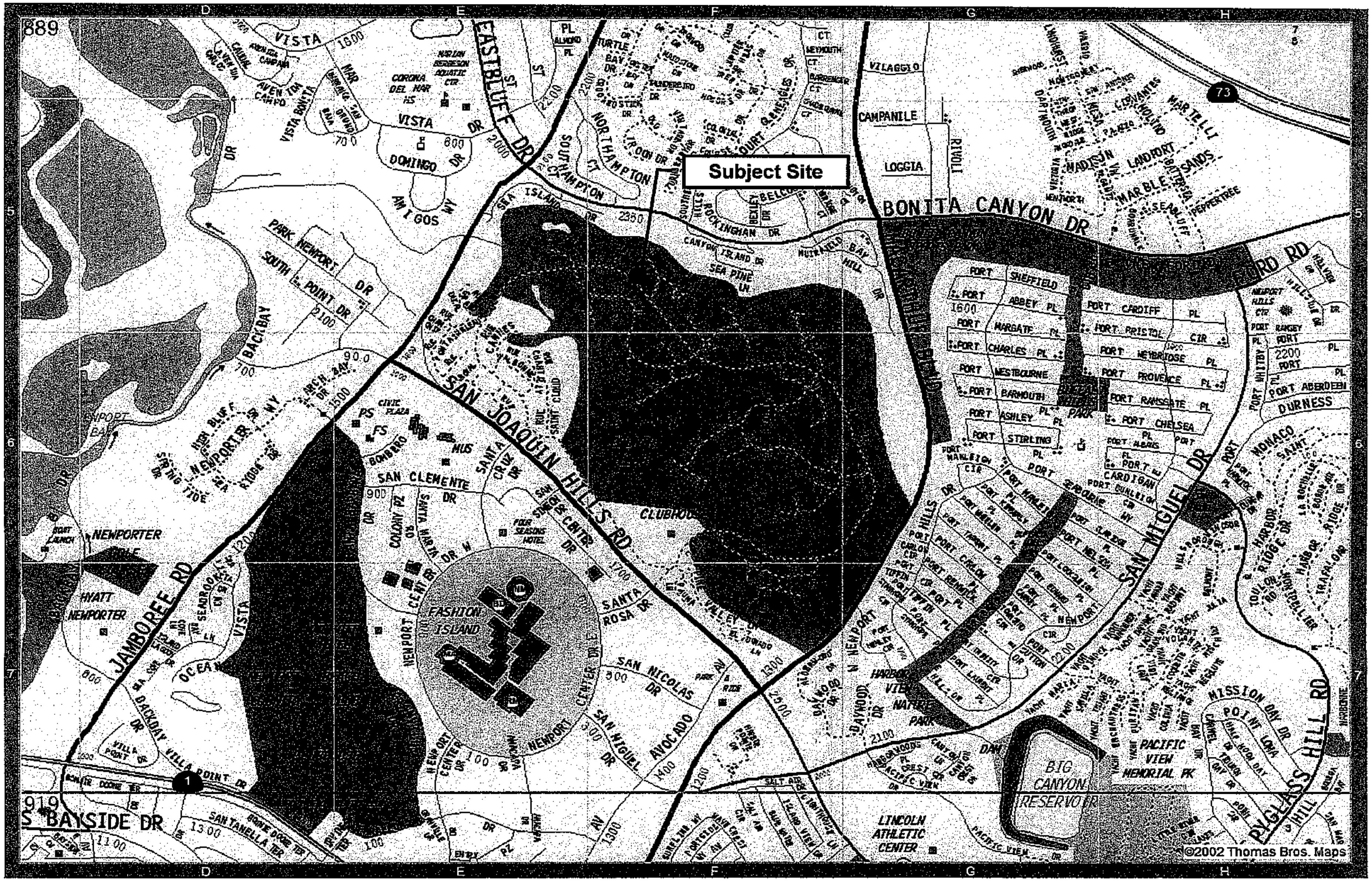
2.0 PROJECT DESCRIPTION

2.1 Site Location and Description

Parcel 1 of Tentative Tract 2008-11 is located on the northeast side of Big Canyon Drive and northwest of Rue Biarritz in the Big Canyon neighborhood of the City of Newport Beach (see Figure 1). The site is a wedge shaped 1.9-acre parcel accessed by an asphalt and gravel road that descends in a northwest direction from Big Canyon Drive to a relatively flat portion that will be the location of the future residential construction (Building Site). The Building Site is bounded on the southwest side by a 10 to 15-foot high graded fill slope with an approximate gradient of 2:1 (horizontal:vertical) ascending to Big Canyon Drive, on the northeast side by a 50-foot high 1.5:1 natural slope ascending to existing residences along Rue Biarritz, and on the northwest by a 17-foot high 3:1 fill slope descending to the 5th Fairway of the Big Canyon Golf Course. Elevations within the Building Site range from approximately 128 feet above mean sea level (MSL) and the southern side to approximately 110 feet MSL at the northern side. Site drainage is sheet flow from the entry drive across the site to an unlined drainage channel at the toe of the northwest slope adjacent to golf course. The site is currently vacant and covered with light to dense vegetation and scattered debris.

2.2 Proposed Rough Grading

Parcel 1 is to be rough graded for single-family residential development use. Final grading and construction plans are not available. The reviewed rough grading plan indicates up to approximately 15 feet of fill to create a flat building. A 13-foot high 2:1 (horizontal:vertical) gradient fill slope descending to the golf course is planned at north Parcel 1 boundary. Additional non-structural fill with a maximum thickness of 15 feet and maximum gradient of 5:1 will be placed in the golf course area immediately adjacent to Parcel 1.



ASSOCIATED SOILS ENGINEERING, INC.
Consulting Geotechnical Engineers

Associated Soils Engineering, Inc.
2860 Walnut Avenue
Signal Hill, CA 90755
Tel (562) 426-7990 Fax (562) 426-1842

Site Location Map

Proj. Name:	**Parcel 1 of Tentative Parcel Map No. 2008-111, Big Canyon Country Club, Newport Beach, California.**
Proj. No.:	**09-6169**
Date:	**June, 2010**

Figure 1

3.3 Settlement

The undocumented artificial fill on site is anticipated to undergo significant, uneven volumetric contraction upon loading, due to its highly uncompacted and doubtful nature at the time of its initial placement. Soil of this nature is required to be removed and re-worked totally, regardless of the development scheme, according to the governing grading code.

Based on the consolidation test results shown on Plates C-1 and C-2 in the Appendix, it appears that the alluvial soils on-site are highly heterogeneous in compression characteristics, indicating that, depending on the locations on site, the alluvial soils are at different stages of their respective natural consolidation process under the loading combination of their own weight and the surcharge from the artificial fill. This situation signals that the consolidation in the on-site alluvial stratum is ongoing and significant total and differential settlement could develop across the site potentially undermining the stability of building foundations, surficial flatworks and underground utilities.

Soils of the Monterey Formation, due to their degree of cementation and hardness, are not anticipated to undergo further consolidation under the likely additional loading from the proposed residential development. Should deep foundation alternative be considered, the Monterey Formation is anticipated to function as the bearing layer in which the tips of deep foundation will be embedded into.

In summary, it is ASE's preliminary estimate that settlements ranging from more than 5 inches to less than 2 inches, reflecting a differential settlement of more than 3 inches, could develop across the site at different locations due to the combination of ongoing natural consolidation of the alluvium material and the newly imposed loading from the residential development.

3.4 Faulting and Seismicity

No active or potentially active faults are known to project through the site. In addition, the site does not lie within an Earthquake Fault Zone as designated by the State of California in the Alquist-Priolo Earthquake Zoning Act (Hart and Bryant, 1997). Several active and potentially active faults, however, do lie within close proximity to the site, including the Newport-Inglewood fault zone, located approximately 3 miles to the southwest, and the San Joaquin Hills thrust fault, located approximately 3 miles to the northeast. However, the subject site is not considered to be at a particularly greater level of seismic risk than other areas in the region.

3.5 Liquefaction

A portion of the site lies within a State of California Seismic Hazard Zone of required investigation for liquefaction potential (CDMG, 2001). The term "liquefaction" describes a phenomenon in which a saturated cohesionless soil loses strength and acquires a degree of mobility as a result of strong ground shaking during an earthquake. The factors known to influence liquefaction potential include soil type and depth, grain size, relative density, ground water level, degree of saturation, and both the intensity and duration of ground shaking. This phenomenon occurs only below the water table and rarely where the groundwater level is greater than 40 feet below the surface. Due to the soft and saturated conditions of the alluvium underlying the site, the potential for settlement by liquefaction as a result of ground shaking does exist. The liquefaction potential will be mitigated at the Building Site by removal and recompaction of the underlying alluvial soils.

3.6 Slope Stability

Based on stability analyses performed by P.A. & Associates (2008, 2009a, 2009b) the northeast natural slope ascending to Rue Biarritz is considered to be grossly stable. However, erosion and surficial failure of the colluvial deposits overlying the bedrock should be anticipated. Methods to minimize the impact of surficial slope instability, such as structural setback from the toe and debris catchment fences, should be determined as development plans are formulated. Note that the minimum setback distance from the toe of the slope is 15 feet per the California Building Code.

4.0 CONCLUSIONS

It is ASE's geotechnical opinion that the subject site can be graded for residential development as shown on the reviewed plans, provided that the grading is completed in compliance with the recommendations presented in this report. The potential for liquefaction and settlement of the site soils can be mitigated by removing and recompacting the existing liquefiable and compressible soils. The proposed grading is not expected to have an adverse impact on adjacent properties.

5.0 GRADING RECOMMENDATIONS

5.1 General

Site grading should be performed in compliance with the more stringent of the requirements and criteria stipulated in Appendix J of the 2007 California Building Code, the General Earthwork and Grading Specifications provided in Appendix C of this report, and the following recommendations.

5.2 Site Preparation and Remedial Grading

5.2.1 Surface Vegetation: Surface vegetation should be stripped from areas of proposed construction. Stripping should penetrate six inches into surface soils. Any soil contaminated with organic matter (such as root systems or strippings mixed into the soil) should be disposed of off-site or set aside for future use in non-structural landscaped areas. Removal of trees and shrubs should include rootballs and attendant root systems.

5.2.2 Removal of Existing Fill: The artificial fill deposit should be completely removed from proposed structural areas. These fill materials may be re-used as engineered, compacted fill in structural areas if cleaned of all deleterious materials such as wood, asphalt, organics, etc.

5.2.3 Removal and Recompaction of Compressible Alluvium: Following the removal of the uncompacted fill, the underlying compressible alluvium can be removed to expose competent bedrock, and then replaced as engineered fill. Removal depths, including the overlying fill, will range from 34 feet at Boring 2 to more than 40 feet at Boring 1 (see cross sections on Plate A-2). For the purposes of this report, it is assumed that the deepest removal will be 50 feet below existing grade in the vicinity of Boring 1; actual depths may be greater. The alluvium is expected to be very moist to wet and groundwater will likely be encountered in the lower 5 to 10 feet of the alluvium deposit. A grading contractor experienced with excavating and recompacting wet clayey soils should be consulted to determine efficient methods of grading this site and for cost estimating.

5.2.4 Remedial Removals Along Site Perimeters: Restricted grading limits adjacent to the perimeter of the site boundary, particularly on the west side adjacent to Big Canyon Drive, will limit the horizontal extent that removals can be completed during grading of the subject site. Temporary excavation sidewalls are recommended to be constructed at a slope ratio no steeper than 1:1 (horizontal to vertical). Should sloughing of wet alluvium be experienced during excavation operations, flattening of cut slope faces, or other special procedures may be required to achieve stable, temporary slopes (see Section 5.2.2 below). Therefore, due to remedial grading limit constraints, and considering a potential removal depth greater than 50 feet, a wedge of potentially unsuitable soil materials may be left in place to an anticipated horizontal distance greater than 50 feet from the western property boundary (see Cross Section A-A'). The left-n-place unsuitable soil located within the wedge will continue to undergo consolidation of varying magnitudes, depending on the remaining thickness of the compressible soil at different locations within the wedge, as well as on the intensity of additional surcharge loading resulting from site improvements. Therefore, as a general guideline, buildings and improvements located easterly of a point projected vertically from the limit of alluvium left in-place (line X-X' on Cross Section A-A') may be designed without considering the potentially uneven settlement caused by the continuing consolidation of the alluvium located within the wedge. Buildings and improvements located to the west of line X-X' have to take into account the potential for differential settlement. The as-graded limit of the alluvium left in-place should be surveyed and by the project civil engineer. Detailed quantification of the magnitude and extent of such settlement should be carried out as development plans are refined.

5.2.5 Water Seepage During Grading: Groundwater will be encountered as excavations progress to depths below 25 feet. Constant water seepage from excavation sidewalls should be anticipated. Slow, trickling flow is anticipated from the open faces of the relatively less permeable clayey strata with more noticeable and faster water flow from the open faces of better-draining sandy strata. Exceedingly fast dewatering could increase the effective overburden pressure of the soils near the top of the temporary excavation slope causing further consolidation of the underlying clay layers resulting in a failure of the temporary slope and possible distress to adjacent existing improvements. Therefore, during excavation of the wet alluvium, it is recommended that drainage ditches be maintained at the toe of temporary slopes to direct water to sumps from where it can be regularly pumped out of the excavation. Should excessive water flow be observed exiting the sand layers, horizontal drain pipes can be installed to intercept the phreatic surface to alleviate water pressure and allow direct outflow without triggering undesirable consolidation of clay layers exposed on the excavation sidewalls.

5.2.6 Non-Structural Fill Areas: In any non-structural area to receive new fills, such as in the golf course area, the upper 2 feet of the existing soils should be removed and replaced with compacted fill as described in the next section.

5.3 Fill Placement

5.3.1 Suitability of Fill Materials: Subsequent to site clearing (as described above) the remaining site soils may be utilized for fill placement. Concrete and asphalt fragments less than 6 inches in size may be placed in the fill at depths greater than 5 feet from finished grade in structural areas (Building Site). Any imported fill soils should be examined by the Geotechnical Consultant and tested as necessary to evaluate their suitability for use as fill prior to being hauled to the site. Final acceptance of any imported soil will be based upon review and testing of the soil actually delivered to the site. Imported soils should be free of organic material, trash and oversized material (i.e. rocks greater than 6 inches in diameter).

5.3.2 Fill Compaction: Subsequent to completion of the recommended removals and prior to fill placement, the excavation bottom should be scarified to a depth of 6 inches, moisture conditioned, and recompacted. Fill soils should be placed in horizontal lifts not exceeding 8 inches in loose thickness, moisture conditioned to within 3 percentage points above optimum moisture content and compacted to 90 percent of the maximum dry density as determined by ASTM Test Method D1557-09. Fills placed on surfaces sloping greater than 5:1 should be keyed and benched into competent native materials as the fill is placed. Keys and benches should be observed by the geotechnical consultant.

5.3.3 Slope Construction: All slopes are planned at a maximum 2:1 slope ratio and as high as approximately 13 feet. Proper compaction of all fill slopes out to the slope face is important for short and long term surficial stability. Where possible, slopes should be overfilled and cut back to a compacted core. Where this is impractical, the slope surface should be track walked with a dozer or backrolled with a sheepsfoot roller and then grid rolled to compact the outer zone of the slope face.

5.3.4 Volume Changes During Grading: Shrinkage that will occur when the existing soil is removed, screened, and replaced as compacted fill is estimated to be on the order of

5.3.4 Volume Changes During Grading: Shrinkage that will occur when the existing soil is removed, screened, and replaced as compacted fill is estimated to be on the order of 20% to 30%. Subsidence due to equipment vibration during grading is estimated to be 2 tenths of a foot.

5.3.5 Observation and Testing: All grading, compaction, and backfill operations should be performed under the observation of and testing by the Geotechnical Consultant's field representative. An adequate number of field tests should be taken to ensure compliance with this report and local ordinances. Maximum density for control of grading should be determined in accordance with ASTM D 1557-09 test procedures. Depths of overexcavation should be reviewed by the Geotechnical Consultant during the actual construction. Any subsurface obstruction, buried structural elements, and unsuitable material encountered during grading, should be immediately brought to the attention of the Geotechnical Consultant for proper exposure, removal and processing, as recommended. If it is determined during grading that site soils require overexcavation to greater depths for obtaining proper support for the proposed structures and/or new fill placement, this additional work should be performed in accordance with the recommendations of the Geotechnical Consultant.

5.4 Review of Future Development Plans

Upon completion of future development plans, they should be forwarded to the Geotechnical Consultant for review of conformance with the intent of the recommendations presented in this report and to provide foundation design criteria.

6.0 CLOSURE

This Geotechnical Report has been prepared for the exclusive use of Big Canyon Country Club and their design consultants for use in planning for residential development of the subject site. This Geotechnical Report has not been prepared for use by other parties, and may not contain sufficient information for the purpose of obtaining grading and building permits.

We appreciate your business and are prepared to assist you with construction-related services.

APPENDIX A

The following Appendix contains the substantiating data and laboratory test results, from ASE's Preliminary Geotechnical Investigation Report dated January 21, 2010, to complement the engineering evaluations and recommendations contained in this report.

Plate A-1 (in back pocket)	Geotechnical Map & Cross Section
Plates B-1 through B-3	Log of Borings
Plates C-1 and C-2	Consolidation Tests
Plates D-1 through D-3	Direct Shear Tests
Plate E-1	Atterberg Limits
Plate F-1	Soil Corrosivity Tests
Plates G-1 through G-3	Log of trenches by P.A. & Assoc., 2008
CPT Data	

SITE EXPLORATION

On September 18, 2009, field exploration was performed by drilling 3 18" diameter bucket auger borings to depths of 18, 39 and 39.5 feet from the existing grades. Continuous observations of the materials encountered in the borings were recorded in the field. The soils were classified in the field by visual and textural examination and these classifications were supplemented by obtaining bulk soil samples for future examination in the laboratory. Relatively undisturbed samples of soils were extracted in thin walled Shelby tubes. All samples were secured in moisture-resistant bags as soon as taken to minimize the loss of field moisture prior to testing. Upon completion of exploration, the borings were backfilled with excavated materials. Description of the soils encountered, depth of samples, field density and moisture content of samples given on the Log of Borings (see attached "B" Plates).

LABORATORY TESTS

After samples were visually classified in the laboratory, a testing program that would provide sufficient data for our evaluation was established.

Moisture Content and Density
The undisturbed soil retained within the Shelby tubes was tested in the laboratory to determine in-place density and moisture content. Test results are presented on the Logs of Borings.

Consolidation and Direct Shear Tests
Consolidation and direct shear tests were performed on selected relatively undisturbed and remolded samples to determine the settlement characteristics and shear strength parameters of various soil samples, respectively. The results of these tests are shown graphically on Plates C and D.

Maximum Density Tests

The following maximum density test was conducted in accordance with ASTM D1557-00 Method A, using 5 equal layers, 25 blows each layer, 10 pound hammer, 18 inch drop in a 1/30 cubic foot mold. The results are as follows:

Boring No. @ Depth	Maximum Dry Density, (pcf)	Optimum Moisture Content (%)	Material Classification
B-1 @ 0-5'	116.0	16	Clayey silt w/ sand (SM)
B-2 @ 5'-10'	107.0	17.0	Clayey silt w/ sand (SM)

Expansion Test

An expansion test was performed on a soil sample to determine the swell characteristics. The expansion test was conducted in accordance with a modification of the Uniform Building Code Standard No. 18-2, Expansion Index Test. The expansion sample was remolded to approximately 90 percent relative compaction at near optimum moisture content, subjected to 144 pounds per square foot surcharge load and was saturated.

Boring No. @ Depth	Expansion Index	Expansion Classification
B-1 @ 0-5'	81	High

ASSOCIATED SOILS ENGINEERING, INC.

FIELD LOG OF BORING B-1

Project: *Big Canyon Country Club-Parcel 1,TPM 2008-111*

Location: *Big Canyon Dr.,Newport Bch* | Project No. *09-6169*

Dates(s) Drilled:	**9/18/09**	Logged By:	**John Whitney**
Drilled By:	**Al-Roy Drilling,Inc.**	Total Depth:	**39 Feet 6 Inches**
Rig Make/Model:	**Calweld 150**	Hammer Type:	**Kelly Bar**
Drilling Method:	**Bucket/Core Auger**	Hammer Weight/Drop:	**2400 Lb./12 In. to 22',1550 Lb./ 12 In. from 22' to 42'**
Hole Diameter:	**18 Inches**	Surface Elevation:	**N/A**

Comments: Groundwater encountered at 31 ft. Caving below 36 ft.

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	DRIVE	TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0	0					ML	CLAYEY SILT WITH SAND: FILL-Light olive gray,moist,fine-grained sand,with Siltstone and Claystone pieces				MAX DENSITY EXPANSION R-VALUE CORROSIVITY TESTS ATTERBERG LIMITS
5	5			2(Ring)		SM	SILTY SAND WITH CLAY: FILL-Dark yellowish brown,moist,fine-grained sand,with some asphaltic concrete and wire pieces #unable to retrieve relatively undisturbed sample	#	10.5		
				1(Ring)		SM	SILTY SAND: FILL-Olive brown,moist,fine to medium-grained sand,with organic silt layer	79.4	11.1		
10	10										
						PCC	CONCRETE: FILL-				
						ML	CLAYEY SILT: FILL-Dark brown,moist to very moist,with plastic and rope pieces				
						CL	SILTY CLAY: NATIVE-Very dark gray and olive,very moist to wet,trace fine sand and gravel				
15	15			Push (Ring)				81.5	37.0		CONSOL
20	20										

SOILS ENGINEERING, INC.

FIELD LOG OF BORING B - 1

Project: ***Big Canyon Country Club-Parcel 1,TPM 2008-111***

Location: ***Big Canyon Dr.,Newport Bch*** | Project No. ***09-6169***

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS BULK	DRIVE	TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
						CL	CLAY: Bluish green with light brown,very moist,with fine sand lenses				
25	25					CL	CLAY: Mottled light brown,dark gray and bluish green,very moist,with fine sand lenses,with occasional cobbles/boulders				
30	30					CL	SANDY CLAY: Dark gray,brownish gray and black,wet,fine-grained sand				
35	35					CL	CLAY: Dark olive gray,wet				

FIELD LOG OF BORING B-2

ASSOCIATED SOILS ENGINEERING, INC.

Project:	*Big Canyon Country Club-Parcel 1,TPM 2008-111*
Location:	*Big Canyon Dr.,Newport Bch* — Project No. *09-6169*

Dates(s) Drilled:	**9/18/09**	Logged By:	**John Whitney**
Drilled By:	**Al-Roy Drilling,Inc.**	Total Depth:	**39 Feet**
Rig Make/Model:	**Calweld 150**	Hammer Type:	**Kelly Bar**
Drilling Method:	**Bucket Auger**	Hammer Weight/Drop:	**2400 Lb./12 In. to 22',1550 Lb./ 12 In. from 22' to 42'**
Hole Diameter:	**18 Inches**	Surface Elevation:	**N/A**

Comments: Groundwater encountered at 33 ft. No caving.

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	DRIVE	TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0	0					ML	CLAYEY SILT: FILL-Light olive gray,moist				
						ML	CLAYEY SILT WITH SAND: FILL-Light olive brown with very pale brown,very moist,fine-grained sand				
5	5		■	1(Ring)				68.2	32.2		MAX DENSITY
						ML	CLAYEY SILT WITH SAND: FILL-Brown to dark brown,very moist,fine-grained sand,with organics (manure),with wood debris at 10 feet				
10	10										
						CL	SILTY CLAY: NATIVE-Dark gray to dark grayish brown,with brown and gray,moist to very moist,with siltstone and claystone fragments				
15	15										
			■	5(Ring)		SC	CLAYEY SAND: Olive and olive yellow,moist,fine to medium-grained sand,with shale pieces	118.0	14.4		CONSOL
20	20										

ASSOCIATED SOILS ENGINEERING, INC.

FIELD LOG OF BORING B - 2

Project: **Big Canyon Country Club-Parcel 1,TPM 2008-111**

Location: **Big Canyon Dr.,Newport Bch** | Project No. **09-6169**

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	DRIVE	TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
20	20					CL	SILTY CLAY WITH SAND: Very dark gray and olive,moist,fine-grained sand,with occasional black organics				
							with roots at 24 feet				
25	25						with siltstone fragments at 26 feet				
30	30								19.8		
						ML	CLAYEY SILTSTONE: Olive gray with olive yellow,wet				
35	35										
				11(Ring)				75.9	42.8		SHEAR

ASSOCIATED SOILS ENGINEERING, INC.

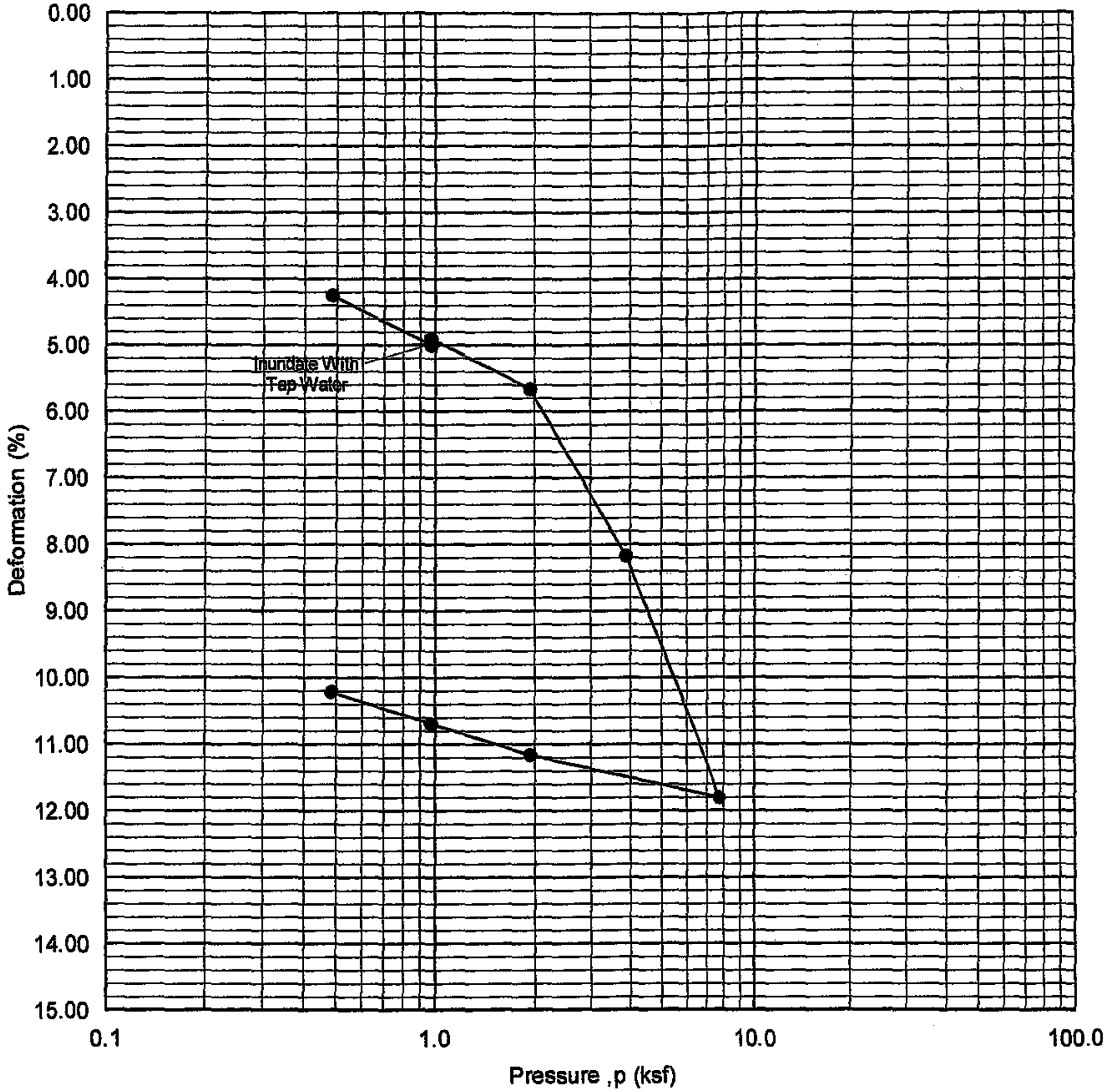
FIELD LOG OF BORING B-3

Project:	*Big Canyon Country Club-Parcel 1,TPM 2008-111*
Location:	*Big Canyon Dr.,Newport Bch*
Project No.	*09-6169*

Dates(s) Drilled:	**9/18/09**	Logged By:	**John Whitney**
Drilled By:	**Al-Roy Drilling,Inc.**	Total Depth:	**18 Feet**
Rig Make/Model:	**Calweld 150**	Hammer Type:	**Kelly Bar**
Drilling Method:	**Bucket Auger**	Hammer Weight/Drop:	**2400 Lb./12 In. to 22',1550 Lb./ 12 In. from 22' to 42'**
Hole Diameter:	**18 Inches**	Surface Elevation:	**N/A**

Comments: Groundwater not encountered. No caving.

DEPTH (Ft.)	ELEVATION (MSL)	SAMPLE INTERVALS: BULK	SAMPLE INTERVALS: DRIVE	SAMPLE INTERVALS: TYPE, "N" or (Blows/ft.)	LITHOLOGY	USCS	GEOTECHNICAL DESCRIPTION	DRY DENSITY (Pcf)	MOISTURE CONTENT (%)	WELL COMPLETION	OTHER TESTS
0	0					SM	SILTY SAND WITH GRAVEL: FILL-Grayish brown,dry to damp;fine-grained sand,with large concrete pieces at 2 feet				
5	5					ML	SANDY SILT WITH CLAY: FILL-Brown,damp to moist,fine-grained sand,with siltstone pieces with concrete fragments at 7 feet				
10	10					CL	SILTY CLAY: FILL-Brown,moist				
						ML	CLAYEY SILTSTONE: NATIVE-Olive gray with olive yellow,moist				
15	15										

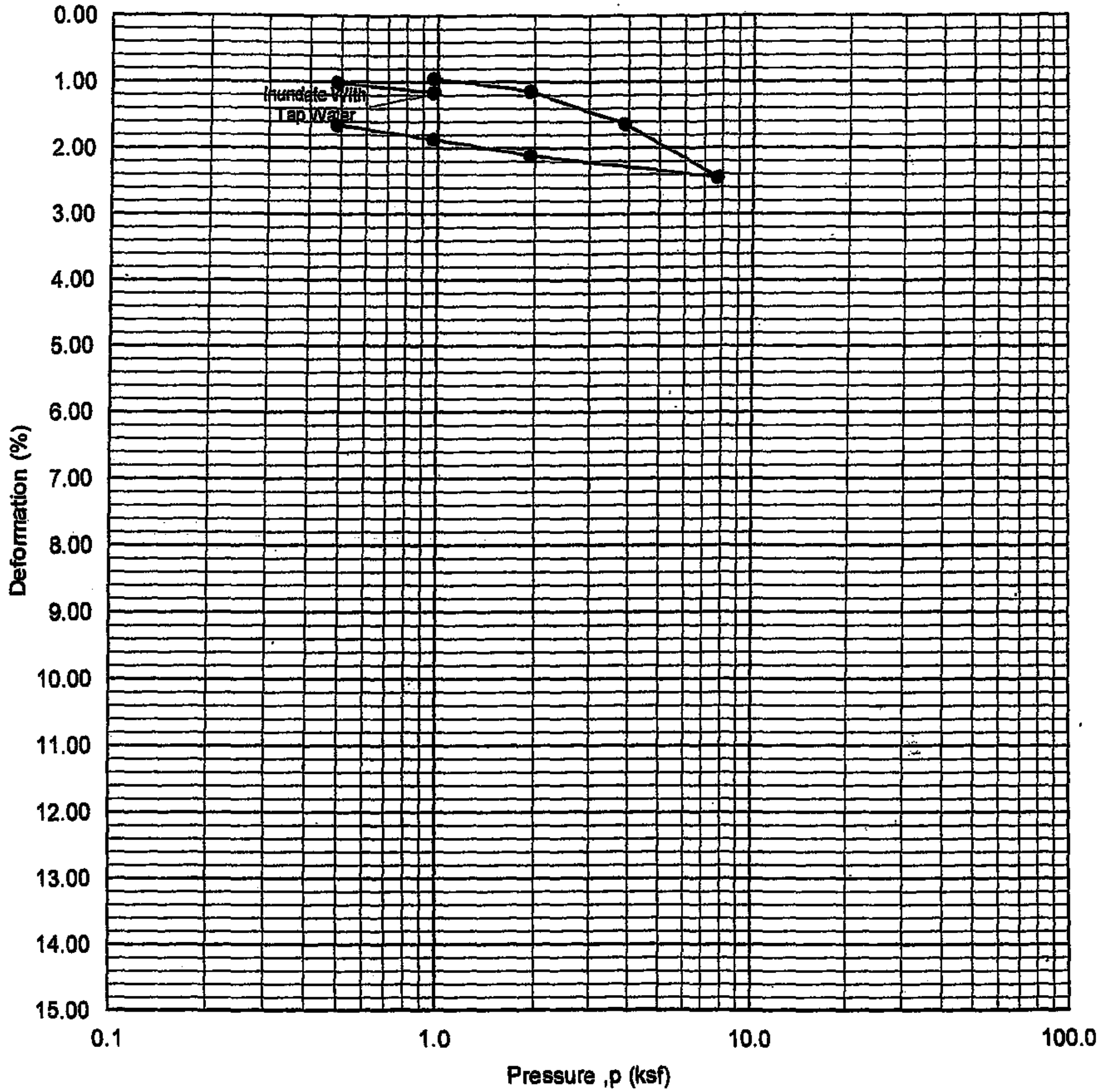


Boring No. : B-1
Depth (ft.) : 15.0
Sample Type: Silty Clay with trace Fine Sand and organics

Dry Density (pcf) = 81.5
Moisture (%) = 37.0

Project Name:Big Canyon C.C.-Parcel 1,TPM 2008-111-Newport Bch	Project No.: 09-6169
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-1

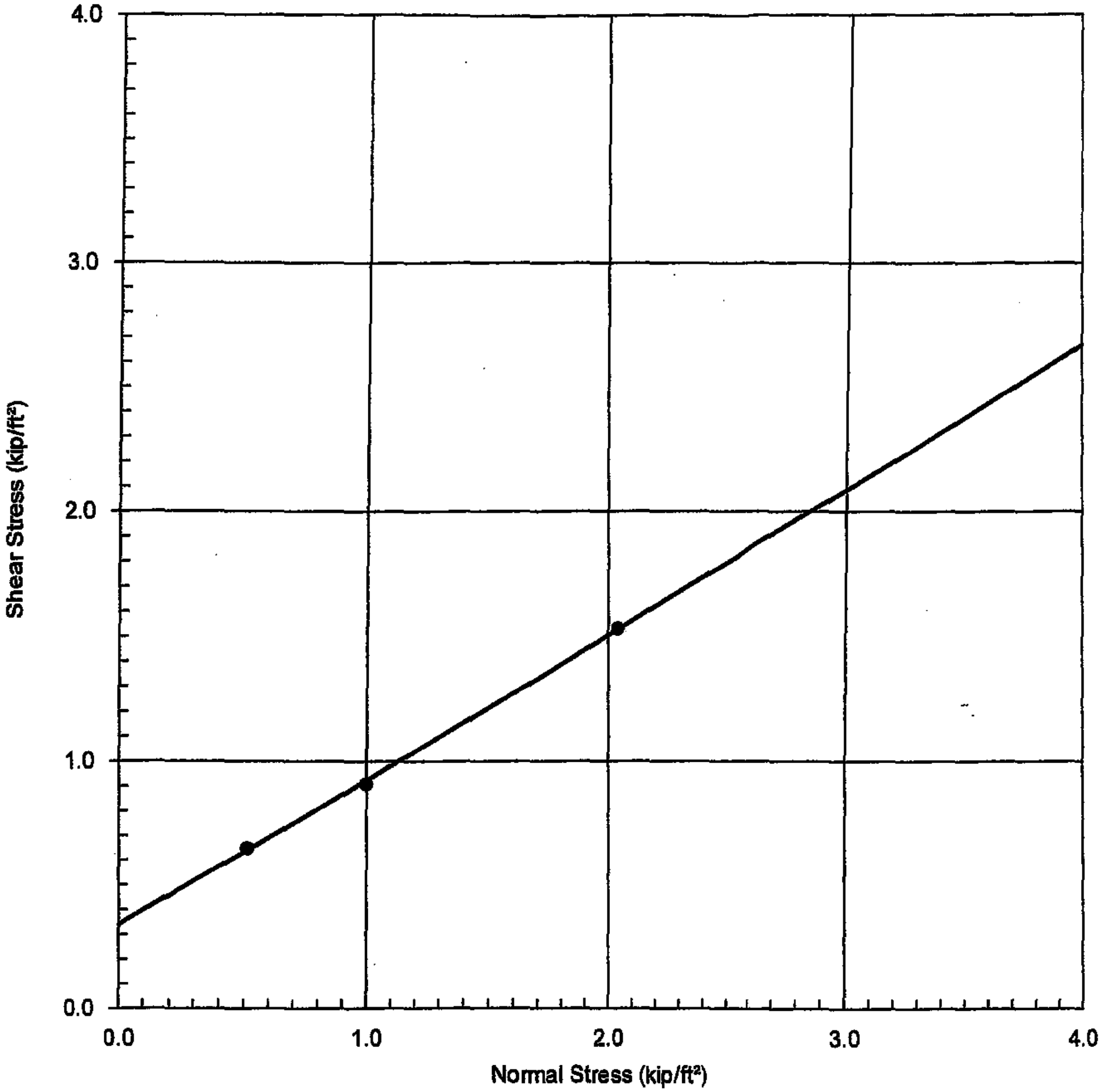


Boring No. : B-2
Depth (ft.) : 18.0
Sample Type: Clayey Fine to Medium Sand

Dry Density (pcf) = 118.0
Moisture (%) = 14.4

Project Name:Big Canyon C.C.-Parcel 1,TPM 2008-111-Newport Bch	Project No.: 09-6169
ASSOCIATED SOILS ENGINEERING, INC.	ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D 2435)

PLATE C-2



Boring No. : B-2
Depth (ft.) : 38.0
Sample : Relatively Undisturbed
Sample Type : Clayey Siltstone

Cohesion(C) = 340 psf
Friction (ϕ) = 30°
Dry Density (pcf) = 75.9
Moisture (%) = 42.8

Project Name:.Big Canyon C.C.-Parcel 1,TPM 2008-111-Newport Bch	Project No.: 09-6169
ASSOCIATED SOILS ENGINEERING, INC.	DIRECT SHEAR TEST RESULTS (ASTM D 3080)

PLATE D-1

ATTERBERG LIMITS

ASTM D 4318-93

Project Name: Big Canyon Country Club-Parcel 1,TPM 2008-111-Newport Beach
Project No. : 09-6169
Boring No. : B-1
Depth (feet): 0-5
Visual Sample Description: Silty Clay (CL)

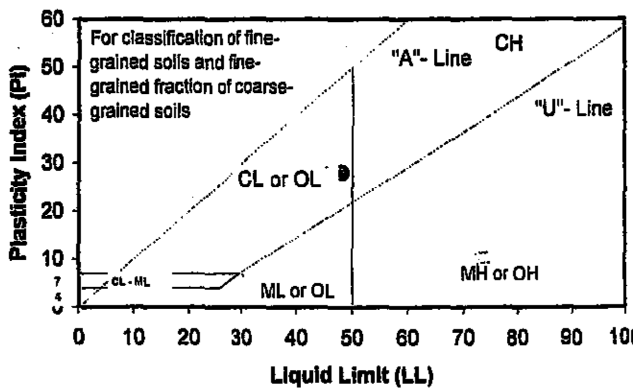
	PLASTIC LIMIT		LIQUID LIMIT			
TEST NO.	1	2	1	2	3	4
Number of Blows [N]			32	26	18	
Container No.	b1	c1	A1	B1	C1	
Wet Wt. of Soil + Cont. (gm)	15.62	14.17	18.16	18.51	17.29	
Dry Wt. of Soil + Cont. (gm)	13.72	12.57	15.95	16.19	15.11	
Wt. of Container (gm)	4.28	4.30	11.11	11.30	10.65	
Moisture Content (%) [Wn]	20.13	19.35	45.66	47.44	48.88	

Liquid Limit	48
Plastic Limit	20
Plasticity Index	28
USCS Classification	CL

PI at "A" - Line = 0.73(LL-20) = 20.44

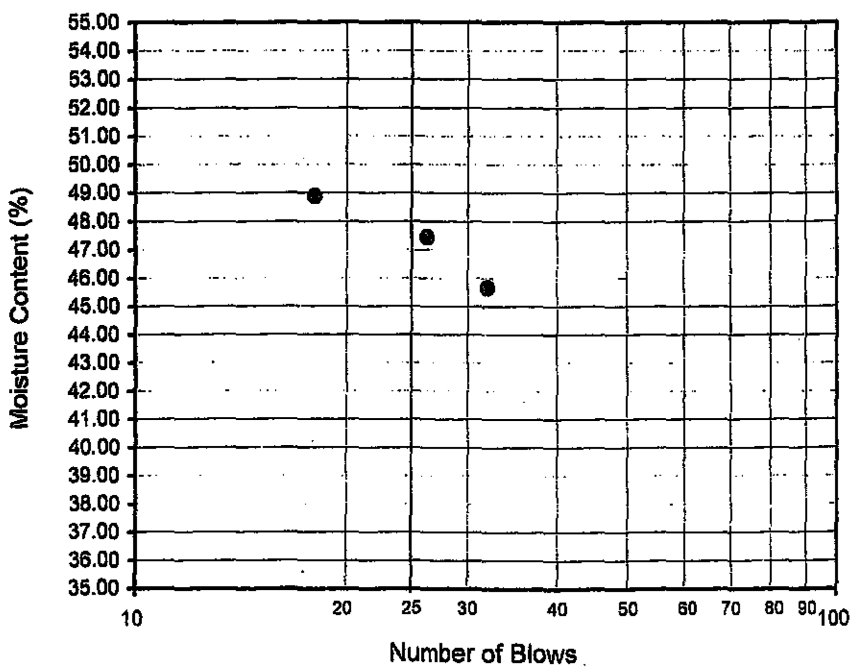
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

- [ ] Wet Preparation
  Multipoint - Wet
- [X] Dry Preparation
  Multipoint - Dry
- [X] Procedure A
  Multipoint Test
- [ ] Procedure B
  One-point Test



Client Name: Associated Soils Engineering, Inc.
Project Name: Big Canyon
Project No.: ASE 09-6169
Address: N/A

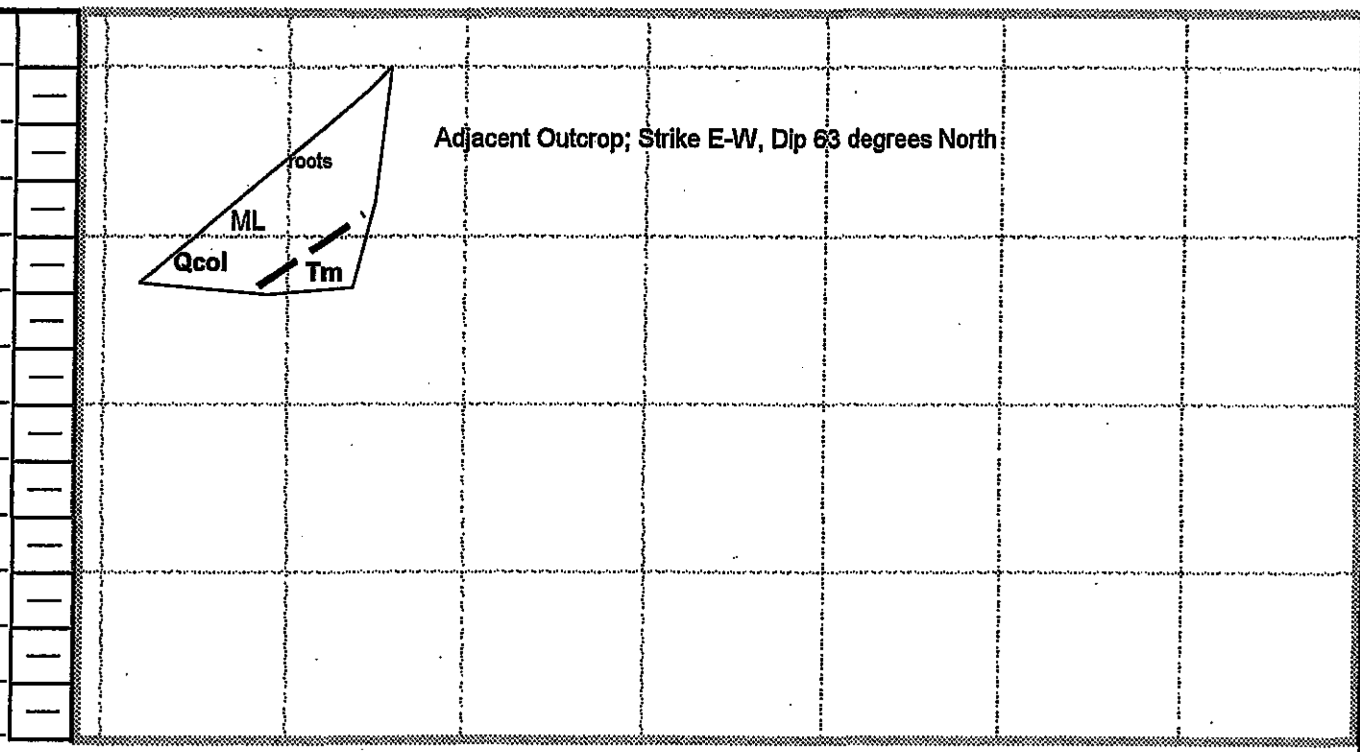
QCI Project No.:09-064-09g
Date: September 30, 2009
Summarized by: ABK

Sample ID	Sample Depth	pH CT-532 (643)	Chloride CT-422 (ppm)	Sulfate CT-417 (% By Weight)	Resistivity CT-532 (643) (ohm-cm)
B-1	0-5'	7.41	140	0.250	400

...e: 11/7/08	Logged By: JR	Equipment: Manual	Sheet: 1 of 1	Test Pit No: T-3
...ation: Fig. A-1-1	Engineer: PA	Hammer: NA	Groundwater not encountered	Total Depth: 4 ft.

Dep... ft.	Blow Count	Sample Type	Moisture (%)	Dry Density	Visual Log	Soil Class	Material Description	Laboratory Test Results
						ML	**Colluvium/Residual Soil - Sandy Silt**, light grayish brown, moist, soft, roots.	
							Bedrock - Siltstone, light olive gray/white, moderately well indurated, siliceous, thin bedded.	
5								
10								

...ale: H: 1" = 3' V: 1" =3'



NOTE: Please refer to Figure A-2 for Explanation of symbols.

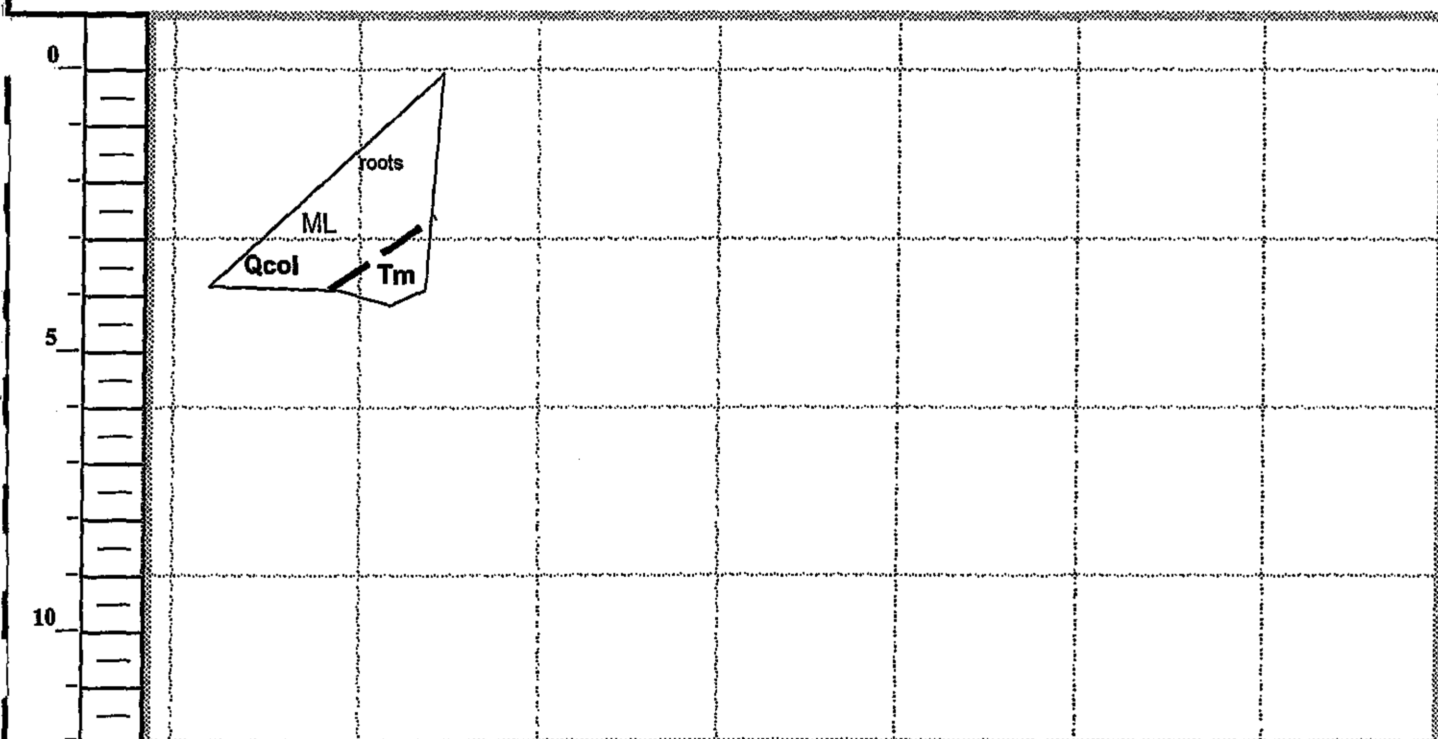
P. A. & ASSOCIATES, INC.	TITLE: TYPICAL LOG OF EXPLORATORY TRENCH			FIGURE NO.: A-5
	PROJECT: 11 Rue Biarritz, Big Canyon, Newport Beach, CA			
	PROJECT NO: 28135-101	DATE 12/14/2008	BY: MM	

PLATE G-1

Date: 11/7/08	Logged By: JR	Equipment: Manual	Sheet: 1 of 1	Test Pit No: T-4
Location: Fig. A-1-1	Engineer: PA	Hammer: NA	Groundwater not encountered	Total Depth: 4 ft.

Depth (ft.)	Blow Count	Sample Type	Moisture (%)	Dry Density	Visual Log	Soil Class	Material Description	Laboratory Test Results
						ML	**Colluvium/Residual Soil - Sandy Silt**, light grayish brown, moist, soft, roots.	
							Bedrock - Siltstone, light olive gray/white, moderately well indurated, siliceous, thin bedded.	
5								
10								

Scale: H: 1" = 3' V: 1" =3'



NOTE: Please refer to Figure A-2 for Explanation of symbols.

P. A. & ASSOCIATES, INC.

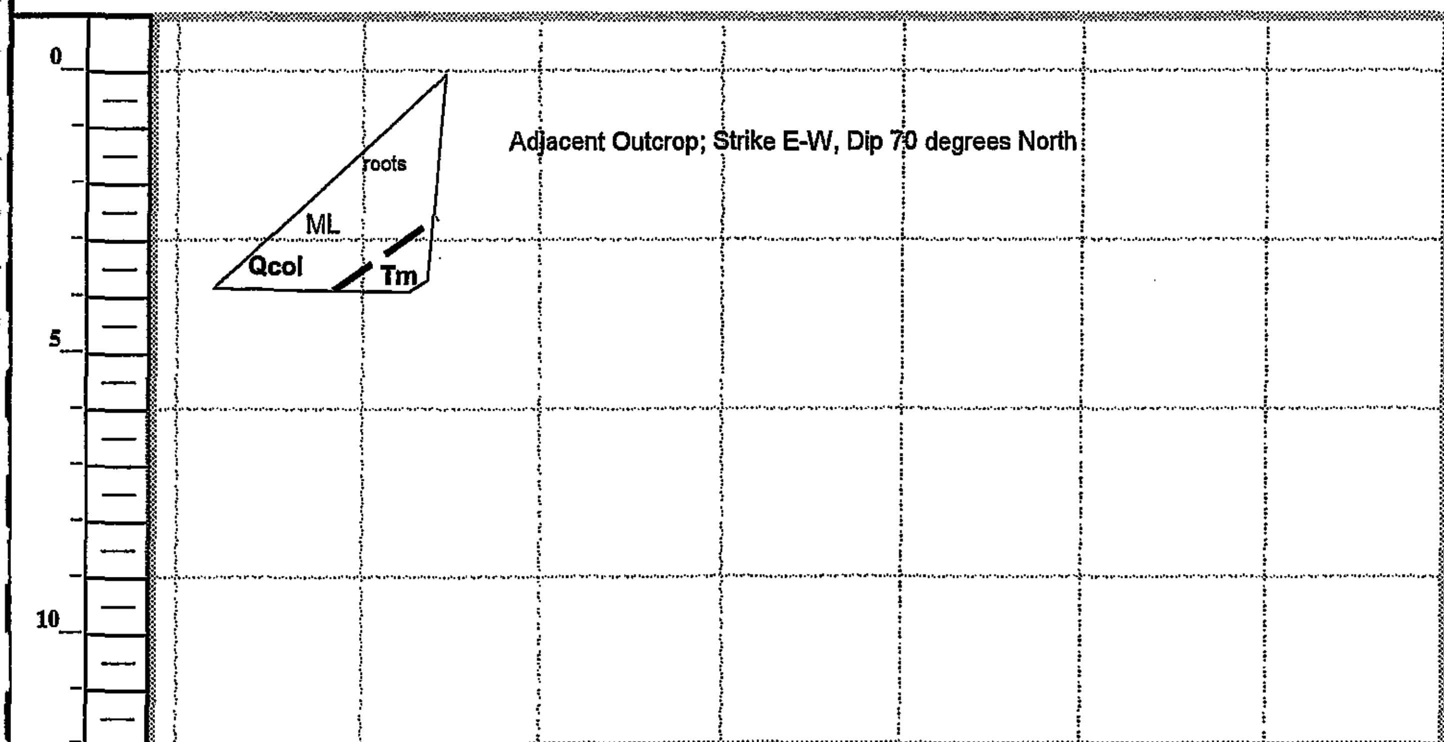
TITLE:	TYPICAL LOG OF EXPLORATORY TRENCH					FIGURE NO.:
PROJECT:	11 Rue Biarritz, Big Canyon, Newport Beach, CA					A-6
PROJECT NO:	28135-101	DATE	12/14/2008	BY:	MM	

PLATE G-2

Date: 11/7/08	Logged By: JR	Equipment: Manual	Sheet: 1 of 1	Test Pit No: T-5
Location: Fig. A-1-1	Engineer: PA	Hammer: NA	Groundwater not encountered	Total Depth: 4 ft.

Depth (ft.)	Blow Count	Sample Type	Moisture (%)	Dry Density	Visual Log	Soil Class	Material Description	Laboratory Test Results
						ML	**Colluvium/Residual Soil - Sandy Silt**, light grayish brown, moist, soft, roots.	
							Bedrock - Siltstone, light olive gray/white, moderately well indurated, siliceous, thin bedded.	
5								
10								

Scale: H: 1" = 3' V: 1" =3'



NOTE: Please refer to Figure A-2 for Explanation of symbols.

P. A. & ASSOCIATES, INC.

TITLE:	TYPICAL LOG OF EXPLORATORY TRENCH					FIGURE NO.:
PROJECT:	11 Rue Biarritz, Big Canyon, Newport Beach, CA					A-7
PROJECT NO:	28135-101	DATE	12/14/2008	BY:	MM	

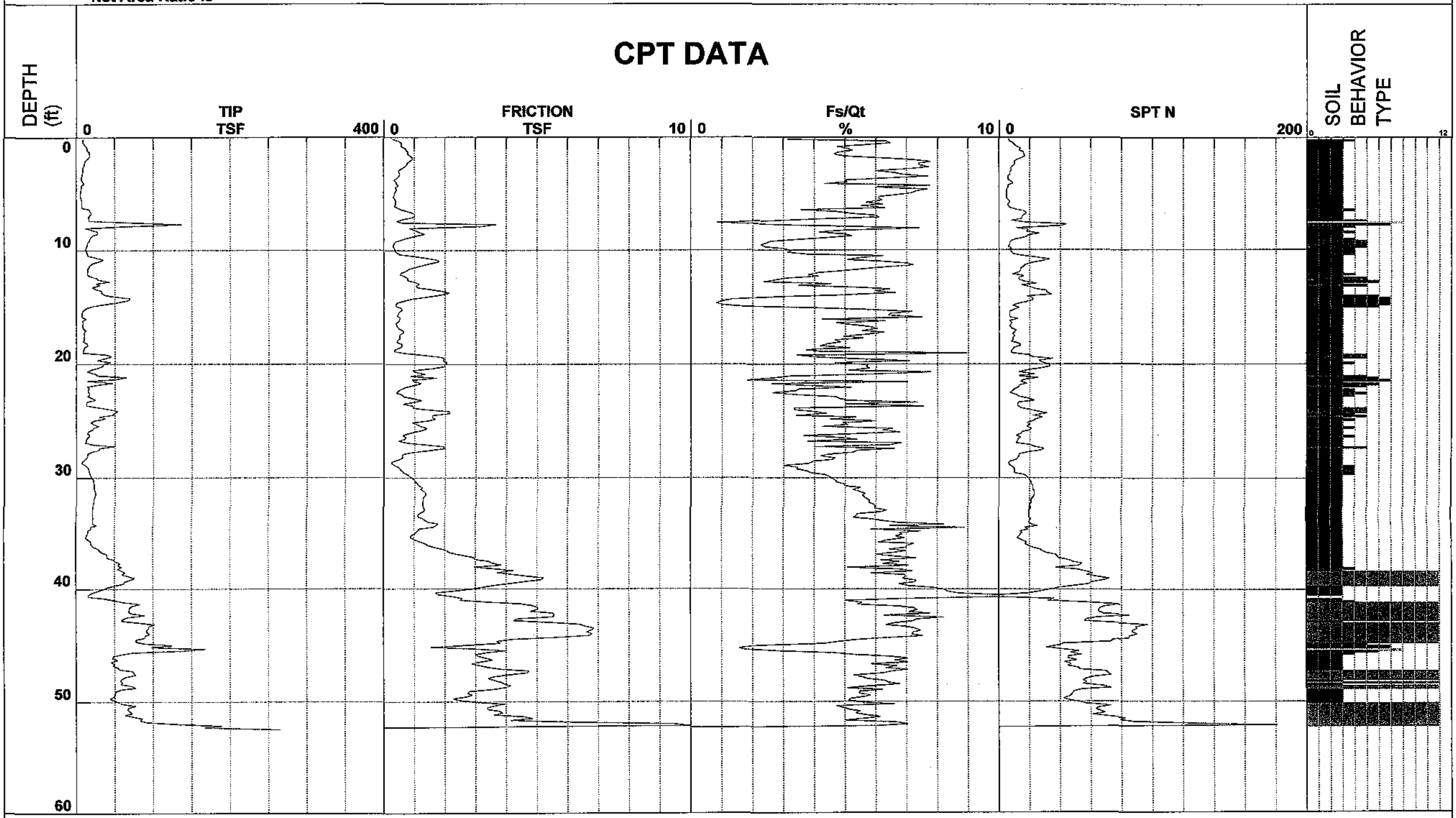
PLATE G-3

Associated Soils Engineering

Project	Big Canyon Country Club	Operator	BH-AH	Filename	SDF(468).cpt
Job Number	6169	Cone Number	DSG0786	GPS	
Hole Number	CPT-01	Date and Time	2/22/2010 8:54:46 AM	Maximum Depth	52.49 ft
Water Table Depth	19.00 ft				

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

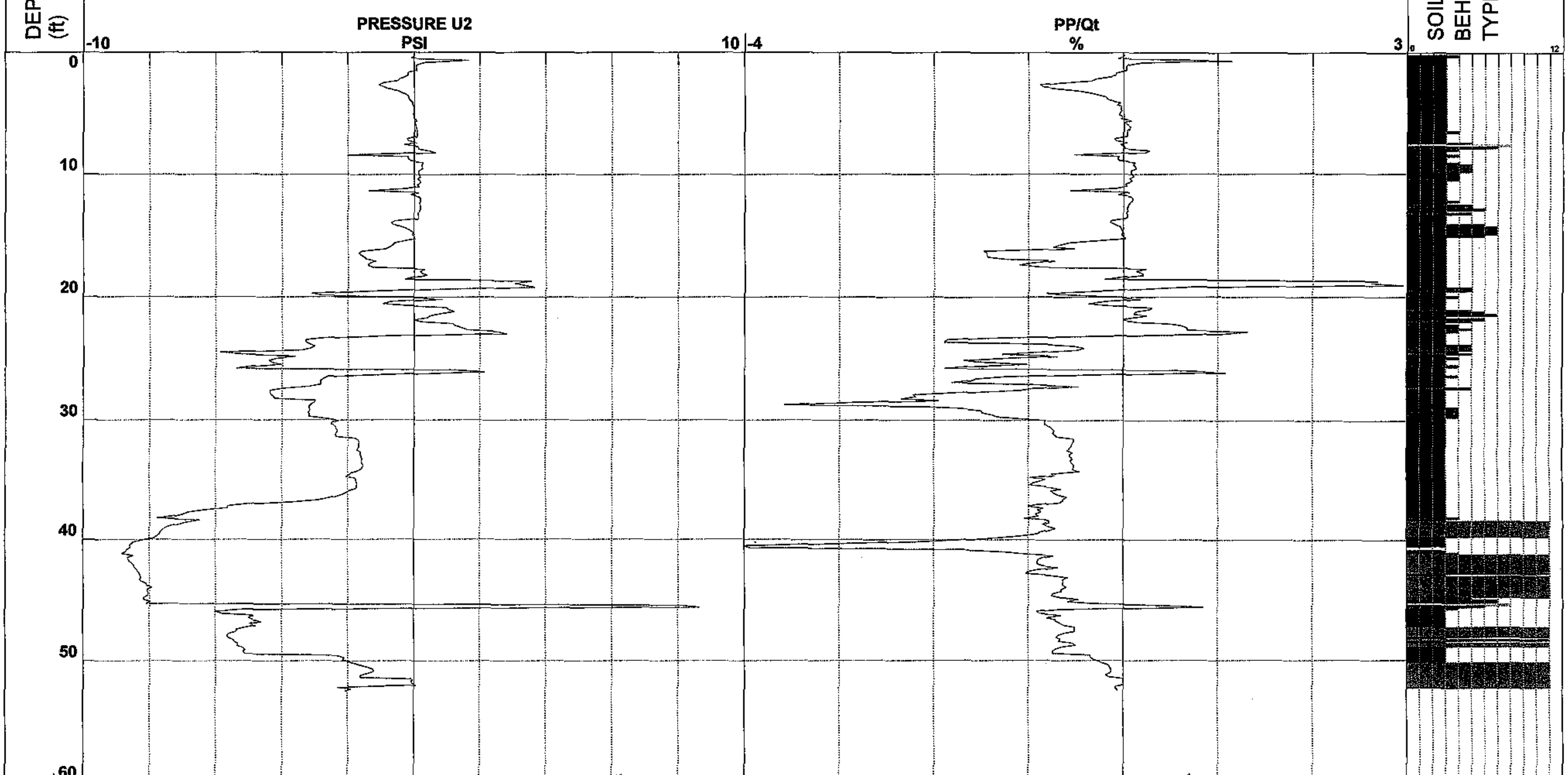
*Soil behavior type and SPT based on data from UBC-1983

Associated Soils Engineering

Project	Big Canyon Country Club	Operator	BH-AH	Filename	SDF(468).cpt
Job Number	6169	Cone Number	DSG0786	GPS	
Hole Number	CPT-01	Date and Time	2/22/2010 8:54:46 AM	Maximum Depth	52.49 ft
Water Table Depth		19.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Cone Size 10cm squared

*Soil behavior type and SPT based on data from UBC-1983

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(468).cpt
CPT Date: 2/22/2010 8:54:46 AM
GW During Test: 19 ft

Page: 1
Sounding ID: CPT-01
Project No: 6169
Cone/Rig: DSG0786

Depth ft	qc PS tsf	* qcln PS -	q1ncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR -	* Fin Ic %	* D50 mm	* Nk -
0.33	7.7	12.3	-	0.5	0.0	6.4	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.5	9.9	67	0.005	15
0.49	9.0	14.4	-	0.6	-0.1	6.5	3	silty CLAY to CLAY	115	1.5	10	6	-	-	0.6	9.9	64	0.005	15
0.66	10.5	16.8	-	0.6	1.7	5.6	3	silty CLAY to CLAY	115	1.5	11	7	-	-	0.7	9.9	58	0.005	15
0.82	12.2	19.6	-	0.6	0.3	4.8	3	silty CLAY to CLAY	115	1.5	13	8	-	-	0.9	9.9	51	0.005	15
0.98	14.1	22.6	-	0.7	0.1	5.1	3	silty CLAY to CLAY	115	1.5	15	9	-	-	1.0	9.9	50	0.005	15
1.15	14.1	22.5	-	0.7	0.1	5.3	3	silty CLAY to CLAY	115	1.5	15	9	-	-	1.0	9.9	50	0.005	15
1.31	16.7	26.9	-	0.8	0.1	4.8	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	45	0.005	15
1.48	16.7	26.8	-	0.8	0.1	4.7	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	45	0.005	15
1.64	17.4	28.0	-	0.9	-0.2	5.0	3	silty CLAY to CLAY	115	1.5	19	12	-	-	1.2	9.9	45	0.005	15
1.80	15.4	24.8	-	0.9	-0.2	6.1	3	silty CLAY to CLAY	115	1.5	17	10	-	-	1.1	9.9	51	0.005	15
1.97	13.0	20.9	-	0.9	-0.3	7.2	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	58	0.005	15
2.13	10.7	17.2	-	0.8	-0.4	7.9	3	silty CLAY to CLAY	115	1.5	11	7	-	-	0.7	9.9	64	0.005	15
2.30	10.4	16.7	-	0.8	-0.5	7.5	3	silty CLAY to CLAY	115	1.5	11	7	-	-	0.7	9.9	64	0.005	15
2.46	10.2	16.3	-	0.8	-0.9	7.5	3	silty CLAY to CLAY	115	1.5	11	7	-	-	0.7	9.9	65	0.005	15
2.62	8.7	13.9	-	0.7	-1.1	7.9	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.6	9.9	69	0.005	15
2.79	7.9	12.7	-	0.6	-0.9	7.2	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.5	9.9	70	0.005	15
2.95	8.1	13.0	-	0.5	-0.8	6.1	3	silty CLAY to CLAY	115	1.5	9	5	-	-	0.6	9.9	66	0.005	15
3.12	7.7	12.4	-	0.5	-0.5	6.8	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.5	9.9	69	0.005	15
3.28	7.6	12.1	-	0.5	-0.4	7.1	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.5	9.9	70	0.005	15
3.45	6.3	10.1	-	0.5	-0.2	7.9	3	silty CLAY to CLAY	115	1.5	7	4	-	-	0.4	9.9	78	0.005	15
3.61	6.7	10.8	-	0.4	-0.2	6.6	3	silty CLAY to CLAY	115	1.5	7	4	-	-	0.5	9.9	72	0.005	15
3.77	6.6	10.6	-	0.3	-0.2	5.2	3	silty CLAY to CLAY	115	1.5	7	4	-	-	0.5	9.9	68	0.005	15
3.94	8.0	12.8	-	0.4	-0.1	5.2	3	silty CLAY to CLAY	115	1.5	9	5	-	-	0.6	9.9	63	0.005	15
4.10	9.6	15.5	-	0.4	0.0	4.4	3	silty CLAY to CLAY	115	1.5	10	6	-	-	0.7	9.9	56	0.005	15
4.27	6.2	10.0	-	0.5	-0.1	8.1	3	silty CLAY to CLAY	115	1.5	7	4	-	-	0.4	9.4	79	0.005	15
4.43	6.3	10.1	-	0.4	0.0	6.3	3	silty CLAY to CLAY	115	1.5	7	4	-	-	0.4	9.4	73	0.005	15
4.59	5.5	8.7	-	0.4	0.0	8.1	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.4	7.9	83	0.005	15
4.76	5.3	8.5	-	0.4	0.0	7.7	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.4	7.4	83	0.005	15
4.92	5.0	8.0	-	0.4	0.0	7.6	3	silty CLAY to CLAY	115	1.5	5	3	-	-	0.3	6.8	84	0.005	15
5.09	5.2	8.3	-	0.3	0.0	7.1	3	silty CLAY to CLAY	115	1.5	6	3	-	-	0.3	6.9	82	0.005	15
5.25	5.2	8.3	-	0.3	0.0	6.5	3	silty CLAY to CLAY	115	1.5	6	3	-	-	0.3	6.8	80	0.005	15
5.41	5.7	9.2	-	0.3	0.0	6.5	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.4	7.4	77	0.005	15
5.58	6.4	10.3	-	0.4	0.1	6.5	3	silty CLAY to CLAY	115	1.5	7	4	-	-	0.4	8.3	74	0.005	15
5.74	6.9	11.1	-	0.4	0.0	6.0	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.5	8.8	70	0.005	15
5.91	6.3	10.1	-	0.4	0.0	6.6	3	silty CLAY to CLAY	115	1.5	7	4	-	-	0.4	7.8	74	0.005	15
6.07	6.4	10.2	-	0.4	0.1	5.9	3	silty CLAY to CLAY	115	1.5	7	4	-	-	0.4	7.7	72	0.005	15
6.23	7.1	11.4	-	0.4	0.1	6.6	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.5	8.5	71	0.005	15
6.40	16.5	26.5	-	0.6	0.1	3.7	4	clayy SILT to silty CLAY	115	2.0	13	8	-	-	1.1	9.9	42	0.070	15
6.56	17.0	27.3	-	0.8	0.1	4.8	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	46	0.005	15
6.73	19.2	30.8	-	1.0	0.1	5.3	3	silty CLAY to CLAY	115	1.5	21	13	-	-	1.3	9.9	45	0.005	15
6.89	17.0	27.2	-	1.0	0.1	6.1	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	50	0.005	15
7.05	15.4	24.7	-	0.9	-0.2	6.3	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.1	9.9	52	0.005	15
7.22	15.8	25.3	-	0.7	-0.2	4.3	3	silty CLAY to CLAY	115	1.5	17	11	-	-	1.1	9.9	45	0.005	15
7.38	16.2	26.0	-	0.4	0.1	2.6	4	clayy SILT to silty CLAY	115	2.0	13	8	-	-	1.1	9.9	37	0.070	15
7.55	72.4	106.8	122.2	0.6	-0.3	0.9	6	clean SAND to silty SAND	125	5.0	21	14	69	45	-	-	9	0.350	16
7.71	136.9	199.5	265.6	3.7	0.1	2.7	5	silty SAND to sandy SILT	120	4.0	50	34	90	48	-	-	14	0.200	16
7.87	63.0	90.9	229.0	3.2	0.1	5.1	9	very stiff fine SOIL	120	2.0	45	32	64	44	-	-	28	0.250	30
8.04	11.5	18.5	-	0.9	0.4	7.7	3	silty CLAY to CLAY	115	1.5	12	8	-	-	0.8	9.9	63	0.005	15
8.20	20.3	32.5	-	1.0	0.7	5.2	3	silty CLAY to CLAY	115	1.5	22	14	-	-	1.4	9.9	44	0.005	15
8.37	27.6	44.2	-	1.1	-2.0	4.2	4	clayy SILT to silty CLAY	115	2.0	22	14	-	-	1.9	9.9	35	0.070	15
8.53	26.9	43.2	-	1.3	-0.2	5.0	3	silty CLAY to CLAY	115	1.5	29	18	-	-	1.9	9.9	39	0.005	15
8.69	20.2	32.3	-	1.1	-0.2	5.4	3	silty CLAY to CLAY	115	1.5	22	13	-	-	1.4	9.9	44	0.005	15
8.86	18.1	29.0	-	0.8	-0.1	4.6	3	silty CLAY to CLAY	115	1.5	19	12	-	-	1.3	9.9	44	0.005	15
9.02	17.0	27.3	-	0.6	0.3	3.6	4	clayy SILT to silty CLAY	115	2.0	14	9	-	-	1.2	9.9	41	0.070	15
9.19	15.9	25.5	-	0.4	0.2	2.7	4	clayy SILT to silty CLAY	115	2.0	13	8	-	-	1.1	9.9	38	0.070	15
9.35	14.0	22.4	-	0.3	0.2	2.6	4	clayy SILT to silty CLAY	115	2.0	11	7	-	-	1.0	9.9	40	0.070	15
9.51	13.7	22.0	-	0.3	0.3	2.4	4	clayy SILT to silty CLAY	115	2.0	11	7	-	-	0.9	9.9	39	0.070	15
9.68	13.0	20.8	-	0.3	0.1	2.5	4	clayy SILT to silty CLAY	115	2.0	10	6	-	-	0.9	9.9	41	0.070	15
9.84	11.9	19.1	-	0.4	0.1	3.1	4	clayy SILT to silty CLAY	115	2.0	10	6	-	-	0.8	9.9	46	0.070	15
10.01	11.6	18.6	-	0.4	0.2	3.4	3	silty CLAY to CLAY	115	1.5	12	8	-	-	0.8	9.9	48	0.005	15
10.17	13.1	21.0	-	0.4	0.2	3.3	4	clayy SILT to silty CLAY	115	2.0	10	7	-	-	0.9	9.9	45	0.070	15
10.34	13.7	21.9	-	0.5	0.1	4.0	3	silty CLAY to CLAY	115	1.5	15	9	-	-	0.9	9.9	47	0.005	15
10.50	15.0	24.0	-	0.9	0.2	6.5	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.0	9.9	54	0.005	15
10.66	24.9	40.0	-	1.4	0.2	5.7	3	silty CLAY to CLAY	115	1.5	27	17	-	-	1.7	9.9	42	0.005	15
10.83	34.7	47.5	-	1.8	0.1	5.2	4	clayy SILT to silty CLAY	115	2.0	24	17	-	-	2.4	9.9	38	0.070	15
10.99	29.4	46.4	-	1.8	0.1	6.3	3	silty CLAY to CLAY	115	1.5	31	20	-	-	2.0	9.9	41	0.005	15
11.16	21.4	33.3	-	1.5	-0.2	7.2	3	silty CLAY to CLAY	115	1.5	22	14	-	-	1.5	9.9	49	0.005	15
11.32	17.5	26.8	-	1.3	-1.4	7.5	3	silty CLAY to CLAY	115	1.5	18	12	-	-	1.2	9.9	54	0.005	15
11.48	16.3	24.7	-	1.0	0.1	6.6	3	silty CLAY to CLAY	115	1.5	16	11	-	-	1.1	9.9	54	0.005	15
11.65	14.7	21.9	-	0.8	-0.1	5.9	3	silty CLAY to CLAY	115	1.5	15	10	-	-	1.0	9.9	54	0.005	15
11.81	14.8	21.7	-	0.7	0.2	5.2	3	silty CLAY to CLAY	115	1.5	14	10	-	-	1.0	9.9	52	0.005	15
11.98	13.8	20.0	-	0.6	0.2	4.4	3	silty CLAY to CLAY	115	1.5	13	9	-	-	0.9	9.9	50	0.005	15
12.14	14.1	20.1	-	0.5	0.2	4.0	3	silty CLAY to CLAY	115	1.5	13	9	-	-	1.0	9.9	49	0.005	15
12.30	16.6	23.5	-	0.7	0.2	4.3	3	silty CLAY to CLAY	115	1.5	16	11	-	-	1.1	9.9	47	0.005	15
12.47	26.2	32.5	-	0.8	0.2	3.1	4	clayy SILT to silty CLAY	115	2.0	16	13	-	-	1.8	9.9	36	0.070	15
12.63	28.2	32.1	104.1	0.8	0.2	2.8	4	clayy SILT to silty CLAY	115	2.0	16	14	-	-	2.0	9.9	35	0.070	15
12.80	42.7	48.3	112.5	1.0	0.2	2.4	5	silty SAND to sandy SILT	120	4.0	12	11	43	40	-	-	27	0.200	16
12.96	25.6	34.2	-	1.2	0.2	4.7	3	silty CLAY to CLAY	115	1.5	23	17	-	-	1.8	9.9	41	0.005	15
13.12	30.4	36.3	-	1.1	0.1	3.6	4	clayy SILT to silty CLAY	115	2.0	18	15	-	-	2.1	9.9	36	0.070	15
13.29	20.7	27.0	-	1.1	0.1	5.5	3	silty CLAY to CLAY	115	1.5	18	14	-	-	1.4	9.9	48	0.005	15
13.45	24.2	31.2	-	1.6	0.2	6.7	3	silty CLAY to CLAY	115	1.5	21	16	-	-	1.7	9.9	49	0.005	15
13.62	32.8	41.8	-	2.0	0.1	6.1	3	silty CLAY to CLAY	115	1.5	28	22	-	-	2.3	9.9	42	0.005	15
13.78	32.2	40.5	-	2.1	-0.6	6.8	3	silty CLAY to CLAY	115	1.5	27	21	-	-	2.2	9.9	45	0.005	15
13.94	35.8	44.5	-	1.8	-0.7	5.1	3	silty CLAY to CLAY	115	1.5	30	24	-	-	2.5	9.9	38	0.005	15
14.11	47.4	51.0	132.1	1.4	-0.6	3.1	4	clayy SILT to silty CLAY	115	2.0	26	24	-	-	3.3	9.9	29	0.070	15
14.27	69.6	74.6	108.5	0.9	-0.4	1.4	5	silty SAND to sandy SILT	120	4.0	19	17	57	43	-	-	16	0.200	16
14.44	67.5	71.9	97.1	0.7	-0.2	1.0	6	clean SAND to silty SAND	125	5.0	14	14	56	42	-	-	14	0.350	16
14.60	55.1	58.3	80.8	0.5	-0.1	0.8	6	clean SAND to silty SAND	125	5.0	12	11	49	41	-	-	15	0.350	16
14.76	38.3	40.2	72.5	0.4	0.0	1.1	5	silty SAND to sandy SILT	120	4.0	10	10	37	39	-	-	21	0.200	16
14.93	22.8	23.8	75.9	0.4	-0.1	1.8	4	clayy SILT to silty CLAY	115	2.0	12	11	-	-	1.6	9.9	34	0.070	15
15.09	13.9	15.9	-	0.6	0.0	4.4	3	silty CLAY to CLAY	115	1.5	11	9	-	-	0.9	8.6	56	0.005	15
15.26	10.1	11.4	-	0.6	0.0	6.5	3	silty CLAY to CLAY	115	1.5	8	7	-	-	0.7	6.0	72	0.005	15
15.42	7.0	7.9	-	0.5	-0.3	8.2	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	4.0	89	0.005	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(468).cpt
CPT Date: 2/22/2010 8:54:46 AM
GW During Test: 19 ft

Sounding ID: CPT-01
Project No: 6169
Cone/Rig: DSG0786

Depth ft	qc PS tsf	* qc1n PS -	qlncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
15.58	7.3	8.1	-	0.5	-0.6	7.4	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	4.1	85	0.005	15
15.75	6.9	7.6	-	0.4	-0.6	7.4	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	3.8	87	0.005	15
15.91	7.1	7.8	-	0.5	-0.7	8.6	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	3.9	90	0.005	15
16.08	12.1	13.0	-	0.5	-0.9	4.6	3	silty CLAY to CLAY	115	1.5	9	8	-	-	0.8	7.0	62	0.005	15
16.24	7.7	8.2	-	0.5	-1.6	7.2	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	4.2	84	0.005	15
16.40	8.3	8.8	-	0.4	-1.7	5.3	3	silty CLAY to CLAY	115	1.5	6	6	-	-	0.6	4.6	75	0.005	15
16.57	7.9	8.3	-	0.4	-1.6	6.0	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	4.3	80	0.005	15
16.73	7.7	7.9	-	0.4	-1.5	6.6	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	4.1	84	0.005	15
16.90	8.2	8.4	-	0.5	-1.4	6.9	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	4.4	82	0.005	15
17.06	11.5	11.7	-	0.6	-1.2	6.1	3	silty CLAY to CLAY	115	1.5	8	8	-	-	0.8	6.3	70	0.005	15
17.23	10.2	10.2	-	0.6	-1.3	6.9	3	silty CLAY to CLAY	115	1.5	7	7	-	-	0.7	5.5	76	0.005	15
17.39	9.2	9.2	-	0.5	-1.4	6.4	3	silty CLAY to CLAY	115	1.5	6	6	-	-	0.6	4.9	78	0.005	15
17.55	10.2	10.1	-	0.5	-1.3	5.5	3	silty CLAY to CLAY	115	1.5	7	7	-	-	0.7	5.4	72	0.005	15
17.72	9.5	9.3	-	0.5	0.3	6.3	3	silty CLAY to CLAY	115	1.5	6	6	-	-	0.6	4.9	77	0.005	15
17.88	9.8	9.5	-	0.5	0.2	5.2	3	silty CLAY to CLAY	115	1.5	6	7	-	-	0.7	5.1	73	0.005	15
18.05	8.6	8.3	-	0.4	0.2	5.5	3	silty CLAY to CLAY	115	1.5	6	6	-	-	0.6	4.3	78	0.005	15
18.21	13.2	12.5	-	0.6	0.4	4.8	3	silty CLAY to CLAY	115	1.5	8	9	-	-	0.9	6.9	63	0.005	15
18.37	14.1	13.3	-	0.6	0.0	4.5	3	silty CLAY to CLAY	115	1.5	9	9	-	-	1.0	7.4	61	0.005	15
18.54	9.9	9.3	-	0.5	-0.3	5.8	3	silty CLAY to CLAY	115	1.5	6	7	-	-	0.7	5.0	75	0.005	15
18.70	9.5	8.8	-	0.4	3.5	4.2	3	silty CLAY to CLAY	115	1.5	6	6	-	-	0.6	4.7	71	0.005	15
18.87	8.3	7.7	-	0.4	3.0	4.9	3	silty CLAY to CLAY	115	1.5	5	6	-	-	0.5	4.0	78	0.005	15
19.03	8.1	7.4	-	0.7	3.3	9.9	2	Organic SOILS - Peats	100	1.0	7	8	-	-	0.8	3.8	95	0.100	10
19.19	38.7	35.3	-	1.3	3.6	3.5	4	clayy SILT to silty CLAY	115	2.0	18	19	-	-	2.7	9.9	36	0.070	15
19.36	45.1	40.9	-	1.9	0.7	4.3	4	clayy SILT to silty CLAY	115	2.0	20	23	-	-	3.1	9.9	37	0.070	15
19.52	36.1	32.7	-	2.0	-1.4	5.6	3	silty CLAY to CLAY	115	1.5	22	24	-	-	2.5	9.9	45	0.005	15
19.69	27.4	24.7	-	1.9	-3.1	7.4	3	silty CLAY to CLAY	115	1.5	16	18	-	-	1.9	9.9	56	0.005	15
19.85	44.0	39.5	-	2.1	-2.7	4.8	3	silty CLAY to CLAY	115	1.5	26	29	-	-	3.1	9.9	39	0.005	15
20.01	34.6	30.9	-	2.0	-0.1	5.9	3	silty CLAY to CLAY	115	1.5	21	23	-	-	2.4	9.9	47	0.005	15
20.18	34.4	30.6	-	2.0	0.9	5.9	3	silty CLAY to CLAY	115	1.5	20	23	-	-	2.4	9.9	47	0.005	15
20.34	27.8	24.6	-	1.6	-0.7	6.1	3	silty CLAY to CLAY	115	1.5	16	19	-	-	1.9	9.9	52	0.005	15
20.51	18.5	16.4	-	0.9	-0.9	5.5	3	silty CLAY to CLAY	115	1.5	11	12	-	-	1.3	8.9	59	0.005	15
20.67	13.8	12.2	-	1.1	-0.3	8.5	3	silty CLAY to CLAY	115	1.5	8	9	-	-	0.9	6.5	76	0.005	15
20.83	23.7	20.8	-	1.4	1.0	6.0	3	silty CLAY to CLAY	115	1.5	14	16	-	-	1.6	9.9	55	0.005	15
21.00	27.1	23.7	-	0.9	1.0	3.4	4	clayy SILT to silty CLAY	115	2.0	12	14	-	-	1.9	9.9	43	0.070	15
21.16	64.8	58.7	130.5	1.7	1.2	2.7	5	silty SAND to sandy SILT	120	4.0	15	16	49	40	-	-	26	0.200	16
21.33	50.8	45.9	97.5	0.9	0.8	1.9	5	silty SAND to sandy SILT	120	4.0	11	13	41	39	-	-	24	0.200	16
21.49	14.2	12.3	-	1.0	0.5	7.7	3	silty CLAY to CLAY	115	1.5	8	9	-	-	1.0	6.4	74	0.005	15
21.65	46.8	42.2	113.3	1.2	0.4	2.7	4	clayy SILT to silty CLAY	115	2.0	21	23	-	-	3.3	9.9	30	0.070	15
21.82	26.3	22.5	-	1.0	0.0	3.9	3	silty CLAY to CLAY	115	1.5	15	18	-	-	1.8	9.9	46	0.005	15
21.98	13.8	11.8	-	0.7	0.3	5.7	3	silty CLAY to CLAY	115	1.5	8	9	-	-	0.9	6.1	68	0.005	15
22.15	16.3	13.9	-	0.6	1.2	3.8	3	silty CLAY to CLAY	115	1.5	9	11	-	-	1.1	7.2	67	0.005	15
22.31	14.2	12.0	-	0.5	1.2	3.7	3	silty CLAY to CLAY	115	1.5	8	9	-	-	1.0	6.2	60	0.005	15
22.47	15.3	12.9	-	0.4	1.4	2.9	3	silty CLAY to CLAY	115	1.5	9	10	-	-	1.0	6.7	54	0.005	15
22.64	17.0	14.3	-	0.6	1.6	3.8	3	silty CLAY to CLAY	115	1.5	10	11	-	-	1.1	7.4	56	0.005	15
22.80	14.0	11.7	-	0.7	2.6	5.2	3	silty CLAY to CLAY	115	1.5	8	9	-	-	0.9	6.0	67	0.005	15
22.97	20.0	16.8	-	1.0	2.8	5.2	3	silty CLAY to CLAY	115	1.5	11	13	-	-	1.4	8.8	58	0.005	15
23.13	24.1	20.0	-	1.2	-0.8	5.4	3	silty CLAY to CLAY	115	1.5	13	16	-	-	1.7	9.9	54	0.005	15
23.30	13.3	11.0	-	1.0	-2.7	8.2	3	silty CLAY to CLAY	115	1.5	7	9	-	-	0.9	5.5	78	0.005	15
23.46	12.7	10.5	-	0.6	-3.3	5.6	3	silty CLAY to CLAY	115	1.5	7	8	-	-	0.8	5.2	72	0.005	15
23.62	12.5	10.3	-	0.9	-3.3	8.5	3	silty CLAY to CLAY	115	1.5	7	8	-	-	0.8	5.1	81	0.005	15
23.79	28.8	23.6	-	1.0	-3.2	3.5	4	clayy SILT to silty CLAY	115	2.0	12	14	-	-	2.0	9.9	44	0.070	15
23.95	42.7	34.9	-	1.4	-3.0	3.5	4	clayy SILT to silty CLAY	115	2.0	17	21	-	-	3.0	9.9	36	0.070	15
24.12	53.3	46.7	148.8	2.1	-3.1	4.1	4	clayy SILT to silty CLAY	115	2.0	23	27	-	-	3.7	9.9	34	0.070	15
24.28	49.1	39.9	-	2.2	-3.4	4.5	4	clayy SILT to silty CLAY	115	2.0	20	25	-	-	3.4	9.9	38	0.070	15
24.44	46.6	40.8	129.2	1.6	-5.9	3.5	4	clayy SILT to silty CLAY	115	2.0	20	23	-	-	3.2	9.9	34	0.070	15
24.61	29.3	23.6	-	1.6	-5.2	5.6	3	silty CLAY to CLAY	115	1.5	16	20	-	-	2.0	9.9	52	0.005	15
24.77	37.0	29.8	-	1.7	-3.6	4.7	3	silty CLAY to CLAY	115	1.5	20	25	-	-	2.6	9.9	44	0.005	15
24.94	23.4	18.8	-	1.4	-4.2	6.4	3	silty CLAY to CLAY	115	1.5	13	16	-	-	1.6	9.6	59	0.005	15
25.10	18.8	15.0	-	0.9	-4.4	5.3	3	silty CLAY to CLAY	115	1.5	10	13	-	-	1.3	7.5	61	0.005	15
25.26	21.4	17.0	-	1.1	-4.3	5.5	3	silty CLAY to CLAY	115	1.5	11	14	-	-	1.5	8.6	58	0.005	15
25.43	28.5	22.6	-	1.2	-4.0	4.5	3	silty CLAY to CLAY	115	1.5	15	19	-	-	2.0	9.9	48	0.005	15
25.59	21.5	17.0	-	1.4	-4.9	7.0	3	silty CLAY to CLAY	115	1.5	11	14	-	-	1.5	8.5	63	0.005	15
25.76	20.5	16.2	-	1.3	-5.4	6.7	3	silty CLAY to CLAY	115	1.5	11	14	-	-	1.4	8.1	64	0.005	15
25.92	15.2	12.0	-	1.0	1.3	7.5	3	silty CLAY to CLAY	115	1.5	8	10	-	-	1.0	5.8	74	0.005	15
26.08	14.2	11.1	-	0.8	2.1	6.0	3	silty CLAY to CLAY	115	1.5	7	9	-	-	0.9	5.3	72	0.005	15
26.25	16.8	13.1	-	0.6	-0.5	4.0	3	silty CLAY to CLAY	115	1.5	9	11	-	-	1.1	6.4	59	0.005	15
26.41	14.9	11.6	-	0.7	-2.6	5.3	3	silty CLAY to CLAY	115	1.5	8	10	-	-	1.0	5.6	68	0.005	15
26.58	12.6	9.7	-	0.7	-2.7	6.1	3	silty CLAY to CLAY	115	1.5	6	8	-	-	0.8	4.5	76	0.005	15
26.74	12.6	9.7	-	0.5	-2.8	4.3	3	silty CLAY to CLAY	115	1.5	6	8	-	-	0.8	4.5	69	0.005	15
26.90	11.3	8.7	-	0.8	-2.8	7.9	3	silty CLAY to CLAY	115	1.5	6	8	-	-	0.7	4.0	85	0.005	15
27.07	21.4	16.4	-	1.4	-2.8	6.9	3	silty CLAY to CLAY	115	1.5	11	14	-	-	1.5	8.1	64	0.005	15
27.23	48.3	36.9	-	1.9	-3.2	4.2	4	clayy SILT to silty CLAY	115	2.0	18	24	-	-	3.4	9.9	38	0.070	15
27.40	29.9	22.8	-	2.0	-4.0	7.0	3	silty CLAY to CLAY	115	1.5	15	20	-	-	2.1	9.9	57	0.005	15
27.56	28.6	21.7	-	1.5	-4.4	5.7	3	silty CLAY to CLAY	115	1.5	14	19	-	-	2.0	9.9	54	0.005	15
27.72	18.3	13.9	-	1.0	-4.4	5.7	3	silty CLAY to CLAY	115	1.5	9	12	-	-	1.2	6.7	64	0.005	15
27.89	14.0	10.6	-	0.6	-4.3	5.1	3	silty CLAY to CLAY	115	1.5	7	9	-	-	0.9	4.9	69	0.005	15
28.05	14.0	10.5	-	0.6	-4.3	4.8	3	silty CLAY to CLAY	115	1.5	7	9	-	-	0.9	4.9	68	0.005	15
28.22	12.9	9.7	-	0.6	-4.2	5.3	3	silty CLAY to CLAY	115	1.5	6	9	-	-	0.9	4.4	73	0.005	15
28.38	11.0	8.2	-	0.5	-3.0	5.4	3	silty CLAY to CLAY	115	1.5	5	7	-	-	0.7	3.7	78	0.005	15
28.54	7.6	5.7	-	0.3	-3.0	5.0	3	silty CLAY to CLAY	115	1.5	4	5	-	-	0.5	2.3	91	0.005	15
28.71	6.3	4.7	-	0.2	-3.1	5.2	3	silty CLAY to CLAY	115	1.5	3	4	-	-	0.4	1.8	95	0.005	15
28.87	11.0	8.1	-	0.3	-3.2	3.5	3	silty CLAY to CLAY	115	1.5	5	7	-	-	0.7	3.6	71	0.005	15
29.04	13.5	9.9	-	0.5	-3.2	4.0	3	silty CLAY to CLAY	115	1.5	7	9	-	-	0.9	4.5	67	0.005	15
29.20	15.1	11.1	-	0.5	-3.2	3.9	3	silty CLAY to CLAY	115	1.5	7	10	-	-	1.0	5.1	63	0.005	15
29.36	15.5	11.4	-	0.6	-3.2	4.2	3	silty CLAY to CLAY	115	1.5	8	10	-	-	1.0	5.2	64	0.005	15
29.53	16.5	12.0	-	0.6	-3.2	4.3	3	silty CLAY to CLAY	115	1.5	8	11	-	-	1.1	5.6	63	0.005	15
29.69	17.2	12.5	-	0.7	-3.2	4.8	3	silty CLAY to CLAY	115	1.5	8	11	-	-	1.2	5.8	64	0.005	15
29.86	18.4	13.4	-	0.8	-2.8	4.9	3	silty CLAY to CLAY	115	1.5	9	12	-	-	1.2	6.2	63	0.005	15
30.02	19.9	14.4	-	0.9	-2.3	5.0	3	silty CLAY to CLAY	115	1.5	10	13	-	-	1.3	6.7	61	0.005	15
30.19	21.3	15.4	-	1.0	-2.5	5.1	3	silty CLAY to CLAY	115	1.5	10	14	-	-	1.4	7.2	60	0.005	15
30.35	21.7	15.6	-	1.0	-2.5	5.1	3	silty CLAY to CLAY	115	1.5	10	14	-	-	1.5	7.3	59	0.005	15
30.51	22.0	15.8	-	1.1	-2.4	5.4	3	silty CLAY to CLAY	115	1.5	11	15	-	-	1.5	7.4	60	0.005	15
30.68	22.7	16.2	-	1.1	-2.4	5.4	3	silty CLAY to CLAY	115	1.5	11	15	-	-	1.5	7.6	59	0.005	15
30.84	22.8	16.2	-	1.3	-2.3	6.0	3	silty CLAY to CLAY	115	1.5	11	15	-	-	1.5	7.6	61	0.005	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(468).cpt
CPT Date: 2/22/2010 8:54:46 AM
GW During Test: 19 ft

Sounding ID: CPT-01
Project No: 6169
Cone/Rig: DSG0786

Depth ft	qc PS tsf	* qc1n PS -	q1ncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR -	* Fin Ic %	* D50 mm	* Nk -
31.01	22.7	16.1	-	1.2	-2.4	5.7	3	silty CLAY to CLAY	115	1.5	11	15	-	-	1.5	7.5	61	0.005	15
31.17	23.7	16.8	-	1.3	-2.4	5.9	3	silty CLAY to CLAY	115	1.5	11	16	-	-	1.6	7.8	60	0.005	15
31.33	24.2	17.1	-	1.4	-2.4	6.1	3	silty CLAY to CLAY	115	1.5	11	16	-	-	1.6	8.0	61	0.005	15
31.50	24.4	17.2	-	1.4	-1.8	6.0	3	silty CLAY to CLAY	115	1.5	11	16	-	-	1.7	8.0	60	0.005	15
31.66	23.3	16.4	-	1.3	-1.7	6.1	3	silty CLAY to CLAY	115	1.5	11	16	-	-	1.6	7.6	62	0.005	15
31.83	22.2	15.5	-	1.3	-1.7	6.2	3	silty CLAY to CLAY	115	1.5	10	15	-	-	1.5	7.2	63	0.005	15
31.99	22.1	15.4	-	1.3	-1.7	6.3	3	silty CLAY to CLAY	115	1.5	10	15	-	-	1.5	7.1	64	0.005	15
32.15	21.8	15.2	-	1.3	-1.7	6.3	3	silty CLAY to CLAY	115	1.5	10	15	-	-	1.5	7.0	64	0.005	15
32.32	21.3	14.8	-	1.3	-1.7	6.5	3	silty CLAY to CLAY	115	1.5	10	14	-	-	1.4	6.7	65	0.005	15
32.48	21.0	14.5	-	1.3	-1.7	6.6	3	silty CLAY to CLAY	115	1.5	10	14	-	-	1.4	6.6	66	0.005	15
32.65	21.7	14.9	-	1.3	-1.6	6.5	3	silty CLAY to CLAY	115	1.5	10	14	-	-	1.5	6.8	65	0.005	15
32.81	20.8	14.3	-	1.3	-1.6	7.0	3	silty CLAY to CLAY	115	1.5	10	14	-	-	1.4	6.5	68	0.005	15
32.97	20.8	14.2	-	1.3	-1.6	6.8	3	silty CLAY to CLAY	115	1.5	9	14	-	-	1.4	6.4	67	0.005	15
33.14	21.3	14.6	-	1.2	-1.6	5.9	3	silty CLAY to CLAY	115	1.5	10	14	-	-	1.4	6.6	64	0.005	15
33.30	20.4	13.9	-	1.1	-1.6	5.9	3	silty CLAY to CLAY	115	1.5	9	14	-	-	1.4	6.3	65	0.005	15
33.47	21.0	14.3	-	1.1	-1.6	5.8	3	silty CLAY to CLAY	115	1.5	10	14	-	-	1.4	6.4	64	0.005	15
33.63	21.5	14.5	-	1.3	-1.6	6.5	3	silty CLAY to CLAY	115	1.5	10	14	-	-	1.4	6.5	66	0.005	15
33.79	21.2	14.3	-	1.3	-1.5	6.9	3	silty CLAY to CLAY	115	1.5	10	14	-	-	1.4	6.4	68	0.005	15
33.96	21.2	14.3	-	1.4	-1.6	7.4	3	silty CLAY to CLAY	115	1.5	10	14	-	-	1.4	6.4	69	0.005	15
34.12	21.4	14.4	-	1.8	-1.6	9.0	3	silty CLAY to CLAY	115	1.5	10	14	-	-	1.4	6.4	73	0.005	15
34.29	26.2	17.5	-	1.7	-1.7	7.0	3	silty CLAY to CLAY	115	1.5	12	17	-	-	1.8	8.0	63	0.005	15
34.45	18.2	12.1	-	1.6	-1.9	10.0	3	silty CLAY to CLAY	115	1.5	8	12	-	-	1.2	5.3	81	0.005	15
34.61	19.3	12.9	-	1.1	-2.0	6.5	3	silty CLAY to CLAY	115	1.5	9	13	-	-	1.3	5.7	69	0.005	15
34.78	15.0	9.9	-	1.1	-2.1	8.6	3	silty CLAY to CLAY	115	1.5	7	10	-	-	1.0	4.2	83	0.005	15
34.94	15.3	10.1	-	1.0	-1.8	7.8	3	silty CLAY to CLAY	115	1.5	7	10	-	-	1.0	4.3	80	0.005	15
35.11	14.6	9.6	-	1.0	-1.8	8.0	3	silty CLAY to CLAY	115	1.5	6	10	-	-	1.0	4.1	83	0.005	15
35.27	13.1	8.6	-	0.9	-1.7	7.9	3	silty CLAY to CLAY	115	1.5	6	9	-	-	0.9	3.6	86	0.005	15
35.43	12.5	8.2	-	0.9	-1.7	8.3	3	silty CLAY to CLAY	115	1.5	5	8	-	-	0.8	3.3	89	0.005	15
35.60	15.6	10.2	-	1.0	-1.7	7.4	3	silty CLAY to CLAY	115	1.5	7	10	-	-	1.0	4.3	79	0.005	15
35.76	19.0	12.4	-	1.2	-1.7	6.8	3	silty CLAY to CLAY	115	1.5	8	13	-	-	1.3	5.4	71	0.005	15
35.93	18.3	11.9	-	1.3	-1.9	8.2	3	silty CLAY to CLAY	115	1.5	8	12	-	-	1.2	5.1	77	0.005	15
36.09	20.0	13.0	-	1.4	-2.0	7.8	3	silty CLAY to CLAY	115	1.5	9	13	-	-	1.3	5.6	73	0.005	15
36.26	22.7	14.7	-	1.6	-2.2	7.7	3	silty CLAY to CLAY	115	1.5	10	15	-	-	1.5	6.5	69	0.005	15
36.42	28.4	18.3	-	1.8	-2.4	7.0	3	silty CLAY to CLAY	115	1.5	12	19	-	-	1.9	8.2	62	0.005	15
36.58	29.5	18.9	-	2.1	-2.6	7.5	3	silty CLAY to CLAY	115	1.5	13	20	-	-	2.0	8.5	62	0.005	15
36.75	32.5	20.8	-	2.1	-2.9	7.0	3	silty CLAY to CLAY	115	1.5	14	22	-	-	2.2	9.4	59	0.005	15
36.91	39.0	25.0	-	2.4	-3.7	6.4	3	silty CLAY to CLAY	115	1.5	17	26	-	-	2.7	9.9	53	0.005	15
37.08	40.2	25.6	-	2.7	-5.1	7.0	3	silty CLAY to CLAY	115	1.5	17	27	-	-	2.8	9.9	54	0.005	15
37.24	40.4	25.7	-	2.9	-5.6	7.7	3	silty CLAY to CLAY	115	1.5	17	27	-	-	2.8	9.9	56	0.005	15
37.40	48.0	30.4	-	3.0	-5.6	6.5	3	silty CLAY to CLAY	115	1.5	20	32	-	-	3.3	9.9	49	0.005	15
37.57	50.5	32.0	-	3.4	-6.4	7.1	3	silty CLAY to CLAY	115	1.5	21	34	-	-	3.5	9.9	50	0.005	15
37.73	56.5	35.7	-	3.5	-6.8	6.5	3	silty CLAY to CLAY	115	1.5	24	38	-	-	3.9	9.9	46	0.005	15
37.90	54.3	34.2	-	3.8	-7.0	7.4	3	silty CLAY to CLAY	115	1.5	23	36	-	-	3.8	9.9	49	0.005	15
38.06	58.1	36.5	-	3.0	-7.3	5.3	3	silty CLAY to CLAY	115	1.5	24	39	-	-	4.0	9.9	42	0.005	15
38.22	53.6	33.6	-	3.6	-7.8	7.1	3	silty CLAY to CLAY	115	1.5	22	36	-	-	3.7	9.9	49	0.005	15
38.39	58.9	36.8	-	4.2	-6.5	7.5	3	silty CLAY to CLAY	115	1.5	25	39	-	-	4.1	9.9	48	0.005	15
38.55	63.4	39.5	-	3.7	-6.9	6.1	3	silty CLAY to CLAY	115	1.5	26	42	-	-	4.4	9.9	43	0.005	15
38.72	59.6	37.0	-	4.1	-7.1	7.2	3	silty CLAY to CLAY	115	1.5	25	40	-	-	4.1	9.9	48	0.005	15
38.88	67.9	42.0	-	4.7	-7.4	7.2	3	silty CLAY to CLAY	115	1.5	28	45	-	-	4.7	9.9	45	0.005	15
39.04	75.6	46.7	-	5.2	-7.5	7.1	3	silty CLAY to CLAY	115	1.5	31	50	-	-	5.3	9.9	43	0.005	15
39.21	70.0	43.1	-	5.1	-7.6	7.6	3	silty CLAY to CLAY	115	1.5	29	47	-	-	4.9	9.9	46	0.005	15
39.37	63.2	38.8	-	4.6	-7.7	7.6	3	silty CLAY to CLAY	115	1.5	26	42	-	-	4.4	9.9	48	0.005	15
39.54	61.2	37.5	-	4.2	-7.7	7.0	3	silty CLAY to CLAY	115	1.5	25	41	-	-	4.2	9.9	47	0.005	15
39.70	51.1	31.2	-	3.6	-7.8	7.4	3	silty CLAY to CLAY	115	1.5	21	34	-	-	3.5	9.9	51	0.005	15
39.86	40.9	24.9	-	3.2	-7.8	8.4	3	silty CLAY to CLAY	115	1.5	17	27	-	-	2.8	9.9	58	0.005	15
40.03	34.6	21.0	-	2.8	-8.2	8.8	3	silty CLAY to CLAY	115	1.5	14	23	-	-	2.4	9.2	63	0.005	15
40.19	27.1	16.4	-	2.3	-8.5	9.1	3	silty CLAY to CLAY	115	1.5	11	18	-	-	1.8	7.1	70	0.005	15
40.36	19.5	11.8	-	1.7	-8.5	9.9	3	silty CLAY to CLAY	115	1.5	8	13	-	-	1.3	4.9	82	0.005	15
40.52	15.2	9.2	-	1.8	-8.6	9.9	3	silty CLAY to CLAY	115	1.5	6	10	-	-	1.0	3.6	90	0.005	15
40.68	15.7	9.4	-	2.3	-8.6	9.9	3	silty CLAY to CLAY	115	1.5	6	10	-	-	1.0	3.8	89	0.005	15
40.85	37.4	22.5	-	2.6	-8.7	7.3	3	silty CLAY to CLAY	115	1.5	15	25	-	-	2.6	9.8	58	0.005	15
41.01	49.7	29.8	-	2.5	-8.7	5.3	3	silty CLAY to CLAY	115	1.5	20	33	-	-	3.4	9.9	46	0.005	15
41.18	60.7	36.2	-	3.4	-8.8	5.8	3	silty CLAY to CLAY	115	1.5	24	40	-	-	4.2	9.9	44	0.005	15
41.34	82.4	49.1	-	4.5	-8.5	5.6	3	silty CLAY to CLAY	115	1.5	33	55	-	-	5.7	9.9	38	0.005	15
41.50	72.4	43.0	-	4.9	-8.7	7.0	3	silty CLAY to CLAY	115	1.5	29	48	-	-	5.0	9.9	44	0.005	15
41.67	69.4	41.1	-	5.0	-8.6	7.5	3	silty CLAY to CLAY	115	1.5	27	46	-	-	4.8	9.9	47	0.005	15
41.83	68.3	40.4	-	5.0	-8.6	7.6	3	silty CLAY to CLAY	115	1.5	27	46	-	-	4.7	9.9	47	0.005	15
42.00	67.5	39.8	-	4.8	-8.5	7.4	3	silty CLAY to CLAY	115	1.5	27	45	-	-	4.7	9.9	47	0.005	15
42.16	71.0	41.7	-	5.5	-8.5	8.0	3	silty CLAY to CLAY	115	1.5	28	47	-	-	4.9	9.9	48	0.005	15
42.32	88.5	51.9	-	5.6	-8.5	6.5	3	silty CLAY to CLAY	115	1.5	35	59	-	-	6.2	9.9	40	0.005	15
42.49	67.0	39.2	-	5.5	-8.4	8.5	3	silty CLAY to CLAY	115	1.5	26	45	-	-	4.6	9.9	50	0.005	15
42.65	59.9	34.9	-	4.4	-8.4	7.6	3	silty CLAY to CLAY	115	1.5	23	40	-	-	4.1	9.9	50	0.005	15
42.82	58.6	34.1	-	4.2	-8.3	7.5	3	silty CLAY to CLAY	115	1.5	23	39	-	-	4.1	9.9	50	0.005	15
42.98	81.5	47.3	-	5.4	-8.3	6.9	3	silty CLAY to CLAY	115	1.5	32	54	-	-	5.7	9.9	43	0.005	15
43.15	101.1	58.5	-	6.4	-8.3	6.5	3	silty CLAY to CLAY	115	1.5	39	67	-	-	7.1	9.9	38	0.005	15
43.31	93.5	54.0	-	6.6	-8.3	7.2	3	silty CLAY to CLAY	115	1.5	36	62	-	-	6.5	9.9	41	0.005	15
43.47	93.8	54.0	-	6.9	-8.3	7.5	3	silty CLAY to CLAY	115	1.5	36	63	-	-	6.5	9.9	42	0.005	15
43.64	90.7	52.1	-	6.8	-8.1	7.7	3	silty CLAY to CLAY	115	1.5	35	60	-	-	6.3	9.9	43	0.005	15
43.80	91.4	52.4	-	6.6	-8.1	7.4	3	silty CLAY to CLAY	115	1.5	35	61	-	-	6.4	9.9	42	0.005	15
43.97	94.6	54.1	-	6.8	-7.9	7.4	3	silty CLAY to CLAY	115	1.5	36	63	-	-	6.6	9.9	42	0.005	15
44.13	88.9	50.7	-	6.7	-8.1	7.7	3	silty CLAY to CLAY	115	1.5	34	59	-	-	6.2	9.9	44	0.005	15
44.29	88.7	50.4	-	5.6	-8.1	6.5	3	silty CLAY to CLAY	115	1.5	34	59	-	-	6.2	9.9	40	0.005	15
44.46	77.6	44.0	-	4.2	-8.0	5.6	3	silty CLAY to CLAY	115	1.5	29	52	-	-	5.4	9.9	40	0.005	15
44.62	76.6	43.4	-	3.7	-8.1	5.0	4	clayy SILT to silty CLAY	115	2.0	22	38	-	-	5.3	9.9	38	0.070	15
44.79	87.8	64.1	180.6	3.8	-8.2	4.4	4	clayy SILT to silty CLAY	115	2.0	32	44	-	-	6.1	9.9	31	0.070	15
44.95	123.7	90.2	148.2	2.7	-8.2	2.3	5	silty SAND to sandy SILT	120	4.0	23	31	64	40	-	-	19	0.200	16
45.11	97.4	70.9	112.8	1.5	-8.0	1.6	5	silty SAND to sandy SILT	120	4.0	18	24	56	39	-	-	18	0.200	16
45.28	168.1	122.2	162.4	2.9	-8.1	1.8	5	silty SAND to sandy SILT	120	4.0	31	42	74	42	-	-	14	0.200	16
45.44	135.8	98.6	177.6	3.9	8.1	3.0	5	silty SAND to sandy SILT	120	4.0	25	34	67	41	-	-	21	0.200	16
45.61	73.5	41.0	-	3.4	8.6	4.8	4	clayy SILT to silty CLAY	115	2.0	20	37	-	-	5.1	9.9	39	0.070	15
45.77	56.3	31.3	-	3.0	-5.3	5.6	3	silty CLAY to CLAY	115	1.5	21	38	-	-	3.9	9.9	46	0.005	15
45.93	47.6	26.4	-	3.1	-6.0	6.8	3	silty CLAY to CLAY	115	1.5	18	32	-	-	3.3	9.9	53	0.005	15
46.10	47.1	26.1	-	3.3	-5.8	7.5	3	silty CLAY to CLAY	115	1.5	17	31	-	-	3.2	9.9	55	0.005	15
46.26	53.5	29.5	-	3.5	-4.8	7.0	3	silty CLAY to CLAY	115	1.5	20	36	-	-	3.7	9.9	51	0.005	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(468).cpt
CPT Date: 2/22/2010 8:54:46 AM
GW During Test: 19 ft

Sounding ID: CPT-01
Project No: 6169
Cone/Rig: DSG0786

Depth ft	qc PS tsf	* qc1n PS -	q1ncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
46.43	44.7	24.6	-	3.1	-5.0	7.5	3	silty CLAY to CLAY	115	1.5	16	30	-	-	3.1	9.9	56	0.005	15
46.59	49.2	27.0	-	2.9	-4.9	6.2	3	silty CLAY to CLAY	115	1.5	18	33	-	-	3.4	9.9	51	0.005	15
46.75	47.2	25.9	-	3.2	-4.6	7.1	3	silty CLAY to CLAY	115	1.5	17	31	-	-	3.2	9.9	54	0.005	15
46.92	54.1	29.6	-	3.4	-5.0	6.7	3	silty CLAY to CLAY	115	1.5	20	36	-	-	3.7	9.9	50	0.005	15
47.08	55.0	30.0	-	3.9	-4.8	7.4	3	silty CLAY to CLAY	115	1.5	20	37	-	-	3.8	9.9	52	0.005	15
47.25	72.7	39.6	-	4.7	-5.1	6.8	3	silty CLAY to CLAY	115	1.5	26	48	-	-	5.0	9.9	45	0.005	15
47.41	74.5	40.5	-	4.7	-5.4	6.5	3	silty CLAY to CLAY	115	1.5	27	50	-	-	5.2	9.9	44	0.005	15
47.57	76.4	41.4	-	4.0	-5.4	5.5	3	silty CLAY to CLAY	115	1.5	28	51	-	-	5.3	9.9	41	0.005	15
47.74	64.8	35.1	-	3.6	-5.6	5.8	3	silty CLAY to CLAY	115	1.5	23	43	-	-	4.5	9.9	45	0.005	15
47.90	59.3	32.0	-	3.4	-5.7	6.0	3	silty CLAY to CLAY	115	1.5	21	40	-	-	4.1	9.9	47	0.005	15
48.07	57.3	30.8	-	3.6	-5.6	6.6	3	silty CLAY to CLAY	115	1.5	21	38	-	-	4.0	9.9	49	0.005	15
48.23	59.6	32.0	-	3.8	-5.5	6.7	3	silty CLAY to CLAY	115	1.5	21	40	-	-	4.1	9.9	49	0.005	15
48.39	57.9	31.0	-	3.9	-5.4	7.1	3	silty CLAY to CLAY	115	1.5	21	39	-	-	4.0	9.9	51	0.005	15
48.56	71.3	38.1	-	4.1	-5.3	6.0	3	silty CLAY to CLAY	115	1.5	25	48	-	-	4.9	9.9	44	0.005	15
48.72	76.8	40.9	-	3.9	-5.4	5.3	3	silty CLAY to CLAY	115	1.5	27	51	-	-	5.3	9.9	40	0.005	15
48.89	56.9	30.2	-	3.5	-5.2	6.6	3	silty CLAY to CLAY	115	1.5	20	38	-	-	3.9	9.9	50	0.005	15
49.05	51.2	27.2	-	2.8	-5.1	5.8	3	silty CLAY to CLAY	115	1.5	18	34	-	-	3.5	9.9	50	0.005	15
49.22	49.8	26.4	-	2.7	-5.2	5.8	3	silty CLAY to CLAY	115	1.5	18	33	-	-	3.4	9.9	50	0.005	15
49.38	49.5	26.2	-	2.9	-5.1	6.2	3	silty CLAY to CLAY	115	1.5	17	33	-	-	3.4	9.9	52	0.005	15
49.54	48.1	25.4	-	2.7	-2.3	6.0	3	silty CLAY to CLAY	115	1.5	17	32	-	-	3.3	9.9	52	0.005	15
49.71	43.6	22.9	-	2.3	-2.1	5.6	3	silty CLAY to CLAY	115	1.5	15	29	-	-	3.0	9.5	52	0.005	15
49.87	48.6	25.5	-	2.5	-2.2	5.5	3	silty CLAY to CLAY	115	1.5	17	32	-	-	3.3	9.9	50	0.005	15
50.04	55.1	28.9	-	3.1	-2.0	5.9	3	silty CLAY to CLAY	115	1.5	19	37	-	-	3.8	9.9	49	0.005	15
50.20	59.7	31.2	-	3.9	-1.8	6.9	3	silty CLAY to CLAY	115	1.5	21	40	-	-	4.1	9.9	50	0.005	15
50.36	76.5	39.9	-	3.6	-1.6	4.9	3	silty CLAY to CLAY	115	1.5	27	51	-	-	5.3	9.9	40	0.005	15
50.53	67.9	35.3	-	3.4	-1.4	5.2	3	silty CLAY to CLAY	115	1.5	24	45	-	-	4.7	9.9	43	0.005	15
50.69	66.2	34.3	-	3.4	-1.2	5.4	3	silty CLAY to CLAY	115	1.5	23	44	-	-	4.6	9.9	44	0.005	15
50.86	68.8	35.6	-	3.8	-1.2	5.7	3	silty CLAY to CLAY	115	1.5	24	46	-	-	4.8	9.9	44	0.005	15
51.02	72.2	37.3	-	3.9	-1.4	5.6	3	silty CLAY to CLAY	115	1.5	25	48	-	-	5.0	9.9	43	0.005	15
51.18	63.5	32.7	-	3.6	-1.6	5.9	3	silty CLAY to CLAY	115	1.5	22	42	-	-	4.4	9.9	46	0.005	15
51.35	74.2	38.1	-	4.6	-1.6	6.4	3	silty CLAY to CLAY	115	1.5	25	49	-	-	5.1	9.9	45	0.005	15
51.51	85.5	43.9	-	4.8	0.0	5.9	3	silty CLAY to CLAY	115	1.5	29	57	-	-	5.9	9.9	41	0.005	15
51.68	82.4	42.2	-	4.1	-0.1	5.2	3	silty CLAY to CLAY	115	1.5	28	55	-	-	5.7	9.9	40	0.005	15
51.84	92.2	47.1	-	6.1	-0.1	6.9	3	silty CLAY to CLAY	115	1.5	31	61	-	-	6.4	9.9	43	0.005	15
52.00	134.1	68.4	-	9.4	0.1	7.2	9	very stiff fine SOIL	120	2.0	34	67	54	40	-	-	38	0.250	30
52.17	189.1	130.9	322.6	11.8	-2.3	6.3	9	very stiff fine SOIL	120	2.0	65	95	76	42	-	-	28	0.250	30

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

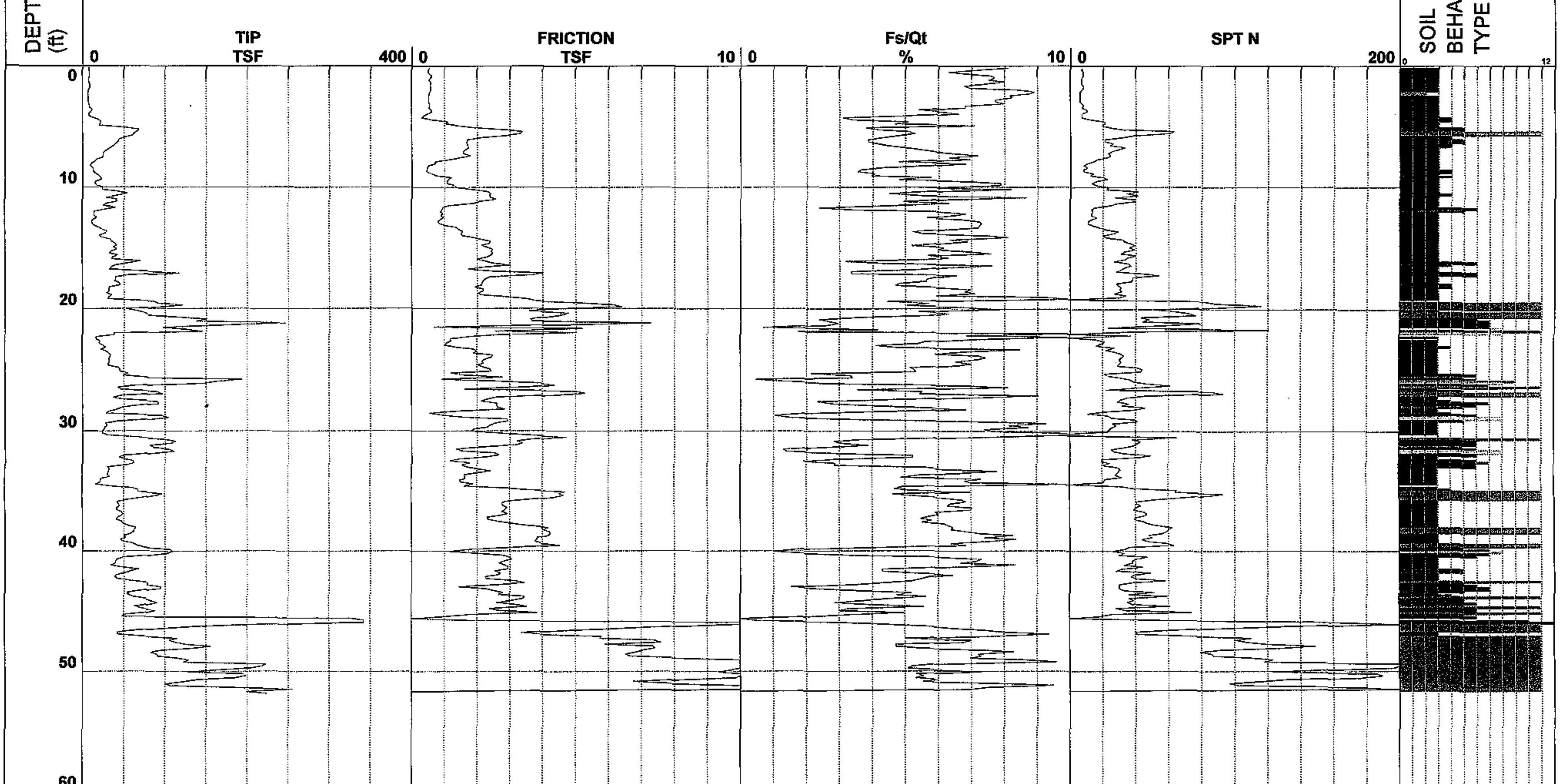
Middle Earth Geo Testing

Associated Soils Engineering

Project	Big Canyon Country Club	Operator	BH-AH	Filename	SDF(473).cpt
Job Number	6169	Cone Number	DSG1104	GPS	
Hole Number	CPT-02	Date and Time	2/22/2010 10:58:14 AM	Maximum Depth	51.84 ft
Water Table Depth	18.00 ft				

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained	4 - silty clay to clay	7 - silty sand to sandy silt	10 - gravelly sand to sand
2 - organic material	5 - clayey silt to silty clay	8 - sand to silty sand	11 - very stiff fine grained (*)
3 - clay	6 - sandy silt to clayey silt	9 - sand	12 - sand to clayey sand (*)

Cone Size 10cm squared

*Soil behavior type and SPT based on data from UBC-1983

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(473).cpt
CPT Date: 2/22/2010 10:58:14 AM
GW During Test: 18 ft

Sounding ID: CPT-02
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qc1n PS -	q1ncs PS -	Slv Stss tsf	pore prss (psi)	Frct Ratio %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
0.33	7.0	11.3	-	0.5	0.0	7.3	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.5	9.9	72	0.005	15
0.49	8.1	13.0	-	0.5	0.0	6.3	3	silty CLAY to CLAY	115	1.5	9	5	-	-	0.6	9.9	66	0.005	15
0.66	7.9	12.7	-	0.6	0.0	7.0	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.6	9.9	69	0.005	15
0.82	8.2	13.2	-	0.6	0.0	7.7	3	silty CLAY to CLAY	115	1.5	9	5	-	-	0.6	9.9	70	0.005	15
0.98	7.4	11.9	-	0.6	0.0	7.8	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.5	9.9	73	0.005	15
1.15	6.8	10.9	-	0.5	0.0	7.6	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.5	9.9	74	0.005	15
1.31	7.3	11.8	-	0.6	0.0	8.1	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.5	9.9	74	0.005	15
1.48	7.7	12.4	-	0.6	0.0	7.5	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.5	9.9	71	0.005	15
1.64	8.4	13.4	-	0.6	0.0	6.9	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.6	9.9	67	0.005	15
1.80	8.4	13.5	-	0.6	0.0	7.0	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.6	9.9	67	0.005	15
1.97	7.0	11.2	-	0.6	0.0	8.5	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.5	9.9	76	0.005	15
2.13	6.2	10.0	-	0.6	0.0	9.1	3	silty CLAY to CLAY	115	1.5	7	4	-	-	0.4	9.9	81	0.005	15
2.30	6.0	9.7	-	0.5	0.0	9.0	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.4	9.9	82	0.005	15
2.46	6.4	10.3	-	0.5	0.0	8.4	3	silty CLAY to CLAY	115	1.5	7	4	-	-	0.4	9.9	78	0.005	15
2.62	6.3	10.1	-	0.5	0.0	8.4	3	silty CLAY to CLAY	115	1.5	7	4	-	-	0.4	9.9	79	0.005	15
2.79	6.8	10.9	-	0.5	0.0	7.9	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.5	9.9	76	0.005	15
2.95	6.6	10.6	-	0.5	0.0	7.9	3	silty CLAY to CLAY	115	1.5	7	4	-	-	0.5	9.9	76	0.005	15
3.12	6.8	10.9	-	0.5	0.0	8.2	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.5	9.9	77	0.005	15
3.28	8.0	12.8	-	0.5	0.0	7.0	3	silty CLAY to CLAY	115	1.5	9	5	-	-	0.6	9.9	69	0.005	15
3.45	7.7	12.3	-	0.5	0.0	7.0	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.5	9.9	70	0.005	15
3.61	10.9	17.5	-	0.6	0.0	5.5	3	silty CLAY to CLAY	115	1.5	12	7	-	-	0.8	9.9	57	0.005	15
3.77	9.9	15.9	-	0.6	0.0	6.3	3	silty CLAY to CLAY	115	1.5	11	7	-	-	0.7	9.9	61	0.005	15
3.94	7.4	11.9	-	0.5	0.0	6.8	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.5	9.9	70	0.005	15
4.10	7.2	11.6	-	0.4	0.0	5.2	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.5	9.9	65	0.005	15
4.27	10.2	16.4	-	0.3	0.0	3.2	3	silty CLAY to CLAY	115	1.5	11	7	-	-	0.7	9.9	49	0.005	15
4.43	18.1	29.0	-	0.6	0.0	3.5	4	clayy SILT to silty CLAY	115	2.0	15	9	-	-	1.3	9.9	39	0.070	15
4.59	21.7	34.7	-	1.1	0.0	5.2	3	silty CLAY to CLAY	115	1.5	23	14	-	-	1.5	9.9	42	0.005	15
4.76	21.7	34.9	-	1.0	0.0	4.7	3	silty CLAY to CLAY	115	1.5	23	14	-	-	1.5	9.9	41	0.005	15
4.92	19.8	31.8	-	1.4	0.0	7.2	3	silty CLAY to CLAY	115	1.5	21	13	-	-	1.4	9.9	50	0.005	15
5.09	49.4	79.3	181.5	1.9	0.0	3.8	4	clayy SILT to silty CLAY	115	2.0	40	25	-	-	3.5	9.9	26	0.070	15
5.25	67.5	108.3	225.5	2.8	0.0	4.2	9	very stiff fine SOIL	120	2.0	54	34	70	46	-	-	24	0.250	30
5.41	66.0	105.9	250.0	3.4	0.0	5.1	9	very stiff fine SOIL	120	2.0	53	33	69	46	-	-	27	0.250	30
5.58	62.2	99.7	248.3	3.3	0.0	5.3	9	very stiff fine SOIL	120	2.0	50	31	67	45	-	-	28	0.250	30
5.74	60.1	96.5	228.3	2.9	0.0	4.8	9	very stiff fine SOIL	120	2.0	48	30	66	45	-	-	27	0.250	30
5.91	49.9	80.1	196.2	2.2	0.0	4.3	4	clayy SILT to silty CLAY	115	2.0	40	25	-	-	3.5	9.9	28	0.070	15
6.07	43.8	70.3	172.7	1.7	0.0	3.9	4	clayy SILT to silty CLAY	115	2.0	35	22	-	-	3.1	9.9	28	0.070	15
6.23	43.1	69.1	171.8	1.7	0.0	3.9	4	clayy SILT to silty CLAY	115	2.0	35	22	-	-	3.0	9.9	28	0.070	15
6.40	40.5	64.6	173.1	1.7	0.0	4.2	4	clayy SILT to silty CLAY	115	2.0	32	20	-	-	2.8	9.9	30	0.070	15
6.56	37.9	59.8	174.8	1.7	0.0	4.5	4	clayy SILT to silty CLAY	115	2.0	30	19	-	-	2.7	9.9	32	0.070	15
6.73	34.7	54.1	178.4	1.7	0.0	5.1	4	clayy SILT to silty CLAY	115	2.0	27	17	-	-	2.4	9.9	35	0.070	15
6.89	29.9	48.0	-	1.6	0.0	5.5	3	silty CLAY to CLAY	115	1.5	32	20	-	-	2.1	9.9	38	0.005	15
7.05	26.5	42.6	-	1.6	0.0	6.0	3	silty CLAY to CLAY	115	1.5	28	18	-	-	1.9	9.9	42	0.005	15
7.22	24.3	39.0	-	1.6	0.0	6.6	3	silty CLAY to CLAY	115	1.5	26	16	-	-	1.7	9.9	45	0.005	15
7.38	24.8	39.8	-	1.8	0.0	7.3	3	silty CLAY to CLAY	115	1.5	27	17	-	-	1.7	9.9	46	0.005	15
7.55	23.6	37.9	-	1.5	0.0	6.4	3	silty CLAY to CLAY	115	1.5	25	16	-	-	1.6	9.9	45	0.005	15
7.71	16.5	26.4	-	1.1	0.0	7.1	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.1	9.9	53	0.005	15
7.87	14.7	23.5	-	0.7	0.0	5.0	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.0	9.9	49	0.005	15
8.04	10.3	16.6	-	0.7	0.0	7.2	3	silty CLAY to CLAY	115	1.5	11	7	-	-	0.7	9.9	64	0.005	15
8.20	8.7	13.9	-	0.5	0.0	6.2	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.6	8.6	65	0.005	15
8.37	10.9	17.5	-	0.5	0.0	4.5	3	silty CLAY to CLAY	115	1.5	12	7	-	-	0.7	9.9	54	0.005	15
8.53	12.6	20.2	-	0.5	0.0	3.8	3	silty CLAY to CLAY	115	1.5	13	8	-	-	0.9	9.9	48	0.005	15
8.69	12.5	20.0	-	0.4	0.0	3.7	3	silty CLAY to CLAY	115	1.5	13	8	-	-	0.9	9.9	47	0.005	15
8.86	14.5	23.3	-	0.6	0.0	4.2	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.0	9.9	47	0.005	15
9.02	18.6	29.8	-	0.7	0.0	4.1	4	clayy SILT to silty CLAY	115	2.0	15	9	-	-	1.3	9.9	41	0.070	15
9.19	20.9	33.4	-	1.2	0.0	5.9	3	silty CLAY to CLAY	115	1.5	22	14	-	-	1.4	9.9	46	0.005	15
9.35	23.1	37.1	-	1.1	0.0	4.9	3	silty CLAY to CLAY	115	1.5	25	15	-	-	1.6	9.9	41	0.005	15
9.51	15.5	24.9	-	1.1	0.0	7.2	3	silty CLAY to CLAY	115	1.5	17	10	-	-	1.1	9.9	55	0.005	15
9.68	13.5	21.7	-	1.1	0.0	8.2	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	61	0.005	15
9.84	16.8	26.9	-	1.3	0.0	8.1	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	56	0.005	15
10.01	23.7	38.0	-	1.3	0.0	5.8	3	silty CLAY to CLAY	115	1.5	25	16	-	-	1.7	9.9	43	0.005	15
10.17	23.0	36.9	-	1.9	0.0	8.4	3	silty CLAY to CLAY	115	1.5	25	15	-	-	1.6	9.9	50	0.005	15
10.34	42.4	59.9	197.5	2.3	0.0	5.5	4	clayy SILT to silty CLAY	115	2.0	30	21	-	-	3.0	9.9	35	0.070	15
10.50	53.1	66.3	184.4	2.4	0.0	4.6	4	clayy SILT to silty CLAY	115	2.0	33	27	-	-	3.7	9.9	31	0.070	15
10.66	43.1	59.5	197.7	2.4	0.0	5.6	4	clayy SILT to silty CLAY	115	2.0	30	22	-	-	3.0	9.9	35	0.070	15
10.83	27.7	44.3	-	2.4	0.0	8.9	3	silty CLAY to CLAY	115	1.5	30	18	-	-	1.9	9.9	48	0.005	15
10.99	40.9	64.5	-	2.6	0.0	6.4	9	very stiff fine SOIL	120	2.0	32	20	53	41	-	-	36	0.250	30
11.16	42.1	56.3	181.5	2.1	0.0	5.0	4	clayy SILT to silty CLAY	115	2.0	28	21	-	-	2.9	9.9	35	0.070	15
11.32	29.8	45.6	-	1.9	0.0	6.5	3	silty CLAY to CLAY	115	1.5	30	20	-	-	2.1	9.9	42	0.005	15
11.48	25.3	38.1	-	1.1	0.0	4.7	4	clayy SILT to silty CLAY	115	2.0	19	13	-	-	1.8	9.9	39	0.070	15
11.65	40.2	47.7	112.6	1.0	0.0	2.4	5	silty SAND to sandy SILT	120	4.0	12	10	43	40	-	-	27	0.200	16
11.81	27.4	35.2	-	0.9	0.0	3.5	4	clayy SILT to silty CLAY	115	2.0	18	14	-	-	1.9	9.9	36	0.070	15
11.98	14.5	20.9	-	0.9	0.0	6.4	3	silty CLAY to CLAY	115	1.5	14	10	-	-	1.0	9.9	56	0.005	15
12.14	13.9	19.9	-	1.0	0.0	7.2	3	silty CLAY to CLAY	115	1.5	13	9	-	-	1.0	9.9	60	0.005	15
12.30	14.0	19.7	-	0.9	0.0	6.8	3	silty CLAY to CLAY	115	1.5	13	9	-	-	1.0	9.9	59	0.005	15
12.47	17.1	23.8	-	1.0	0.0	5.9	3	silty CLAY to CLAY	115	1.5	16	11	-	-	1.2	9.9	52	0.005	15
12.63	13.1	18.0	-	0.9	0.0	7.1	3	silty CLAY to CLAY	115	1.5	12	9	-	-	0.9	9.5	62	0.005	15
12.80	11.1	15.0	-	0.8	0.0	7.8	3	silty CLAY to CLAY	115	1.5	10	7	-	-	0.8	7.8	68	0.005	15
12.96	11.5	15.4	-	0.8	0.0	7.8	3	silty CLAY to CLAY	115	1.5	10	8	-	-	0.8	8.0	68	0.005	15
13.12	14.3	18.8	-	1.0	0.0	7.6	3	silty CLAY to CLAY	115	1.5	13	10	-	-	1.0	9.9	62	0.005	15
13.29	19.1	24.9	-	1.4	0.0	7.5	3	silty CLAY to CLAY	115	1.5	17	13	-	-	1.3	9.9	56	0.005	15
13.45	22.9	29.5	-	1.4	0.0	6.4	3	silty CLAY to CLAY	115	1.5	20	15	-	-	1.6	9.9	49	0.005	15
13.62	29.9	38.0	-	1.6	0.0	5.4	3	silty CLAY to CLAY	115	1.5	25	20	-	-	2.1	9.9	42	0.005	15
13.78	27.0	34.0	-	1.5	0.0	5.7	3	silty CLAY to CLAY	115	1.5	23	18	-	-	1.9	9.9	45	0.005	15
13.94	20.5	25.5	-	1.5	0.0	7.8	3	silty CLAY to CLAY	115	1.5	17	14	-	-	1.4	9.9	56	0.005	15
14.11	22.6	27.8	-	1.8	0.0	8.4	3	silty CLAY to CLAY	115	1.5	19	15	-	-	1.6	9.9	56	0.005	15
14.27	33.3	40.5	-	2.1	0.0	6.5	3	silty CLAY to CLAY	115	1.5	27	22	-	-	2.3	9.9	44	0.005	15
14.44	34.9	41.9	-	2.4	0.0	7.0	3	silty CLAY to CLAY	115	1.5	28	23	-	-	2.4	9.9	45	0.005	15
14.60	39.0	46.4	-	2.4	0.0	6.2	3	silty CLAY to CLAY	115	1.5	31	26	-	-	2.7	9.9	41	0.005	15
14.76	41.1	48.3	-	2.1	0.0	5.3	3	silty CLAY to CLAY	115	1.5	32	27	-	-	2.9	9.9	38	0.005	15
14.93	37.3	43.3	-	2.3	0.0	6.3	3	silty CLAY to CLAY	115	1.5	29	25	-	-	2.6	9.9	42	0.005	15
15.09	41.1	47.2	-	2.5	0.0	6.1	3	silty CLAY to CLAY	115	1.5	31	27	-	-	2.9	9.9	40	0.005	15
15.26	34.7	39.5	-	2.4	0.0	7.1	3	silty CLAY to CLAY	115	1.5	26	23	-	-	2.4	9.9	46	0.005	15
15.42	32.5	36.5	-	2.5	0.0	7.8	3	silty CLAY to CLAY	115	1.5	24	22	-	-	2.3	9.9	49	0.005	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(473).cpt
CPT Date: 2/22/2010 10:58:14 AM
GW During Test: 18 ft

Page: 2
Sounding ID: CPT-02
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qc1n PS -	q1ncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
15.58	42.2	47.0	-	2.4	0.0	5.8	3	silty CLAY to CLAY	115	1.5	31	28	-	-	2.9	9.9	40	0.005	15
15.75	36.2	39.9	-	2.3	0.0	6.5	3	silty CLAY to CLAY	115	1.5	27	24	-	-	2.5	9.9	44	0.005	15
15.91	34.9	38.0	-	2.0	0.0	5.9	3	silty CLAY to CLAY	115	1.5	25	23	-	-	2.4	9.9	43	0.005	15
16.08	70.3	71.0	156.5	2.2	0.0	3.2	4	clayy SILT to silty CLAY	115	2.0	35	35	-	-	4.9	9.9	25	0.070	15
16.24	55.1	55.3	169.9	2.5	0.0	4.6	4	clayy SILT to silty CLAY	115	2.0	28	28	-	-	3.9	9.9	33	0.070	15
16.40	38.8	41.1	-	3.0	0.0	7.8	3	silty CLAY to CLAY	115	1.5	27	26	-	-	2.7	9.9	47	0.005	15
16.57	34.5	36.1	-	2.2	0.0	6.4	3	silty CLAY to CLAY	115	1.5	24	23	-	-	2.4	9.9	46	0.005	15
16.73	32.4	33.6	-	1.7	0.0	5.5	3	silty CLAY to CLAY	115	1.5	22	22	-	-	2.2	9.9	44	0.005	15
16.90	73.2	72.1	162.4	2.5	0.0	3.4	4	clayy SILT to silty CLAY	115	2.0	36	37	-	-	5.1	9.9	26	0.070	15
17.06	118.1	115.7	207.4	4.0	0.0	3.4	5	silty SAND to sandy SILT	120	4.0	29	30	72	44	-	-	21	0.200	16
17.23	56.0	56.4	-	3.7	0.0	6.7	3	silty CLAY to CLAY	115	1.5	38	37	-	-	3.9	9.9	39	0.005	15
17.39	39.8	39.7	-	2.4	0.0	6.1	3	silty CLAY to CLAY	115	1.5	26	27	-	-	2.8	9.9	43	0.005	15
17.55	39.7	39.2	-	2.2	0.0	5.8	3	silty CLAY to CLAY	115	1.5	26	26	-	-	2.8	9.9	42	0.005	15
17.72	38.4	37.6	-	2.2	0.0	5.8	3	silty CLAY to CLAY	115	1.5	25	26	-	-	2.7	9.9	43	0.005	15
17.88	44.3	42.9	-	2.1	0.0	4.9	4	clayy SILT to silty CLAY	115	2.0	21	22	-	-	3.1	9.9	38	0.070	15
18.05	45.3	43.8	-	2.1	0.0	4.8	4	clayy SILT to silty CLAY	115	2.0	22	23	-	-	3.2	9.9	38	0.070	15
18.21	32.4	31.1	-	1.9	0.0	6.1	3	silty CLAY to CLAY	115	1.5	21	22	-	-	2.2	9.9	48	0.005	15
18.37	31.0	29.7	-	2.2	0.0	7.2	3	silty CLAY to CLAY	115	1.5	20	21	-	-	2.2	9.9	52	0.005	15
18.54	32.2	30.7	-	2.2	0.0	7.0	3	silty CLAY to CLAY	115	1.5	20	21	-	-	2.2	9.9	50	0.005	15
18.70	28.4	27.0	-	2.0	0.0	7.4	3	silty CLAY to CLAY	115	1.5	18	19	-	-	2.0	9.9	54	0.005	15
18.87	35.5	33.6	-	2.1	0.0	6.1	3	silty CLAY to CLAY	115	1.5	22	24	-	-	2.5	9.9	46	0.005	15
19.03	31.3	29.5	-	2.9	0.0	9.5	3	silty CLAY to CLAY	115	1.5	20	21	-	-	2.2	9.9	57	0.005	15
19.19	30.1	28.3	-	3.5	0.0	9.9	3	silty CLAY to CLAY	115	1.5	19	20	-	-	2.1	9.9	59	0.005	15
19.36	85.7	80.5	201.8	3.8	0.0	4.5	4	clayy SILT to silty CLAY	115	2.0	40	43	-	-	6.0	9.9	28	0.070	15
19.52	91.4	85.7	241.9	5.2	0.0	5.8	9	very stiff fine SOIL	120	2.0	43	46	62	43	-	-	31	0.250	30
19.69	120.9	113.1	259.1	6.1	0.0	5.1	9	very stiff fine SOIL	120	2.0	57	60	71	44	-	-	26	0.250	30
19.85	94.0	87.7	273.6	6.4	0.0	6.9	9	very stiff fine SOIL	120	2.0	44	47	63	43	-	-	34	0.250	30
20.01	53.6	49.2	-	4.2	0.0	8.0	3	silty CLAY to CLAY	115	1.5	33	36	-	-	3.7	9.9	45	0.005	15
20.18	66.4	61.7	200.1	3.6	0.0	5.5	4	clayy SILT to silty CLAY	115	2.0	31	33	-	-	4.6	9.9	35	0.070	15
20.34	75.3	68.7	-	4.8	0.0	6.4	9	very stiff fine SOIL	120	2.0	34	38	55	41	-	-	36	0.250	30
20.51	79.4	73.5	225.5	4.6	0.0	5.8	9	very stiff fine SOIL	120	2.0	37	40	57	42	-	-	33	0.250	30
20.67	112.5	103.8	207.3	4.2	0.0	3.8	5	silty SAND to sandy SILT	120	4.0	26	28	68	43	-	-	23	0.200	16
20.83	151.1	139.2	198.3	3.6	0.0	2.4	5	silty SAND to sandy SILT	120	4.0	35	38	78	45	-	-	15	0.200	16
21.00	137.6	126.5	195.0	3.7	0.0	2.7	5	silty SAND to sandy SILT	120	4.0	32	34	75	44	-	-	17	0.200	16
21.16	246.1	225.8	302.3	7.3	0.0	3.0	8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	16.3	9.9	14	0.250	16
21.33	171.4	157.0	222.1	4.5	0.0	2.6	5	silty SAND to sandy SILT	120	4.0	39	43	82	45	-	-	15	0.200	16
21.49	97.4	89.0	102.7	0.7	0.0	0.7	6	clean SAND to silty SAND	125	5.0	18	19	63	42	-	-	9	0.350	16
21.65	124.9	113.9	231.3	5.2	0.0	4.2	9	very stiff fine SOIL	120	2.0	57	62	71	44	-	-	23	0.250	30
21.82	145.0	131.9	170.6	2.5	0.0	1.8	6	clean SAND to silty SAND	125	5.0	26	29	76	44	-	-	13	0.350	16
21.98	37.6	32.8	-	5.0	0.0	9.9	3	silty CLAY to CLAY	115	1.5	22	25	-	-	2.6	9.9	56	0.005	15
22.15	38.4	33.4	-	2.6	0.0	7.1	3	silty CLAY to CLAY	115	1.5	22	26	-	-	2.7	9.9	49	0.005	15
22.31	15.9	13.8	-	1.8	0.0	9.9	3	silty CLAY to CLAY	115	1.5	9	11	-	-	1.1	7.0	76	0.005	15
22.47	16.6	14.3	-	1.2	0.0	7.7	3	silty CLAY to CLAY	115	1.5	10	11	-	-	1.1	7.2	70	0.005	15
22.64	21.4	18.4	-	1.2	0.0	6.0	3	silty CLAY to CLAY	115	1.5	12	14	-	-	1.5	9.5	58	0.005	15
22.80	19.9	17.1	-	1.1	0.0	5.8	3	silty CLAY to CLAY	115	1.5	11	13	-	-	1.4	8.7	59	0.005	15
22.97	24.6	21.1	-	1.0	0.0	4.4	3	silty CLAY to CLAY	115	1.5	14	16	-	-	1.7	9.9	49	0.005	15
23.13	27.7	23.6	-	1.3	0.0	5.1	3	silty CLAY to CLAY	115	1.5	16	18	-	-	1.9	9.9	50	0.005	15
23.30	22.5	19.1	-	1.9	0.0	9.0	3	silty CLAY to CLAY	115	1.5	13	15	-	-	1.5	9.7	66	0.005	15
23.46	28.7	24.2	-	2.0	0.0	7.2	3	silty CLAY to CLAY	115	1.5	16	19	-	-	2.0	9.9	56	0.005	15
23.62	31.9	26.9	-	1.9	0.0	6.2	3	silty CLAY to CLAY	115	1.5	18	21	-	-	2.2	9.9	51	0.005	15
23.79	34.1	28.6	-	2.5	0.0	7.5	3	silty CLAY to CLAY	115	1.5	19	23	-	-	2.4	9.9	53	0.005	15
23.95	32.7	27.3	-	2.4	0.0	7.8	3	silty CLAY to CLAY	115	1.5	18	22	-	-	2.3	9.9	55	0.005	15
24.12	31.6	26.3	-	2.3	0.0	7.5	3	silty CLAY to CLAY	115	1.5	18	21	-	-	2.2	9.9	55	0.005	15
24.28	32.8	27.3	-	2.2	0.0	6.8	3	silty CLAY to CLAY	115	1.5	18	22	-	-	2.3	9.9	52	0.005	15
24.44	31.4	25.9	-	2.2	0.0	7.3	3	silty CLAY to CLAY	115	1.5	17	21	-	-	2.2	9.9	55	0.005	15
24.61	30.6	25.2	-	2.0	0.0	6.9	3	silty CLAY to CLAY	115	1.5	17	20	-	-	2.1	9.9	54	0.005	15
24.77	42.6	35.0	-	2.2	0.0	5.3	3	silty CLAY to CLAY	115	1.5	23	28	-	-	3.0	9.9	43	0.005	15
24.94	45.5	37.2	-	2.4	0.0	5.4	3	silty CLAY to CLAY	115	1.5	25	30	-	-	3.2	9.9	42	0.005	15
25.10	45.4	37.0	-	2.4	0.0	5.5	3	silty CLAY to CLAY	115	1.5	25	30	-	-	3.2	9.9	43	0.005	15
25.26	55.4	48.5	108.9	1.2	0.0	2.2	5	silty SAND to sandy SILT	120	4.0	12	14	43	39	-	-	26	0.200	16
25.43	48.4	42.3	129.8	1.6	0.0	3.4	4	clayy SILT to silty CLAY	115	2.0	21	24	-	-	3.4	9.9	33	0.070	15
25.59	81.3	70.9	163.2	2.8	0.0	3.5	4	clayy SILT to silty CLAY	115	2.0	35	41	-	-	5.7	9.9	26	0.070	15
25.76	193.9	168.8	168.8	0.9	0.0	0.5	6	clean SAND to silty SAND	125	5.0	34	39	84	45	-	-	5	0.350	16
25.92	162.8	141.4	174.0	2.6	0.0	1.6	6	clean SAND to silty SAND	125	5.0	28	33	78	44	-	-	11	0.350	16
26.08	147.8	128.2	197.0	3.9	0.0	2.7	5	silty SAND to sandy SILT	120	4.0	32	37	75	44	-	-	17	0.200	16
26.25	64.0	50.9	-	4.4	0.0	7.0	3	silty CLAY to CLAY	115	1.5	34	43	-	-	4.5	9.9	42	0.005	15
26.41	43.0	34.1	-	3.5	0.0	8.4	3	silty CLAY to CLAY	115	1.5	23	29	-	-	3.0	9.9	52	0.005	15
26.58	45.6	36.0	-	1.6	0.0	3.7	4	clayy SILT to silty CLAY	115	2.0	18	23	-	-	3.2	9.9	37	0.070	15
26.74	89.8	77.3	226.2	4.9	0.0	5.6	9	very stiff fine SOIL	120	2.0	39	45	59	41	-	-	32	0.250	30
26.90	97.1	83.5	233.2	5.3	0.0	5.5	9	very stiff fine SOIL	120	2.0	42	49	61	41	-	-	31	0.250	30
27.07	47.6	37.2	-	4.3	0.0	9.4	3	silty CLAY to CLAY	115	1.5	25	32	-	-	3.3	9.9	53	0.005	15
27.23	36.4	28.3	-	2.6	0.0	7.5	3	silty CLAY to CLAY	115	1.5	19	24	-	-	2.5	9.9	53	0.005	15
27.40	48.9	37.9	-	2.3	0.0	4.9	3	silty CLAY to CLAY	115	1.5	25	33	-	-	3.4	9.9	40	0.005	15
27.56	90.2	77.0	139.8	2.1	0.0	2.4	5	silty SAND to sandy SILT	120	4.0	19	23	58	41	-	-	21	0.200	16
27.72	92.9	79.1	154.7	2.6	0.0	2.9	5	silty SAND to sandy SILT	120	4.0	20	23	59	41	-	-	23	0.200	16
27.89	67.1	57.1	159.2	2.6	0.0	3.9	4	clayy SILT to silty CLAY	115	2.0	29	34	-	-	4.7	9.9	31	0.070	15
28.05	47.6	36.4	-	2.6	0.0	5.7	3	silty CLAY to CLAY	115	1.5	24	32	-	-	3.3	9.9	44	0.005	15
28.22	41.5	31.6	-	2.8	0.0	7.1	3	silty CLAY to CLAY	115	1.5	21	28	-	-	2.9	9.9	50	0.005	15
28.38	31.7	24.1	-	1.3	0.0	4.3	3	silty CLAY to CLAY	115	1.5	16	21	-	-	2.2	9.9	46	0.005	15
28.54	27.9	21.1	-	0.5	0.0	2.1	4	clayy SILT to silty CLAY	115	2.0	11	14	-	-	1.9	9.9	38	0.070	15
28.71	95.6	80.6	105.2	1.0	0.0	1.1	6	clean SAND to silty SAND	125	5.0	16	19	60	41	-	-	13	0.350	16
28.87	103.9	87.5	124.7	1.6	0.0	1.5	5	silty SAND to sandy SILT	120	4.0	22	26	63	41	-	-	15	0.200	16
29.04	81.0	68.1	165.2	2.9	0.0	3.7	4	clayy SILT to silty CLAY	115	2.0	34	41	-	-	5.7	9.9	28	0.070	15
29.20	42.4	31.7	-	2.9	0.0	7.2	3	silty CLAY to CLAY	115	1.5	21	28	-	-	2.9	9.9	50	0.005	15
29.36	27.4	20.4	-	2.5	0.0	9.9	3	silty CLAY to CLAY	115	1.5	14	18	-	-	1.9	9.6	66	0.005	15
29.53	29.3	21.7	-	2.4	0.0	8.7	3	silty CLAY to CLAY	115	1.5	14	20	-	-	2.0	9.9	62	0.005	15
29.69	26.4	19.5	-	2.3	0.0	9.3	3	silty CLAY to CLAY	115	1.5	13	18	-	-	1.8	9.1	66	0.005	15
29.86	25.5	18.8	-	1.9	0.0	7.9	3	silty CLAY to CLAY	115	1.5	13	17	-	-	1.7	8.7	64	0.005	15
30.02	23.5	17.3	-	1.8	0.0	8.3	3	silty CLAY to CLAY	115	1.5	12	16	-	-	1.6	8.0	67	0.005	15
30.19	23.5	17.2	-	2.7	0.0	9.9	3	silty CLAY to CLAY	115	1.5	11	16	-	-	1.6	7.9	71	0.005	15
30.35	29.2	21.3	-	3.5	0.0	9.9	3	silty CLAY to CLAY	115	1.5	14	19	-	-	2.0	9.9	65	0.005	15
30.51	68.2	49.6	-	4.7	0.0	7.1	3	silty CLAY to CLAY	115	1.5	33	45	-	-	4.8	9.9	42	0.005	15
30.68	100.3	83.0	182.0	3.6	0.0	3.7	4	clayy SILT to silty CLAY	115	2.0	41	50	-	-	7.0	9.9	25	0.070	15
30.84	113.0	93.4	169.7	3.2	0.0	2.9	5	silty SAND to sandy SILT	120	4.0	23	28	65	42	-	-	21	0.200	16

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(473).cpt
CPT Date: 2/22/2010 10:58:14 AM
GW During Test: 18 ft

Sounding ID: CPT-02
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qcln PS -	q1ncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
31.01	107.5	88.6	174.3	3.4	0.0	3.2	5	silty SAND to sandy SILT	120	4.0	22	27	63	41	-	-	23	0.200	16
31.17	82.0	67.5	172.5	3.2	0.0	4.0	4	clayy SILT to silty CLAY	115	2.0	34	41	-	-	5.7	9.9	29	0.070	15
31.33	85.9	70.6	137.2	2.1	0.0	2.5	5	silty SAND to sandy SILT	120	4.0	18	21	56	40	-	-	22	0.200	16
31.50	103.6	85.0	116.2	1.3	0.0	1.3	5	silty SAND to sandy SILT	120	4.0	21	26	62	41	-	-	14	0.200	16
31.66	110.9	90.9	124.7	1.6	0.0	1.4	5	silty SAND to sandy SILT	120	4.0	23	28	64	41	-	-	14	0.200	16
31.83	87.4	71.4	150.5	2.5	0.0	3.0	5	silty SAND to sandy SILT	120	4.0	18	22	56	40	-	-	24	0.200	16
31.99	50.8	35.9	-	2.7	0.0	5.4	3	silty CLAY to CLAY	115	1.5	24	34	-	-	3.5	9.9	43	0.005	15
32.15	44.0	31.0	-	2.3	0.0	5.5	3	silty CLAY to CLAY	115	1.5	21	29	-	-	3.0	9.9	46	0.005	15
32.32	50.8	41.4	118.1	1.4	0.0	2.9	4	clayy SILT to silty CLAY	115	2.0	21	25	-	-	3.5	9.9	31	0.070	15
32.48	60.5	49.2	103.5	1.2	0.0	2.0	5	silty SAND to sandy SILT	120	4.0	12	15	44	38	-	-	24	0.200	16
32.65	61.6	50.0	128.3	1.8	0.0	3.0	4	clayy SILT to silty CLAY	115	2.0	25	31	-	-	4.3	9.9	29	0.070	15
32.81	53.5	43.3	121.9	1.5	0.0	3.0	4	clayy SILT to silty CLAY	115	2.0	22	27	-	-	3.7	9.9	31	0.070	15
32.97	30.2	20.9	-	1.7	0.0	6.0	3	silty CLAY to CLAY	115	1.5	14	20	-	-	2.1	9.5	56	0.005	15
33.14	32.6	22.5	-	2.0	0.0	6.5	3	silty CLAY to CLAY	115	1.5	15	22	-	-	2.2	9.9	55	0.005	15
33.30	31.0	21.3	-	2.4	0.0	8.3	3	silty CLAY to CLAY	115	1.5	14	21	-	-	2.1	9.7	62	0.005	15
33.47	30.5	20.9	-	2.0	0.0	7.0	3	silty CLAY to CLAY	115	1.5	14	20	-	-	2.1	9.5	59	0.005	15
33.63	29.5	20.2	-	1.6	0.0	5.8	3	silty CLAY to CLAY	115	1.5	13	20	-	-	2.0	9.1	56	0.005	15
33.79	33.1	22.6	-	1.6	0.0	5.2	3	silty CLAY to CLAY	115	1.5	15	22	-	-	2.3	9.9	51	0.005	15
33.96	22.5	15.3	-	1.6	0.0	8.0	3	silty CLAY to CLAY	115	1.5	10	15	-	-	1.5	6.7	69	0.005	15
34.12	21.6	14.6	-	1.5	0.0	7.5	3	silty CLAY to CLAY	115	1.5	10	14	-	-	1.5	6.4	69	0.005	15
34.29	21.4	14.5	-	1.5	0.0	7.7	3	silty CLAY to CLAY	115	1.5	10	14	-	-	1.4	6.3	70	0.005	15
34.45	16.1	10.8	-	1.9	0.0	9.9	3	silty CLAY to CLAY	115	1.5	7	11	-	-	1.1	4.5	84	0.005	15
34.61	32.3	21.7	-	1.6	0.0	5.3	3	silty CLAY to CLAY	115	1.5	14	22	-	-	2.2	9.8	52	0.005	15
34.78	61.1	41.0	-	2.9	0.0	4.9	3	silty CLAY to CLAY	115	1.5	27	41	-	-	4.2	9.9	39	0.005	15
34.94	67.8	45.4	-	3.5	0.0	5.3	3	silty CLAY to CLAY	115	1.5	30	45	-	-	4.7	9.9	39	0.005	15
35.11	67.2	44.9	-	4.7	0.0	7.2	3	silty CLAY to CLAY	115	1.5	30	45	-	-	4.7	9.9	44	0.005	15
35.27	96.9	76.8	203.8	4.5	0.0	4.7	4	clayy SILT to silty CLAY	115	2.0	38	48	-	-	6.8	9.9	30	0.070	15
35.43	89.0	70.4	210.0	4.6	0.0	5.3	4	clayy SILT to silty CLAY	115	2.0	35	44	-	-	6.2	9.9	33	0.070	15
35.60	70.9	46.9	-	4.3	0.0	6.3	3	silty CLAY to CLAY	115	1.5	31	47	-	-	4.9	9.9	41	0.005	15
35.76	52.2	34.5	-	3.5	0.0	7.0	3	silty CLAY to CLAY	115	1.5	23	35	-	-	3.6	9.9	48	0.005	15
35.93	41.7	27.4	-	2.9	0.0	7.2	3	silty CLAY to CLAY	115	1.5	18	28	-	-	2.9	9.9	53	0.005	15
36.09	43.2	28.3	-	2.8	0.0	6.7	3	silty CLAY to CLAY	115	1.5	19	29	-	-	3.0	9.9	51	0.005	15
36.26	44.5	29.1	-	2.8	0.0	6.6	3	silty CLAY to CLAY	115	1.5	19	30	-	-	3.1	9.9	50	0.005	15
36.42	41.4	27.0	-	2.9	0.0	7.4	3	silty CLAY to CLAY	115	1.5	18	28	-	-	2.9	9.9	54	0.005	15
36.58	40.7	26.5	-	2.8	0.0	7.4	3	silty CLAY to CLAY	115	1.5	18	27	-	-	2.8	9.9	55	0.005	15
36.75	46.7	30.3	-	2.8	0.0	6.2	3	silty CLAY to CLAY	115	1.5	20	31	-	-	3.2	9.9	49	0.005	15
36.91	48.6	31.4	-	2.9	0.0	6.3	3	silty CLAY to CLAY	115	1.5	21	32	-	-	3.4	9.9	48	0.005	15
37.08	46.8	30.2	-	2.7	0.0	6.0	3	silty CLAY to CLAY	115	1.5	20	31	-	-	3.2	9.9	48	0.005	15
37.24	41.9	27.0	-	2.3	0.0	5.8	3	silty CLAY to CLAY	115	1.5	18	28	-	-	2.9	9.9	50	0.005	15
37.40	40.3	25.9	-	2.3	0.0	6.1	3	silty CLAY to CLAY	115	1.5	17	27	-	-	2.8	9.9	51	0.005	15
37.57	47.2	30.2	-	2.6	0.0	5.8	3	silty CLAY to CLAY	115	1.5	20	31	-	-	3.3	9.9	47	0.005	15
37.73	48.7	31.1	-	3.0	0.0	6.5	3	silty CLAY to CLAY	115	1.5	21	32	-	-	3.4	9.9	49	0.005	15
37.90	54.9	34.9	-	3.5	0.0	6.6	3	silty CLAY to CLAY	115	1.5	23	37	-	-	3.8	9.9	47	0.005	15
38.06	64.4	40.9	-	4.2	0.0	6.7	3	silty CLAY to CLAY	115	1.5	27	43	-	-	4.5	9.9	44	0.005	15
38.22	62.5	39.6	-	4.0	0.0	6.6	3	silty CLAY to CLAY	115	1.5	26	42	-	-	4.3	9.9	45	0.005	15
38.39	61.4	38.7	-	4.2	0.0	7.1	3	silty CLAY to CLAY	115	1.5	26	41	-	-	4.3	9.9	47	0.005	15
38.55	58.0	36.5	-	4.2	0.0	7.6	3	silty CLAY to CLAY	115	1.5	24	39	-	-	4.0	9.9	49	0.005	15
38.72	50.3	31.6	-	4.2	0.0	8.7	3	silty CLAY to CLAY	115	1.5	21	34	-	-	3.5	9.9	54	0.005	15
38.88	51.8	32.4	-	3.8	0.0	7.7	3	silty CLAY to CLAY	115	1.5	22	35	-	-	3.6	9.9	51	0.005	15
39.04	45.6	28.5	-	3.8	0.0	8.8	3	silty CLAY to CLAY	115	1.5	19	30	-	-	3.1	9.9	57	0.005	15
39.21	50.5	31.5	-	3.8	0.0	7.8	3	silty CLAY to CLAY	115	1.5	21	34	-	-	3.5	9.9	52	0.005	15
39.37	61.7	38.3	-	3.9	0.0	6.6	3	silty CLAY to CLAY	115	1.5	26	41	-	-	4.3	9.9	46	0.005	15
39.54	65.8	40.7	-	4.5	0.0	7.1	3	silty CLAY to CLAY	115	1.5	27	44	-	-	4.6	9.9	46	0.005	15
39.70	74.3	45.9	-	3.3	0.0	4.6	4	clayy SILT to silty CLAY	115	2.0	23	37	-	-	5.2	9.9	36	0.070	15
39.86	105.8	80.6	125.6	1.8	0.0	1.8	5	silty SAND to sandy SILT	120	4.0	20	26	60	40	-	-	17	0.200	16
40.03	109.5	83.4	107.6	1.1	0.0	1.1	6	clean SAND to silty SAND	125	5.0	17	22	61	40	-	-	13	0.350	16
40.19	102.0	77.5	129.1	2.0	0.0	2.0	5	silty SAND to sandy SILT	120	4.0	19	25	59	40	-	-	19	0.200	16
40.36	79.4	60.2	155.6	2.8	0.0	3.6	4	clayy SILT to silty CLAY	115	2.0	30	40	-	-	5.5	9.9	29	0.070	15
40.52	48.6	29.6	-	3.0	0.0	6.4	3	silty CLAY to CLAY	115	1.5	20	32	-	-	3.4	9.9	50	0.005	15
40.68	41.7	25.3	-	3.0	0.0	7.8	3	silty CLAY to CLAY	115	1.5	17	28	-	-	2.9	9.9	57	0.005	15
40.85	39.4	23.9	-	2.8	0.0	7.6	3	silty CLAY to CLAY	115	1.5	16	26	-	-	2.7	9.9	57	0.005	15
41.01	39.9	24.1	-	2.7	0.0	7.1	3	silty CLAY to CLAY	115	1.5	16	27	-	-	2.7	9.9	56	0.005	15
41.18	33.9	20.5	-	2.8	0.0	9.0	3	silty CLAY to CLAY	115	1.5	14	23	-	-	2.3	8.7	64	0.005	15
41.34	46.0	27.7	-	2.9	0.0	6.8	3	silty CLAY to CLAY	115	1.5	18	31	-	-	3.2	9.9	52	0.005	15
41.50	67.6	40.5	-	2.9	0.0	4.5	4	clayy SILT to silty CLAY	115	2.0	20	34	-	-	4.7	9.9	38	0.070	15
41.67	58.5	35.0	-	2.5	0.0	4.5	4	clayy SILT to silty CLAY	115	2.0	17	29	-	-	4.0	9.9	40	0.070	15
41.83	51.5	30.7	-	2.7	0.0	5.5	3	silty CLAY to CLAY	115	1.5	20	34	-	-	3.6	9.9	46	0.005	15
42.00	40.6	24.2	-	2.6	0.0	6.9	3	silty CLAY to CLAY	115	1.5	16	27	-	-	2.8	9.9	55	0.005	15
42.16	38.9	23.1	-	2.2	0.0	6.1	3	silty CLAY to CLAY	115	1.5	15	26	-	-	2.7	9.8	54	0.005	15
42.32	41.5	24.6	-	2.3	0.0	5.8	3	silty CLAY to CLAY	115	1.5	16	28	-	-	2.8	9.9	52	0.005	15
42.49	60.4	35.7	-	3.1	0.0	5.4	3	silty CLAY to CLAY	115	1.5	24	40	-	-	4.2	9.9	43	0.005	15
42.65	78.7	46.4	-	3.4	0.0	4.5	4	clayy SILT to silty CLAY	115	2.0	23	39	-	-	5.5	9.9	36	0.070	15
42.82	77.8	57.9	151.4	2.7	0.0	3.5	4	clayy SILT to silty CLAY	115	2.0	29	39	-	-	5.4	9.9	29	0.070	15
42.98	94.7	70.4	111.0	1.4	0.0	1.6	5	silty SAND to sandy SILT	120	4.0	18	24	55	39	-	-	18	0.200	16
43.15	93.9	69.7	135.1	2.2	0.0	2.5	5	silty SAND to sandy SILT	120	4.0	17	23	55	39	-	-	22	0.200	16
43.31	68.1	39.7	-	2.5	0.0	3.8	4	clayy SILT to silty CLAY	115	2.0	20	34	-	-	4.7	9.9	36	0.070	15
43.47	53.5	31.1	-	2.8	0.0	5.4	3	silty CLAY to CLAY	115	1.5	21	36	-	-	3.7	9.9	46	0.005	15
43.64	55.7	32.3	-	2.7	0.0	5.0	3	silty CLAY to CLAY	115	1.5	22	37	-	-	3.8	9.9	44	0.005	15
43.80	61.2	35.4	-	3.5	0.0	5.9	3	silty CLAY to CLAY	115	1.5	24	41	-	-	4.2	9.9	45	0.005	15
43.97	75.6	43.6	-	3.4	0.0	4.7	4	clayy SILT to silty CLAY	115	2.0	22	38	-	-	5.3	9.9	37	0.070	15
44.13	82.0	60.4	162.7	3.1	0.0	3.9	4	clayy SILT to silty CLAY	115	2.0	30	41	-	-	5.7	9.9	30	0.070	15
44.29	91.2	67.1	145.8	2.6	0.0	2.9	5	silty SAND to sandy SILT	120	4.0	17	23	54	39	-	-	25	0.200	16
44.46	80.0	58.8	164.4	3.1	0.0	4.0	4	clayy SILT to silty CLAY	115	2.0	29	40	-	-	5.6	9.9	31	0.070	15
44.62	63.4	36.2	-	3.5	0.0	5.8	3	silty CLAY to CLAY	115	1.5	24	42	-	-	4.4	9.9	44	0.005	15
44.79	72.6	53.2	142.8	2.4	0.0	3.4	4	clayy SILT to silty CLAY	115	2.0	27	36	-	-	5.0	9.9	30	0.070	15
44.95	88.0	64.4	148.2	2.7	0.0	3.1	4	clayy SILT to silty CLAY	115	2.0	32	44	-	-	6.1	9.9	26	0.070	15
45.11	77.2	43.8	-	3.8	0.0	5.1	3	silty CLAY to CLAY	115	1.5	29	51	-	-	5.4	9.9	39	0.005	15
45.28	52.7	29.8	-	1.7	0.0	3.5	4	clayy SILT to silty CLAY	115	2.0	15	26	-	-	3.6	9.9	39	0.070	15
45.44	48.0	35.0	95.0	1.0	0.0	2.1	5	silty SAND to sandy SILT	120	4.0	9	12	32	35	-	-	30	0.200	16
45.61	329.2	239.8	239.8	0.0	0.0	0.1	7	grvly SAND to dense SAND	130	6.0	40	55	95	45	-	-	5	1.000	16
45.77	342.2	248.9	248.9	1.7	0.0	0.5	6	clean SAND to silty SAND	125	5.0	50	68	95	45	-	-	5	0.350	16
45.93	342.2	248.5	329.7	10.4	0.0	3.1	8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	22.6	9.9	13	0.250	16
46.10	221.8	160.9	298.1	10.0	0.0	4.6	9	very stiff fine SOIL	120	2.0	80	100	83	43	-	-	21	0.250	30
46.26	138.8	100.5	268.0	8.0	0.0	5.9	9	very stiff fine SOIL	120	2.0	50	69	67	41	-	-	30	0.250	30

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

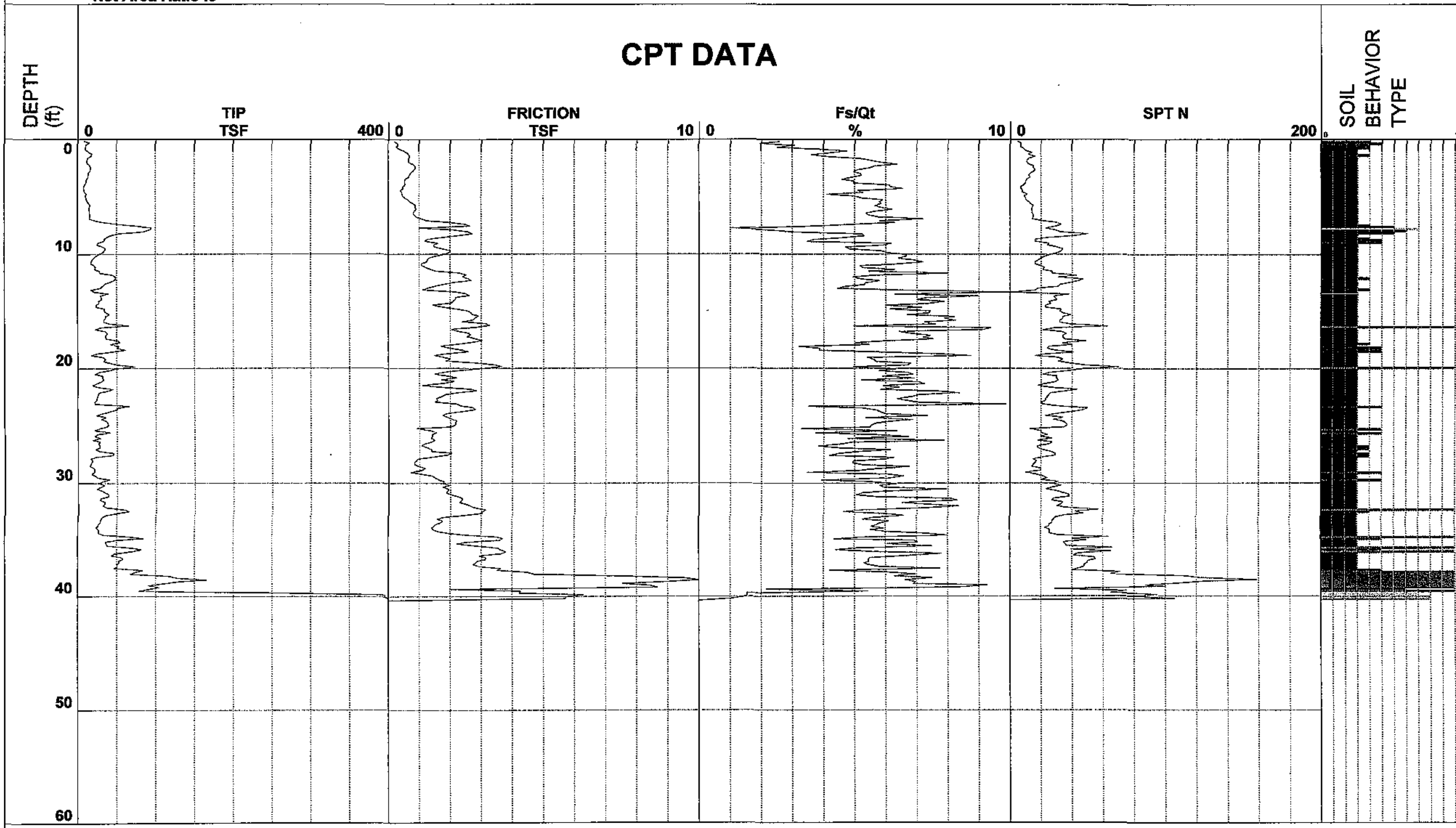
Middle Earth Geo Testing

Associated Soils Engineering

Project	Big Canyon Country Club	Operator	BH-AH	Filename	SDF(474).cpt
Job Number	6169	Cone Number	DSG1104	GPS	
Hole Number	CPT-03	Date and Time	2/22/2010 11:51:16 AM	Maximum Depth	40.52 ft
Water Table Depth	15.00 ft				

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

*Soil behavior type and SPT based on data from UBC-1983

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(474).cpt
CPT Date: 2/22/2010 11:51:16 AM
GW During Test: 15 ft

Sounding ID: CPT-03
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qcln PS -	q1ncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
0.33	15.4	24.7	77.5	0.3	0.0	1.9	4	clayy SILT to silty CLAY	115	2.0	12	8	-	-	1.1	9.9	34	0.070	15
0.49	10.4	16.7	-	0.3	0.0	3.1	3	silty CLAY to CLAY	115	1.5	11	7	-	-	0.7	9.9	48	0.005	15
0.66	10.5	16.8	-	0.3	0.0	2.5	4	clayy SILT to silty CLAY	115	2.0	8	5	-	-	0.7	9.9	44	0.070	15
0.82	9.4	15.0	-	0.4	0.0	3.8	3	silty CLAY to CLAY	115	1.5	10	6	-	-	0.7	9.9	53	0.005	15
0.98	10.6	17.0	-	0.5	0.0	4.8	3	silty CLAY to CLAY	115	1.5	11	7	-	-	0.7	9.9	55	0.005	15
1.15	14.6	23.4	-	0.6	0.0	4.2	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.0	9.9	46	0.005	15
1.31	18.1	29.1	-	0.7	0.0	3.6	4	clayy SILT to silty CLAY	115	2.0	15	9	-	-	1.3	9.9	40	0.070	15
1.48	16.9	27.1	-	0.7	0.0	4.2	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	43	0.005	15
1.64	12.8	20.5	-	0.7	0.0	5.2	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	52	0.005	15
1.80	11.8	18.9	-	0.7	0.0	5.6	3	silty CLAY to CLAY	115	1.5	13	8	-	-	0.8	9.9	55	0.005	15
1.97	11.3	18.1	-	0.7	0.0	5.9	3	silty CLAY to CLAY	115	1.5	12	8	-	-	0.8	9.9	57	0.005	15
2.13	12.4	19.9	-	0.8	0.0	6.4	3	silty CLAY to CLAY	115	1.5	13	8	-	-	0.9	9.9	57	0.005	15
2.30	15.3	24.5	-	0.9	0.0	5.7	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.1	9.9	50	0.005	15
2.46	16.0	25.7	-	0.9	0.0	5.5	3	silty CLAY to CLAY	115	1.5	17	11	-	-	1.1	9.9	49	0.005	15
2.62	16.5	26.4	-	0.8	0.0	5.1	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	47	0.005	15
2.79	15.6	25.0	-	0.8	0.0	5.0	3	silty CLAY to CLAY	115	1.5	17	10	-	-	1.1	9.9	48	0.005	15
2.95	13.8	22.1	-	0.7	0.0	5.3	3	silty CLAY to CLAY	115	1.5	15	9	-	-	1.0	9.9	51	0.005	15
3.12	12.9	20.7	-	0.7	0.0	5.3	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	52	0.005	15
3.28	13.5	21.6	-	0.7	0.0	5.0	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	50	0.005	15
3.45	12.0	19.2	-	0.6	0.0	4.7	3	silty CLAY to CLAY	115	1.5	13	8	-	-	0.8	9.9	52	0.005	15
3.61	10.8	17.3	-	0.5	0.0	5.1	3	silty CLAY to CLAY	115	1.5	12	7	-	-	0.7	9.9	55	0.005	15
3.77	10.8	17.3	-	0.5	0.0	5.1	3	silty CLAY to CLAY	115	1.5	12	7	-	-	0.7	9.9	56	0.005	15
3.94	9.0	14.4	-	0.5	0.0	6.3	3	silty CLAY to CLAY	115	1.5	10	6	-	-	0.6	9.9	64	0.005	15
4.10	7.8	12.5	-	0.5	0.0	6.3	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.5	9.9	68	0.005	15
4.27	7.3	11.7	-	0.5	0.0	6.8	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.5	9.9	71	0.005	15
4.43	7.9	12.6	-	0.4	0.0	5.3	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.5	9.9	64	0.005	15
4.59	8.3	13.3	-	0.4	0.0	5.5	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.6	9.9	63	0.005	15
4.76	11.0	17.6	-	0.5	0.0	4.2	3	silty CLAY to CLAY	115	1.5	12	7	-	-	0.8	9.9	52	0.005	15
4.92	9.4	15.0	-	0.5	0.0	5.2	3	silty CLAY to CLAY	115	1.5	10	6	-	-	0.6	9.9	59	0.005	15
5.09	10.4	16.7	-	0.5	0.0	5.4	3	silty CLAY to CLAY	115	1.5	11	7	-	-	0.7	9.9	58	0.005	15
5.25	10.8	17.4	-	0.6	0.0	6.1	3	silty CLAY to CLAY	115	1.5	12	7	-	-	0.7	9.9	59	0.005	15
5.41	12.1	19.4	-	0.7	0.0	5.9	3	silty CLAY to CLAY	115	1.5	13	8	-	-	0.8	9.9	56	0.005	15
5.58	13.8	22.1	-	0.8	0.0	6.0	3	silty CLAY to CLAY	115	1.5	15	9	-	-	1.0	9.9	54	0.005	15
5.74	15.7	25.2	-	0.9	0.0	5.8	3	silty CLAY to CLAY	115	1.5	17	10	-	-	1.1	9.9	50	0.005	15
5.91	14.8	23.8	-	0.9	0.0	6.0	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.0	9.9	52	0.005	15
6.07	14.5	23.2	-	0.9	0.0	6.4	3	silty CLAY to CLAY	115	1.5	15	10	-	-	1.0	9.9	54	0.005	15
6.23	14.8	23.8	-	0.8	0.0	5.8	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.0	9.9	52	0.005	15
6.40	15.0	24.0	-	0.8	0.0	5.5	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.0	9.9	50	0.005	15
6.56	15.3	24.6	-	0.8	0.0	5.6	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.1	9.9	50	0.005	15
6.73	15.6	25.1	-	0.9	0.0	5.9	3	silty CLAY to CLAY	115	1.5	17	10	-	-	1.1	9.9	51	0.005	15
6.89	14.8	23.7	-	1.1	0.0	7.4	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.0	9.9	56	0.005	15
7.05	21.4	34.3	-	1.2	0.0	5.9	3	silty CLAY to CLAY	115	1.5	23	14	-	-	1.5	9.9	45	0.005	15
7.22	31.3	50.2	-	2.0	0.0	6.4	3	silty CLAY to CLAY	115	1.5	33	21	-	-	2.2	9.9	40	0.005	15
7.38	51.8	77.2	205.9	2.5	0.0	4.9	4	clayy SILT to silty CLAY	115	2.0	39	26	-	-	3.6	9.9	30	0.070	15
7.55	76.9	113.3	206.2	2.6	0.0	3.4	5	silty SAND to sandy SILT	120	4.0	28	19	71	45	-	-	21	0.200	16
7.71	94.9	138.4	155.2	1.0	0.0	1.1	6	clean SAND to silty SAND	125	5.0	28	19	78	46	-	-	9	0.350	16
7.87	91.9	132.5	187.8	2.1	0.0	2.3	5	silty SAND to sandy SILT	120	4.0	33	23	76	46	-	-	15	0.200	16
8.04	84.1	120.0	200.8	2.6	0.0	3.1	5	silty SAND to sandy SILT	120	4.0	30	21	73	45	-	-	19	0.200	16
8.20	51.9	73.2	211.7	2.7	0.0	5.3	4	clayy SILT to silty CLAY	115	2.0	37	26	-	-	3.6	9.9	32	0.070	15
8.37	42.5	59.3	193.0	2.3	0.0	5.4	4	clayy SILT to silty CLAY	115	2.0	30	21	-	-	3.0	9.9	35	0.070	15
8.53	37.1	51.3	166.9	1.7	0.0	4.7	4	clayy SILT to silty CLAY	115	2.0	26	19	-	-	2.6	9.9	35	0.070	15
8.69	34.0	46.6	141.0	1.3	0.0	3.8	4	clayy SILT to silty CLAY	115	2.0	23	17	-	-	2.4	9.9	33	0.070	15
8.86	34.0	46.2	135.5	1.2	0.0	3.5	4	clayy SILT to silty CLAY	115	2.0	23	17	-	-	2.4	9.9	32	0.070	15
9.02	25.9	41.5	-	1.6	0.0	6.3	3	silty CLAY to CLAY	115	1.5	28	17	-	-	1.8	9.9	43	0.005	15
9.19	24.8	39.7	-	1.5	0.0	6.0	3	silty CLAY to CLAY	115	1.5	26	17	-	-	1.7	9.9	43	0.005	15
9.35	31.4	50.3	-	1.5	0.0	4.8	4	clayy SILT to silty CLAY	115	2.0	25	16	-	-	2.2	9.9	35	0.070	15
9.51	35.5	53.0	174.3	1.7	0.0	4.9	4	clayy SILT to silty CLAY	115	2.0	27	18	-	-	2.5	9.9	35	0.070	15
9.68	34.1	54.7	-	2.0	0.0	5.9	3	silty CLAY to CLAY	115	1.5	36	23	-	-	2.4	9.9	38	0.005	15
9.84	32.6	52.2	-	2.0	0.0	6.2	3	silty CLAY to CLAY	115	1.5	35	22	-	-	2.3	9.9	39	0.005	15
10.01	27.0	43.4	-	1.8	0.0	6.8	3	silty CLAY to CLAY	115	1.5	29	18	-	-	1.9	9.9	44	0.005	15
10.17	22.8	36.5	-	1.5	0.0	6.8	3	silty CLAY to CLAY	115	1.5	24	15	-	-	1.6	9.9	47	0.005	15
10.34	20.4	32.8	-	1.3	0.0	6.6	3	silty CLAY to CLAY	115	1.5	22	14	-	-	1.4	9.9	48	0.005	15
10.50	18.3	29.4	-	1.3	0.0	7.1	3	silty CLAY to CLAY	115	1.5	20	12	-	-	1.3	9.9	51	0.005	15
10.66	17.1	27.5	-	1.2	0.0	7.5	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	54	0.005	15
10.83	16.8	26.8	-	1.1	0.0	6.6	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	52	0.005	15
10.99	20.9	33.0	-	1.1	0.0	5.3	3	silty CLAY to CLAY	115	1.5	22	14	-	-	1.4	9.9	44	0.005	15
11.16	22.8	35.5	-	1.2	0.0	5.4	3	silty CLAY to CLAY	115	1.5	24	15	-	-	1.6	9.9	43	0.005	15
11.32	21.4	32.8	-	1.3	0.0	6.5	3	silty CLAY to CLAY	115	1.5	22	14	-	-	1.5	9.9	48	0.005	15
11.48	28.1	42.4	-	1.5	0.0	5.6	3	silty CLAY to CLAY	115	1.5	28	19	-	-	2.0	9.9	41	0.005	15
11.65	28.4	42.3	-	2.3	0.0	8.2	3	silty CLAY to CLAY	115	1.5	28	19	-	-	2.0	9.9	48	0.005	15
11.81	44.4	57.1	-	2.5	0.0	5.7	4	clayy SILT to silty CLAY	115	2.0	29	22	-	-	3.1	9.9	36	0.070	15
11.98	48.3	56.4	181.5	2.4	0.0	5.0	4	clayy SILT to silty CLAY	115	2.0	28	24	-	-	3.4	9.9	34	0.070	15
12.14	48.7	61.5	196.1	2.6	0.0	5.3	4	clayy SILT to silty CLAY	115	2.0	31	24	-	-	3.4	9.9	34	0.070	15
12.30	46.2	57.7	-	2.7	0.0	5.9	3	silty CLAY to CLAY	115	1.5	38	31	-	-	3.2	9.9	37	0.005	15
12.47	39.3	54.6	-	2.1	0.0	5.4	4	clayy SILT to silty CLAY	115	2.0	27	20	-	-	2.7	9.9	36	0.070	15
12.63	33.9	46.5	-	1.8	0.0	5.4	3	silty CLAY to CLAY	115	1.5	31	23	-	-	2.4	9.9	39	0.005	15
12.80	32.0	43.4	-	1.5	0.0	4.8	4	clayy SILT to silty CLAY	115	2.0	22	16	-	-	2.2	9.9	38	0.070	15
12.96	28.9	38.7	-	1.3	0.0	4.6	4	clayy SILT to silty CLAY	115	2.0	19	14	-	-	2.0	9.9	39	0.070	15
13.12	17.0	22.4	-	1.1	0.0	6.9	3	silty CLAY to CLAY	115	1.5	15	11	-	-	1.2	9.9	56	0.005	15
13.29	21.1	27.5	-	2.1	0.0	9.9	3	silty CLAY to CLAY	115	1.5	18	14	-	-	1.5	9.9	60	0.005	15
13.45	39.4	50.8	-	2.5	0.0	6.4	3	silty CLAY to CLAY	115	1.5	34	26	-	-	2.8	9.9	40	0.005	15
13.62	29.1	37.1	-	2.6	0.0	9.2	3	silty CLAY to CLAY	115	1.5	25	19	-	-	2.0	9.9	52	0.005	15
13.78	29.8	37.5	-	2.2	0.0	7.5	3	silty CLAY to CLAY	115	1.5	25	20	-	-	2.1	9.9	48	0.005	15
13.94	30.9	38.4	-	2.2	0.0	7.2	3	silty CLAY to CLAY	115	1.5	26	21	-	-	2.1	9.9	47	0.005	15
14.11	26.6	32.7	-	2.1	0.0	8.1	3	silty CLAY to CLAY	115	1.5	22	18	-	-	1.8	9.9	52	0.005	15
14.27	27.3	33.2	-	2.0	0.0	7.6	3	silty CLAY to CLAY	115	1.5	22	18	-	-	1.9	9.9	50	0.005	15
14.44	23.7	28.5	-	1.4	0.0	6.2	3	silty CLAY to CLAY	115	1.5	19	16	-	-	1.6	9.9	50	0.005	15
14.60	23.8	28.3	-	1.7	0.0	7.4	3	silty CLAY to CLAY	115	1.5	19	16	-	-	1.6	9.9	53	0.005	15
14.76	34.2	40.2	-	2.1	0.0	6.3	3	silty CLAY to CLAY	115	1.5	27	23	-	-	2.4	9.9	44	0.005	15
14.93	33.7	39.2	-	2.5	0.0	7.6	3	silty CLAY to CLAY	115	1.5	26	22	-	-	2.3	9.9	47	0.005	15
15.09	35.9	41.5	-	2.7	0.0	7.6	3	silty CLAY to CLAY	115	1.5	28	24	-	-	2.5	9.9	46	0.005	15
15.26	40.3	46.4	-	2.7	0.0	6.8	3	silty CLAY to CLAY	115	1.5	31	27	-	-	2.8	9.9	43	0.005	15
15.42	35.5	40.6	-	2.9	0.0	8.4	3	silty CLAY to CLAY	115	1.5	27	24	-	-	2.5	9.9	49	0.005	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(474).cpt
CPT Date: 2/22/2010 11:51:16 AM
GW During Test: 15 ft

Sounding ID: CPT-03
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qcln PS -	q1ncs PS -	Slv Stss tsf	pore prss (psi)	Frct Ratio %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR -	* Fin Ic %	* D50 - mm	* Nk - -
15.58	35.4	40.4	-	2.8	0.0	8.1	3	silty CLAY to CLAY	115	1.5	27	24	-	-	2.5	9.9	48	0.005	15
15.75	33.2	37.7	-	2.7	0.0	8.5	3	silty CLAY to CLAY	115	1.5	25	22	-	-	2.3	9.9	50	0.005	15
15.91	32.9	37.1	-	2.4	0.0	7.5	3	silty CLAY to CLAY	115	1.5	25	22	-	-	2.3	9.9	48	0.005	15
16.08	41.0	46.1	-	3.1	0.0	7.8	3	silty CLAY to CLAY	115	1.5	31	27	-	-	2.9	9.9	45	0.005	15
16.24	65.7	67.4	197.8	3.3	0.0	5.0	4	clayy SILT to silty CLAY	115	2.0	34	33	-	-	4.6	9.9	32	0.070	15
16.40	30.2	33.6	-	2.8	0.0	9.7	3	silty CLAY to CLAY	115	1.5	22	20	-	-	2.1	9.9	55	0.005	15
16.57	22.4	24.8	-	2.0	0.0	9.5	3	silty CLAY to CLAY	115	1.5	17	15	-	-	1.5	9.9	61	0.005	15
16.73	34.5	38.0	-	2.2	0.0	6.6	3	silty CLAY to CLAY	115	1.5	25	23	-	-	2.4	9.9	45	0.005	15
16.90	37.8	41.4	-	2.6	0.0	7.0	3	silty CLAY to CLAY	115	1.5	28	25	-	-	2.6	9.9	45	0.005	15
17.06	35.6	38.8	-	2.6	0.0	7.6	3	silty CLAY to CLAY	115	1.5	26	24	-	-	2.5	9.9	48	0.005	15
17.23	35.1	38.1	-	2.5	0.0	7.4	3	silty CLAY to CLAY	115	1.5	25	23	-	-	2.4	9.9	47	0.005	15
17.39	36.8	39.7	-	2.8	0.0	7.7	3	silty CLAY to CLAY	115	1.5	26	25	-	-	2.6	9.9	48	0.005	15
17.55	51.2	55.1	-	3.0	0.0	6.0	3	silty CLAY to CLAY	115	1.5	37	34	-	-	3.6	9.9	38	0.005	15
17.72	53.8	55.5	182.7	2.7	0.0	5.1	4	clayy SILT to silty CLAY	115	2.0	28	27	-	-	3.8	9.9	35	0.070	15
17.88	41.4	44.1	-	2.3	0.0	5.6	3	silty CLAY to CLAY	115	1.5	29	28	-	-	2.9	9.9	40	0.005	15
18.05	52.2	52.3	137.6	1.7	0.0	3.3	4	clayy SILT to silty CLAY	115	2.0	26	26	-	-	3.7	9.9	29	0.070	15
18.21	50.2	50.1	150.3	1.9	0.0	4.0	4	clayy SILT to silty CLAY	115	2.0	25	25	-	-	3.5	9.9	33	0.070	15
18.37	60.7	60.4	162.6	2.3	0.0	3.9	4	clayy SILT to silty CLAY	115	2.0	30	30	-	-	4.2	9.9	30	0.070	15
18.54	42.6	44.6	-	2.6	0.0	6.2	3	silty CLAY to CLAY	115	1.5	30	28	-	-	3.0	9.9	42	0.005	15
18.70	24.2	25.3	-	1.9	0.0	8.2	3	silty CLAY to CLAY	115	1.5	17	16	-	-	1.7	9.9	58	0.005	15
18.87	16.7	17.4	-	1.5	0.0	9.4	3	silty CLAY to CLAY	115	1.5	12	11	-	-	1.1	8.7	69	0.005	15
19.03	32.6	33.7	-	1.8	0.0	5.6	3	silty CLAY to CLAY	115	1.5	22	22	-	-	2.3	9.9	45	0.005	15
19.19	35.5	36.5	-	2.0	0.0	5.8	3	silty CLAY to CLAY	115	1.5	24	24	-	-	2.5	9.9	44	0.005	15
19.36	32.6	33.3	-	1.9	0.0	5.9	3	silty CLAY to CLAY	115	1.5	22	22	-	-	2.3	9.9	46	0.005	15
19.52	40.2	41.0	-	2.7	0.0	7.0	3	silty CLAY to CLAY	115	1.5	27	27	-	-	2.8	9.9	45	0.005	15
19.69	50.2	51.0	-	3.4	0.0	6.8	3	silty CLAY to CLAY	115	1.5	34	33	-	-	3.5	9.9	41	0.005	15
19.85	73.5	71.7	204.2	3.7	0.0	5.0	4	clayy SILT to silty CLAY	115	2.0	36	37	-	-	5.1	9.9	31	0.070	15
20.01	49.1	49.4	-	3.1	0.0	6.5	3	silty CLAY to CLAY	115	1.5	33	33	-	-	3.4	9.9	41	0.005	15
20.18	39.7	39.8	-	2.3	0.0	6.0	3	silty CLAY to CLAY	115	1.5	27	26	-	-	2.8	9.9	43	0.005	15
20.34	27.0	26.9	-	1.8	0.0	7.0	3	silty CLAY to CLAY	115	1.5	18	18	-	-	1.9	9.9	53	0.005	15
20.51	21.8	21.6	-	1.5	0.0	7.3	3	silty CLAY to CLAY	115	1.5	14	15	-	-	1.5	9.9	58	0.005	15
20.67	31.5	31.1	-	1.9	0.0	6.1	3	silty CLAY to CLAY	115	1.5	21	21	-	-	2.2	9.9	48	0.005	15
20.83	31.8	31.3	-	2.2	0.0	7.2	3	silty CLAY to CLAY	115	1.5	21	21	-	-	2.2	9.9	51	0.005	15
21.00	32.7	32.1	-	1.7	0.0	5.4	3	silty CLAY to CLAY	115	1.5	21	22	-	-	2.3	9.9	45	0.005	15
21.16	30.2	29.4	-	2.1	0.0	7.3	3	silty CLAY to CLAY	115	1.5	20	20	-	-	2.1	9.9	52	0.005	15
21.33	24.4	23.7	-	1.8	0.0	7.6	3	silty CLAY to CLAY	115	1.5	16	16	-	-	1.7	9.9	57	0.005	15
21.49	18.7	18.1	-	1.1	0.0	6.3	3	silty CLAY to CLAY	115	1.5	12	12	-	-	1.3	8.7	60	0.005	15
21.65	26.6	25.7	-	1.7	0.0	6.7	3	silty CLAY to CLAY	115	1.5	17	18	-	-	1.8	9.9	53	0.005	15
21.82	45.1	43.3	-	2.6	0.0	6.0	3	silty CLAY to CLAY	115	1.5	29	30	-	-	3.1	9.9	42	0.005	15
21.98	36.7	35.1	-	2.8	0.0	8.0	3	silty CLAY to CLAY	115	1.5	23	24	-	-	2.5	9.9	50	0.005	15
22.15	26.8	25.5	-	2.2	0.0	8.8	3	silty CLAY to CLAY	115	1.5	17	18	-	-	1.8	9.9	59	0.005	15
22.31	26.3	24.9	-	1.9	0.0	7.4	3	silty CLAY to CLAY	115	1.5	17	18	-	-	1.8	9.9	56	0.005	15
22.47	25.1	23.7	-	1.7	0.0	7.2	3	silty CLAY to CLAY	115	1.5	16	17	-	-	1.7	9.9	56	0.005	15
22.64	24.2	22.8	-	1.5	0.0	6.7	3	silty CLAY to CLAY	115	1.5	15	16	-	-	1.7	9.9	56	0.005	15
22.80	23.7	22.2	-	1.6	0.0	7.1	3	silty CLAY to CLAY	115	1.5	15	16	-	-	1.6	9.9	57	0.005	15
22.97	21.4	20.0	-	1.5	0.0	7.5	3	silty CLAY to CLAY	115	1.5	13	14	-	-	1.5	9.4	61	0.005	15
23.13	22.3	20.7	-	2.2	0.0	9.9	3	silty CLAY to CLAY	115	1.5	14	15	-	-	1.5	9.8	66	0.005	15
23.30	66.2	61.8	156.4	2.3	0.0	3.6	4	clayy SILT to silty CLAY	115	2.0	31	33	-	-	4.6	9.9	29	0.070	15
23.46	52.0	47.9	-	2.7	0.0	5.4	3	silty CLAY to CLAY	115	1.5	32	35	-	-	3.6	9.9	38	0.005	15
23.62	49.0	45.0	-	2.8	0.0	5.9	3	silty CLAY to CLAY	115	1.5	30	33	-	-	3.4	9.9	41	0.005	15
23.79	40.9	37.4	-	2.4	0.0	6.0	3	silty CLAY to CLAY	115	1.5	25	27	-	-	2.8	9.9	44	0.005	15
23.95	31.4	28.6	-	1.9	0.0	6.3	3	silty CLAY to CLAY	115	1.5	19	21	-	-	2.2	9.9	50	0.005	15
24.12	23.7	21.5	-	1.7	0.0	7.8	3	silty CLAY to CLAY	115	1.5	14	16	-	-	1.6	9.9	60	0.005	15
24.28	35.7	32.3	-	1.9	0.0	5.6	3	silty CLAY to CLAY	115	1.5	22	24	-	-	2.5	9.9	45	0.005	15
24.44	29.6	26.7	-	2.0	0.0	7.2	3	silty CLAY to CLAY	115	1.5	18	20	-	-	2.0	9.9	54	0.005	15
24.61	35.8	32.1	-	2.2	0.0	6.4	3	silty CLAY to CLAY	115	1.5	21	24	-	-	2.5	9.9	48	0.005	15
24.77	37.7	33.7	-	2.2	0.0	5.9	3	silty CLAY to CLAY	115	1.5	22	25	-	-	2.6	9.9	46	0.005	15
24.94	39.0	34.7	-	2.2	0.0	5.8	3	silty CLAY to CLAY	115	1.5	23	26	-	-	2.7	9.9	45	0.005	15
25.10	36.8	32.6	-	2.0	0.0	5.7	3	silty CLAY to CLAY	115	1.5	22	25	-	-	2.5	9.9	46	0.005	15
25.26	27.8	24.6	-	0.9	0.0	3.5	4	clayy SILT to silty CLAY	115	2.0	12	14	-	-	1.9	9.9	43	0.070	15
25.43	20.8	18.3	-	1.3	0.0	6.9	3	silty CLAY to CLAY	115	1.5	12	14	-	-	1.4	8.3	61	0.005	15
25.59	41.2	36.1	-	1.5	0.0	3.9	4	clayy SILT to silty CLAY	115	2.0	18	21	-	-	2.9	9.9	38	0.070	15
25.76	25.3	22.1	-	1.4	0.0	5.9	3	silty CLAY to CLAY	115	1.5	15	17	-	-	1.7	9.9	54	0.005	15
25.92	21.0	18.3	-	1.4	0.0	7.2	3	silty CLAY to CLAY	115	1.5	12	14	-	-	1.4	8.3	62	0.005	15
26.08	28.4	24.6	-	1.4	0.0	5.0	3	silty CLAY to CLAY	115	1.5	16	19	-	-	2.0	9.9	49	0.005	15
26.25	18.8	16.2	-	1.5	0.0	8.6	3	silty CLAY to CLAY	115	1.5	11	13	-	-	1.3	7.2	69	0.005	15
26.41	28.2	24.3	-	1.4	0.0	5.2	3	silty CLAY to CLAY	115	1.5	16	19	-	-	1.9	9.9	50	0.005	15
26.58	25.7	22.0	-	1.2	0.0	4.8	3	silty CLAY to CLAY	115	1.5	15	17	-	-	1.8	9.9	50	0.005	15
26.74	27.6	23.6	-	1.1	0.0	4.1	3	silty CLAY to CLAY	115	1.5	16	18	-	-	1.9	9.9	46	0.005	15
26.90	27.5	23.4	-	1.2	0.0	4.8	3	silty CLAY to CLAY	115	1.5	16	18	-	-	1.9	9.9	49	0.005	15
27.07	22.4	19.0	-	1.4	0.0	6.6	3	silty CLAY to CLAY	115	1.5	13	15	-	-	1.5	8.5	60	0.005	15
27.23	27.0	22.8	-	1.4	0.0	5.4	3	silty CLAY to CLAY	115	1.5	15	18	-	-	1.9	9.9	52	0.005	15
27.40	45.1	38.0	-	2.0	0.0	4.7	3	silty CLAY to CLAY	115	1.5	25	30	-	-	3.1	9.9	40	0.005	15
27.56	44.8	37.5	-	1.9	0.0	4.3	4	clayy SILT to silty CLAY	115	2.0	19	22	-	-	3.1	9.9	39	0.070	15
27.72	22.3	18.6	-	1.4	0.0	6.8	3	silty CLAY to CLAY	115	1.5	12	15	-	-	1.5	8.2	61	0.005	15
27.89	15.9	13.3	-	0.9	0.0	6.6	3	silty CLAY to CLAY	115	1.5	9	11	-	-	1.1	5.7	69	0.005	15
28.05	18.1	15.1	-	0.9	0.0	5.4	3	silty CLAY to CLAY	115	1.5	10	12	-	-	1.2	6.5	62	0.005	15
28.22	16.7	13.8	-	0.8	0.0	5.5	3	silty CLAY to CLAY	115	1.5	9	11	-	-	1.1	5.9	64	0.005	15
28.38	15.9	13.1	-	0.8	0.0	5.9	3	silty CLAY to CLAY	115	1.5	9	11	-	-	1.1	5.5	67	0.005	15
28.54	14.5	11.9	-	1.0	0.0	7.6	3	silty CLAY to CLAY	115	1.5	8	10	-	-	1.0	5.0	75	0.005	15
28.71	20.6	16.8	-	1.2	0.0	6.2	3	silty CLAY to CLAY	115	1.5	11	14	-	-	1.4	7.3	61	0.005	15
28.87	20.6	16.8	-	1.1	0.0	5.6	3	silty CLAY to CLAY	115	1.5	11	14	-	-	1.4	7.3	59	0.005	15
29.04	20.7	16.8	-	0.7	0.0	3.8	3	silty CLAY to CLAY	115	1.5	11	14	-	-	1.4	7.3	52	0.005	15
29.20	17.0	13.8	-	1.0	0.0	6.7	3	silty CLAY to CLAY	115	1.5	9	11	-	-	1.1	5.8	68	0.005	15
29.36	21.4	17.3	-	1.4	0.0	7.1	3	silty CLAY to CLAY	115	1.5	12	14	-	-	1.5	7.5	64	0.005	15
29.53	24.8	19.9	-	1.5	0.0	6.5	3	silty CLAY to CLAY	115	1.5	13	17	-	-	1.7	8.7	58	0.005	15
29.69	40.9	32.8	-	1.6	0.0	4.1	4	clayy SILT to silty CLAY	115	2.0	16	20	-	-	2.8	9.9	40	0.070	15
29.86	32.0	25.5	-	1.8	0.0	5.9	3	silty CLAY to CLAY	115	1.5	17	21	-	-	2.2	9.9	51	0.005	15
30.02	27.8	22.1	-	1.8	0.0	6.8	3	silty CLAY to CLAY	115	1.5	15	19	-	-	1.9	9.7	57	0.005	15
30.19	34.0	27.0	-	2.0	0.0	6.1	3	silty CLAY to CLAY	115	1.5	18	23	-	-	2.3	9.9	51	0.005	15
30.35	29.2	23.1	-	1.7	0.0	6.3	3	silty CLAY to CLAY	115	1.5	15	19	-	-	2.0	9.9	54	0.005	15
30.51	24.5	19.3	-	1.9	0.0	8.6	3	silty CLAY to CLAY	115	1.5	13	16	-	-	1.7	8.3	65	0.005	15
30.68	31.8	24.9	-	1.9	0.0	6.4	3	silty CLAY to CLAY	115	1.5	17	21	-	-	2.2	9.9	53	0.005	15
30.84	35.3	27.6	-	1.9	0.0	5.5	3	silty CLAY to CLAY	115	1.5	18	24	-	-	2.4	9.9	48	0.005	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(474).cpt
CPT Date: 2/22/2010 11:51:16 AM
GW During Test: 15 ft

Sounding ID: CPT-03
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qcln PS -	qlncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
31.01	39.8	31.0	-	2.0	0.0	5.3	3	silty CLAY to CLAY	115	1.5	21	27	-	-	2.7	9.9	45	0.005	15
31.17	39.3	30.5	-	2.2	0.0	6.0	3	silty CLAY to CLAY	115	1.5	20	26	-	-	2.7	9.9	48	0.005	15
31.33	29.4	22.8	-	2.4	0.0	8.6	3	silty CLAY to CLAY	115	1.5	15	20	-	-	2.0	9.9	61	0.005	15
31.50	28.3	21.9	-	2.4	0.0	8.9	3	silty CLAY to CLAY	115	1.5	15	19	-	-	1.9	9.4	63	0.005	15
31.66	35.1	27.0	-	2.3	0.0	6.9	3	silty CLAY to CLAY	115	1.5	18	23	-	-	2.4	9.9	53	0.005	15
31.83	34.1	26.1	-	2.5	0.0	7.7	3	silty CLAY to CLAY	115	1.5	17	23	-	-	2.3	9.9	56	0.005	15
31.99	31.6	24.2	-	2.6	0.0	8.9	3	silty CLAY to CLAY	115	1.5	16	21	-	-	2.2	9.9	60	0.005	15
32.15	37.5	28.6	-	2.8	0.0	7.8	3	silty CLAY to CLAY	115	1.5	19	25	-	-	2.6	9.9	54	0.005	15
32.32	59.2	44.9	-	3.1	0.0	5.4	3	silty CLAY to CLAY	115	1.5	30	39	-	-	4.1	9.9	39	0.005	15
32.48	65.3	49.4	-	3.0	0.0	4.8	4	clayy SILT to silty CLAY	115	2.0	25	33	-	-	4.5	9.9	36	0.070	15
32.65	49.5	37.4	-	2.9	0.0	6.2	3	silty CLAY to CLAY	115	1.5	25	33	-	-	3.4	9.9	45	0.005	15
32.81	36.5	27.4	-	2.4	0.0	6.9	3	silty CLAY to CLAY	115	1.5	18	24	-	-	2.5	9.9	53	0.005	15
32.97	30.7	23.0	-	1.7	0.0	6.0	3	silty CLAY to CLAY	115	1.5	15	20	-	-	2.1	9.8	54	0.005	15
33.14	29.6	22.1	-	1.6	0.0	5.6	3	silty CLAY to CLAY	115	1.5	15	20	-	-	2.0	9.4	53	0.005	15
33.30	28.4	21.1	-	1.7	0.0	6.6	3	silty CLAY to CLAY	115	1.5	14	19	-	-	1.9	9.0	57	0.005	15
33.47	28.2	20.9	-	1.6	0.0	6.3	3	silty CLAY to CLAY	115	1.5	14	19	-	-	1.9	8.9	56	0.005	15
33.63	26.0	19.2	-	1.5	0.0	6.2	3	silty CLAY to CLAY	115	1.5	13	17	-	-	1.8	8.1	58	0.005	15
33.79	25.9	19.1	-	1.4	0.0	6.0	3	silty CLAY to CLAY	115	1.5	13	17	-	-	1.8	8.0	58	0.005	15
33.96	23.2	17.0	-	1.4	0.0	6.5	3	silty CLAY to CLAY	115	1.5	11	15	-	-	1.6	7.1	62	0.005	15
34.12	25.8	18.9	-	1.4	0.0	6.0	3	silty CLAY to CLAY	115	1.5	13	17	-	-	1.8	7.9	58	0.005	15
34.29	26.5	19.4	-	1.6	0.0	6.5	3	silty CLAY to CLAY	115	1.5	13	18	-	-	1.8	8.1	59	0.005	15
34.45	26.5	19.3	-	1.9	0.0	7.9	3	silty CLAY to CLAY	115	1.5	13	18	-	-	1.8	8.0	63	0.005	15
34.61	32.8	23.8	-	2.6	0.0	8.5	3	silty CLAY to CLAY	115	1.5	16	22	-	-	2.3	9.9	60	0.005	15
34.78	65.3	47.2	-	3.5	0.0	5.5	3	silty CLAY to CLAY	115	1.5	31	44	-	-	4.5	9.9	39	0.005	15
34.94	84.3	69.5	187.3	3.7	0.0	4.5	4	clayy SILT to silty CLAY	115	2.0	35	42	-	-	5.9	9.9	30	0.070	15
35.11	51.4	36.9	-	3.5	0.0	7.2	3	silty CLAY to CLAY	115	1.5	25	34	-	-	3.6	9.9	48	0.005	15
35.27	35.3	25.3	-	2.5	0.0	7.5	3	silty CLAY to CLAY	115	1.5	17	24	-	-	2.4	9.9	56	0.005	15
35.43	36.3	26.0	-	2.2	0.0	6.4	3	silty CLAY to CLAY	115	1.5	17	24	-	-	2.5	9.9	52	0.005	15
35.60	38.0	27.1	-	2.9	0.0	7.9	3	silty CLAY to CLAY	115	1.5	18	25	-	-	2.6	9.9	56	0.005	15
35.76	69.1	49.1	-	3.5	0.0	5.2	4	clayy SILT to silty CLAY	115	2.0	25	35	-	-	4.8	9.9	37	0.070	15
35.93	81.6	66.7	185.1	3.6	0.0	4.5	4	clayy SILT to silty CLAY	115	2.0	33	41	-	-	5.7	9.9	31	0.070	15
36.09	68.2	48.2	-	3.8	0.0	5.7	3	silty CLAY to CLAY	115	1.5	32	45	-	-	4.7	9.9	39	0.005	15
36.26	46.4	32.6	-	3.6	0.0	8.2	3	silty CLAY to CLAY	115	1.5	22	31	-	-	3.2	9.9	52	0.005	15
36.42	43.2	30.3	-	2.9	0.0	7.1	3	silty CLAY to CLAY	115	1.5	20	29	-	-	3.0	9.9	51	0.005	15
36.58	56.5	39.5	-	3.1	0.0	5.7	3	silty CLAY to CLAY	115	1.5	26	38	-	-	3.9	9.9	42	0.005	15
36.75	57.3	40.0	-	3.1	0.0	5.7	3	silty CLAY to CLAY	115	1.5	27	38	-	-	4.0	9.9	42	0.005	15
36.91	51.7	36.0	-	2.8	0.0	5.7	3	silty CLAY to CLAY	115	1.5	24	34	-	-	3.6	9.9	44	0.005	15
37.08	52.6	36.4	-	2.8	0.0	5.5	3	silty CLAY to CLAY	115	1.5	24	35	-	-	3.6	9.9	43	0.005	15
37.24	49.6	34.3	-	2.7	0.0	5.7	3	silty CLAY to CLAY	115	1.5	23	33	-	-	3.4	9.9	45	0.005	15
37.40	50.4	34.7	-	2.9	0.0	6.1	3	silty CLAY to CLAY	115	1.5	23	34	-	-	3.5	9.9	46	0.005	15
37.57	46.8	32.1	-	3.6	0.0	8.1	3	silty CLAY to CLAY	115	1.5	21	31	-	-	3.2	9.9	53	0.005	15
37.73	83.4	67.0	181.3	3.5	0.0	4.3	4	clayy SILT to silty CLAY	115	2.0	34	42	-	-	5.8	9.9	30	0.070	15
37.90	73.7	50.3	-	4.5	0.0	6.3	3	silty CLAY to CLAY	115	1.5	34	49	-	-	5.1	9.9	40	0.005	15
38.06	67.4	45.9	-	4.7	0.0	7.2	3	silty CLAY to CLAY	115	1.5	31	45	-	-	4.7	9.9	44	0.005	15
38.22	117.0	93.6	271.5	7.4	0.0	6.4	9	very stiff fine SOIL	120	2.0	47	58	65	41	-	-	32	0.250	30
38.39	127.3	86.1	-	9.5	0.0	7.6	9	very stiff fine SOIL	120	2.0	43	64	62	41	-	-	36	0.250	30
38.55	165.6	132.1	337.5	11.0	0.0	6.7	9	very stiff fine SOIL	120	2.0	66	83	76	43	-	-	29	0.250	30
38.72	129.8	103.4	305.7	9.1	0.0	7.1	9	very stiff fine SOIL	120	2.0	52	65	68	41	-	-	32	0.250	30
38.88	109.3	73.3	-	7.5	0.0	7.0	9	very stiff fine SOIL	120	2.0	37	55	57	40	-	-	36	0.250	30
39.04	90.9	60.7	-	8.4	0.0	9.5	9	very stiff fine SOIL	120	2.0	30	45	51	39	-	-	45	0.250	30
39.21	104.6	69.7	-	8.7	0.0	8.5	9	very stiff fine SOIL	120	2.0	35	52	55	40	-	-	41	0.250	30
39.37	91.7	72.6	131.6	2.0	0.0	2.2	5	silty SAND to sandy SILT	120	4.0	18	23	56	39	-	-	21	0.200	16
39.54	78.3	51.8	-	4.3	0.0	5.6	3	silty CLAY to CLAY	115	1.5	35	52	-	-	5.5	9.9	38	0.005	15
39.70	273.3	215.6	241.2	4.2	0.0	1.6	6	clean SAND to silty SAND	125	5.0	43	55	92	45	-	-	8	0.350	16
39.86	396.3	312.2	329.6	6.3	0.0	1.6	6	clean SAND to silty SAND	125	5.0	62	79	95	47	-	-	7	0.350	16
40.03	396.4	311.7	322.3	5.7	0.0	1.5	6	clean SAND to silty SAND	125	5.0	62	79	95	47	-	-	6	0.350	16
40.19	555.2	435.9	435.9	5.7	0.0	1.0	6	clean SAND to silty SAND	125	5.0	87	100	95	48	-	-	5	0.350	16

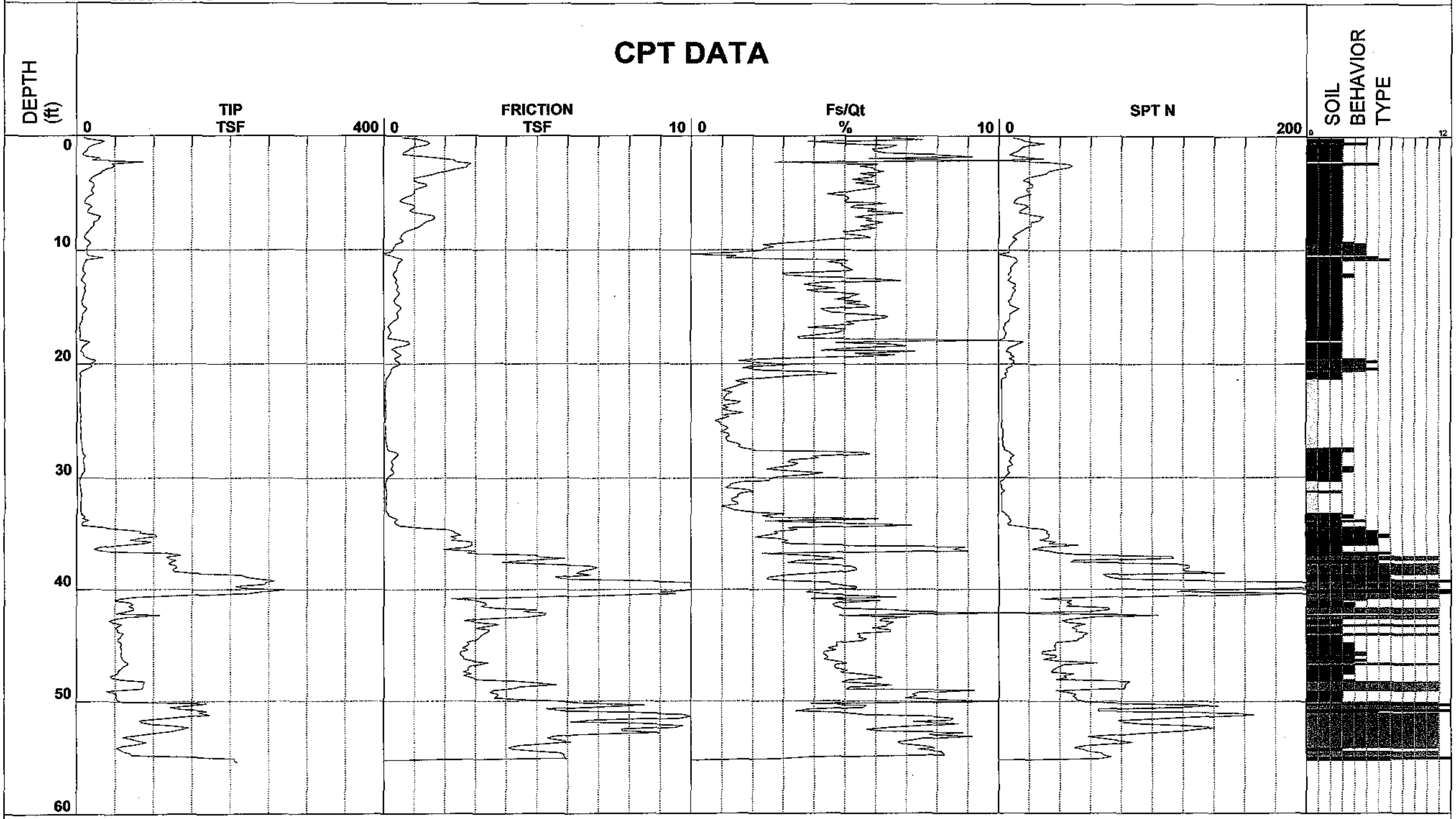
* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Associated Soils Engineering

Project	Big Canyon Country Club	Operator	BH-AH	Filename	SDF(476).cpt
Job Number	6169	Cone Number	DSG1104	GPS	
Hole Number	CPT-04	Date and Time	2/22/2010 12:48:31 PM	Maximum Depth	55.45 ft
Water Table Depth	18.00 ft				

Net Area Ratio .8



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

*Soil behavior type and SPT based on data from UBC-1983

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(476).cpt
CPT Date: 2/22/2010 12:48:31 PM
GW During Test: 18 ft

Page: 1
Sounding ID: CPT-04
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qc1n PS -	q1ncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
0.33	14.3	22.9	-	1.1	0.0	7.5	3	silty CLAY to CLAY	115	1.5	15	10	-	-	1.0	9.9	57	0.005	15
0.49	35.7	57.3	153.8	1.4	0.0	3.8	4	clayy SILT to silty CLAY	115	2.0	29	18	-	-	2.5	9.9	30	0.070	15
0.66	30.6	49.1	-	1.5	0.0	4.8	4	clayy SILT to silty CLAY	115	2.0	25	15	-	-	2.2	9.9	36	0.070	15
0.82	20.9	33.6	-	1.4	0.0	6.7	3	silty CLAY to CLAY	115	1.5	22	14	-	-	1.5	9.9	47	0.005	15
0.98	16.5	26.5	-	1.1	0.0	6.5	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	51	0.005	15
1.15	14.7	23.6	-	0.9	0.0	5.9	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.0	9.9	52	0.005	15
1.31	13.8	22.2	-	0.8	0.0	6.0	3	silty CLAY to CLAY	115	1.5	15	9	-	-	1.0	9.9	53	0.005	15
1.48	10.4	16.7	-	0.7	0.0	6.4	3	silty CLAY to CLAY	115	1.5	11	7	-	-	0.7	9.9	60	0.005	15
1.64	7.7	12.4	-	0.6	0.0	8.2	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.5	9.9	73	0.005	15
1.80	13.5	21.6	-	1.2	0.0	9.2	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	62	0.005	15
1.97	30.3	48.6	-	1.8	0.0	5.8	3	silty CLAY to CLAY	115	1.5	32	20	-	-	2.1	9.9	39	0.005	15
2.13	21.3	34.2	-	2.3	0.0	9.9	3	silty CLAY to CLAY	115	1.5	23	14	-	-	1.5	9.9	55	0.005	15
2.30	87.1	139.6	208.3	2.4	0.0	2.7	5	silty SAND to sandy SILT	120	4.0	35	22	78	48	-	-	16	0.200	16
2.46	46.9	75.2	233.2	2.8	0.0	6.1	9	very stiff fine SOIL	120	2.0	38	23	58	46	-	-	34	0.250	30
2.62	49.6	79.5	225.4	2.7	0.0	5.5	9	very stiff fine SOIL	120	2.0	40	25	59	46	-	-	31	0.250	30
2.79	45.5	73.0	226.6	2.7	0.0	6.0	9	very stiff fine SOIL	120	2.0	36	23	57	46	-	-	34	0.250	30
2.95	39.1	62.7	-	2.3	0.0	6.0	4	clayy SILT to silty CLAY	115	2.0	31	20	-	-	2.8	9.9	36	0.070	15
3.12	33.7	54.0	-	2.1	0.0	6.3	3	silty CLAY to CLAY	115	1.5	36	22	-	-	2.4	9.9	39	0.005	15
3.28	31.9	51.2	-	1.8	0.0	5.5	3	silty CLAY to CLAY	115	1.5	34	21	-	-	2.2	9.9	37	0.005	15
3.45	25.8	41.4	-	1.5	0.0	6.0	3	silty CLAY to CLAY	115	1.5	28	17	-	-	1.8	9.9	42	0.005	15
3.61	21.1	33.9	-	1.2	0.0	5.9	3	silty CLAY to CLAY	115	1.5	23	14	-	-	1.5	9.9	45	0.005	15
3.77	19.0	30.4	-	1.0	0.0	5.3	3	silty CLAY to CLAY	115	1.5	20	13	-	-	1.3	9.9	45	0.005	15
3.94	16.7	26.8	-	1.0	0.0	6.0	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	50	0.005	15
4.10	20.6	33.0	-	1.1	0.0	5.4	3	silty CLAY to CLAY	115	1.5	22	14	-	-	1.4	9.9	44	0.005	15
4.27	22.8	36.6	-	1.4	0.0	6.1	3	silty CLAY to CLAY	115	1.5	24	15	-	-	1.6	9.9	44	0.005	15
4.43	22.8	36.6	-	1.4	0.0	6.2	3	silty CLAY to CLAY	115	1.5	24	15	-	-	1.6	9.9	45	0.005	15
4.59	20.3	32.5	-	1.2	0.0	5.9	3	silty CLAY to CLAY	115	1.5	22	14	-	-	1.4	9.9	46	0.005	15
4.76	19.0	30.5	-	1.0	0.0	5.4	3	silty CLAY to CLAY	115	1.5	20	13	-	-	1.3	9.9	45	0.005	15
4.92	20.2	32.5	-	1.0	0.0	5.0	3	silty CLAY to CLAY	115	1.5	22	13	-	-	1.4	9.9	43	0.005	15
5.09	22.1	35.4	-	1.0	0.0	4.5	4	clayy SILT to silty CLAY	115	2.0	18	11	-	-	1.5	9.9	40	0.070	15
5.25	17.8	28.5	-	0.9	0.0	5.1	3	silty CLAY to CLAY	115	1.5	19	12	-	-	1.2	9.9	46	0.005	15
5.41	14.1	22.6	-	0.7	0.0	5.2	3	silty CLAY to CLAY	115	1.5	15	9	-	-	1.0	9.9	51	0.005	15
5.58	11.7	18.8	-	0.6	0.0	5.2	3	silty CLAY to CLAY	115	1.5	13	8	-	-	0.8	9.9	54	0.005	15
5.74	10.6	17.0	-	0.5	0.0	5.1	3	silty CLAY to CLAY	115	1.5	11	7	-	-	0.7	9.9	56	0.005	15
5.91	10.6	16.9	-	0.7	0.0	6.6	3	silty CLAY to CLAY	115	1.5	11	7	-	-	0.7	9.9	61	0.005	15
6.07	17.5	28.1	-	0.9	0.0	5.5	3	silty CLAY to CLAY	115	1.5	19	12	-	-	1.2	9.9	47	0.005	15
6.23	19.5	31.3	-	1.0	0.0	5.3	3	silty CLAY to CLAY	115	1.5	21	13	-	-	1.4	9.9	45	0.005	15
6.40	16.4	26.2	-	1.0	0.0	6.2	3	silty CLAY to CLAY	115	1.5	17	11	-	-	1.1	9.9	51	0.005	15
6.56	14.7	23.5	-	0.8	0.0	5.9	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.0	9.9	52	0.005	15
6.73	13.5	21.7	-	0.9	0.0	7.1	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	57	0.005	15
6.89	22.2	35.6	-	1.3	0.0	6.0	3	silty CLAY to CLAY	115	1.5	24	15	-	-	1.5	9.9	45	0.005	15
7.05	30.6	49.1	-	1.6	0.0	5.4	3	silty CLAY to CLAY	115	1.5	33	20	-	-	2.1	9.9	38	0.005	15
7.22	28.5	45.6	-	1.7	0.0	6.0	3	silty CLAY to CLAY	115	1.5	30	19	-	-	2.0	9.9	40	0.005	15
7.38	27.9	44.7	-	1.6	0.0	5.8	3	silty CLAY to CLAY	115	1.5	30	19	-	-	1.9	9.9	40	0.005	15
7.55	22.3	35.7	-	1.4	0.0	6.3	3	silty CLAY to CLAY	115	1.5	24	15	-	-	1.6	9.9	46	0.005	15
7.71	21.6	34.6	-	1.3	0.0	6.1	3	silty CLAY to CLAY	115	1.5	23	14	-	-	1.5	9.9	45	0.005	15
7.87	22.0	35.3	-	1.2	0.0	5.6	3	silty CLAY to CLAY	115	1.5	24	15	-	-	1.5	9.9	44	0.005	15
8.04	18.5	29.7	-	1.1	0.0	6.1	3	silty CLAY to CLAY	115	1.5	20	12	-	-	1.3	9.9	48	0.005	15
8.20	16.9	27.1	-	0.9	0.0	5.7	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	49	0.005	15
8.37	14.9	23.9	-	0.7	0.0	5.1	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.0	9.9	49	0.005	15
8.53	12.8	20.5	-	0.6	0.0	5.2	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	53	0.005	15
8.69	10.4	16.7	-	0.6	0.0	5.8	3	silty CLAY to CLAY	115	1.5	11	7	-	-	0.7	9.9	60	0.005	15
8.86	9.5	15.2	-	0.6	0.0	6.2	3	silty CLAY to CLAY	115	1.5	10	6	-	-	0.6	8.9	63	0.005	15
9.02	12.2	19.5	-	0.6	0.0	4.7	3	silty CLAY to CLAY	115	1.5	13	8	-	-	0.8	9.9	52	0.005	15
9.19	16.0	25.7	-	0.6	0.0	4.2	3	silty CLAY to CLAY	115	1.5	17	11	-	-	1.1	9.9	44	0.005	15
9.35	18.8	30.1	-	0.6	0.0	3.2	4	clayy SILT to silty CLAY	115	2.0	15	9	-	-	1.3	9.9	38	0.070	15
9.51	16.9	27.1	-	0.4	0.0	2.4	4	clayy SILT to silty CLAY	115	2.0	14	8	-	-	1.2	9.9	36	0.070	15
9.68	14.1	22.6	-	0.4	0.0	2.8	4	clayy SILT to silty CLAY	115	2.0	11	7	-	-	1.0	9.9	41	0.070	15
9.84	13.7	21.9	-	0.3	0.0	2.5	4	clayy SILT to silty CLAY	115	2.0	11	7	-	-	0.9	9.9	40	0.070	15
10.01	13.7	22.0	-	0.3	0.0	2.4	4	clayy SILT to silty CLAY	115	2.0	11	7	-	-	0.9	9.9	39	0.070	15
10.17	14.0	20.0	-	0.2	0.0	1.7	4	clayy SILT to silty CLAY	115	2.0	10	7	-	-	1.0	9.9	36	0.070	15
10.34	13.7	17.2	33.0	0.0	0.0	0.1	5	silty SAND to sandy SILT	120	4.0	4	3	9	35	-	-	21	0.200	16
10.50	16.2	20.2	66.7	0.2	0.0	1.5	4	clayy SILT to silty CLAY	115	2.0	10	8	-	-	1.1	9.9	35	0.070	15
10.66	35.4	43.9	78.4	0.4	0.0	1.2	5	silty SAND to sandy SILT	120	4.0	11	9	40	40	-	-	21	0.200	16
10.83	12.4	19.8	-	0.6	0.0	5.4	3	silty CLAY to CLAY	115	1.5	13	8	-	-	0.8	9.9	54	0.005	15
10.99	12.5	19.7	-	0.6	0.0	4.7	3	silty CLAY to CLAY	115	1.5	13	8	-	-	0.9	9.9	52	0.005	15
11.16	10.0	15.5	-	0.5	0.0	5.3	3	silty CLAY to CLAY	115	1.5	10	7	-	-	0.7	7.8	60	0.005	15
11.32	9.5	14.5	-	0.5	0.0	5.3	3	silty CLAY to CLAY	115	1.5	10	6	-	-	0.6	7.3	61	0.005	15
11.48	8.7	13.1	-	0.4	0.0	5.5	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.6	6.6	65	0.005	15
11.65	8.3	12.4	-	0.4	0.0	5.7	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.6	6.2	67	0.005	15
11.81	8.5	12.5	-	0.4	0.0	5.3	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.6	6.3	65	0.005	15
11.98	11.4	16.5	-	0.3	0.0	3.2	3	silty CLAY to CLAY	115	1.5	11	8	-	-	0.8	8.5	49	0.005	15
12.14	10.0	14.3	-	0.3	0.0	3.3	3	silty CLAY to CLAY	115	1.5	10	7	-	-	0.7	7.3	54	0.005	15
12.30	8.7	12.2	-	0.3	0.0	4.3	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.6	6.2	62	0.005	15
12.47	6.8	9.5	-	0.4	0.0	6.6	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	4.7	78	0.005	15
12.63	6.2	8.5	-	0.4	0.0	7.7	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.4	4.2	85	0.005	15
12.80	8.8	11.9	-	0.4	0.0	4.6	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.6	6.1	64	0.005	15
12.96	11.6	15.5	-	0.4	0.0	3.9	3	silty CLAY to CLAY	115	1.5	10	8	-	-	0.8	8.1	54	0.005	15
13.12	11.4	15.0	-	0.5	0.0	4.4	3	silty CLAY to CLAY	115	1.5	10	8	-	-	0.8	7.9	57	0.005	15
13.29	9.7	12.7	-	0.5	0.0	5.1	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.7	6.6	64	0.005	15
13.45	11.0	14.2	-	0.4	0.0	4.1	3	silty CLAY to CLAY	115	1.5	9	7	-	-	0.7	7.4	57	0.005	15
13.62	10.8	13.7	-	0.4	0.0	4.4	3	silty CLAY to CLAY	115	1.5	9	7	-	-	0.7	7.2	59	0.005	15
13.78	9.6	12.1	-	0.5	0.0	6.0	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.6	6.3	69	0.005	15
13.94	9.0	11.1	-	0.5	0.0	5.7	3	silty CLAY to CLAY	115	1.5	7	6	-	-	0.6	5.8	70	0.005	15
14.11	8.2	10.1	-	0.4	0.0	5.7	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.5	5.2	73	0.005	15
14.27	7.8	9.5	-	0.4	0.0	5.2	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	4.9	73	0.005	15
14.44	6.2	7.5	-	0.3	0.0	6.3	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.4	3.7	84	0.005	15
14.60	6.9	8.2	-	0.4	0.0	5.7	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	4.2	79	0.005	15
14.76	7.4	8.7	-	0.4	0.0	6.4	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	4.4	80	0.005	15
14.93	8.9	10.4	-	0.5	0.0	6.4	3	silty CLAY to CLAY	115	1.5	7	6	-	-	0.6	5.4	74	0.005	15
15.09	13.2	15.2	-	0.6	0.0	4.5	3	silty CLAY to CLAY	115	1.5	10	9	-	-	0.9	8.2	57	0.005	15
15.26	11.8	13.5	-	0.5	0.0	4.7	3	silty CLAY to CLAY	115	1.5	9	8	-	-	0.8	7.2	61	0.005	15
15.42	9.5	10.7	-	0.4	0.0	5.0	3	silty CLAY to CLAY	115	1.5	7	6	-	-	0.6	5.6	68	0.005	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Project ID: Associated Soils
Data File: SDF(476).cpt
CPT Date: 2/22/2010 12:48:31 PM
GW During Test: 18 ft

Sounding ID: CPT-04
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qcln PS -	qlncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
15.58	7.6	8.5	-	0.4	0.0	6.3	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	4.3	80	0.005	15
15.75	7.2	7.9	-	0.5	0.0	7.3	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	4.0	86	0.005	15
15.91	7.2	7.9	-	0.5	0.0	7.2	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	4.0	86	0.005	15
16.08	7.3	7.9	-	0.4	0.0	6.7	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	4.1	84	0.005	15
16.24	6.1	6.5	-	0.3	0.0	6.0	3	silty CLAY to CLAY	115	1.5	4	4	-	-	0.4	3.2	88	0.005	15
16.40	4.3	4.5	-	0.2	0.0	6.8	2	Organic SOILS - Peats	100	1.0	5	4	-	-	0.4	2.1	95	0.100	10
16.57	3.7	3.9	-	0.2	0.0	6.4	2	Organic SOILS - Peats	100	1.0	4	4	-	-	0.3	1.7	95	0.100	10
16.73	3.5	3.7	-	0.1	0.0	5.2	2	Organic SOILS - Peats	100	1.0	4	4	-	-	0.3	1.6	95	0.100	10
16.90	3.5	3.6	-	0.2	0.0	6.9	2	Organic SOILS - Peats	100	1.0	4	4	-	-	0.3	1.6	95	0.100	10
17.06	4.4	4.5	-	0.2	0.0	6.3	2	Organic SOILS - Peats	100	1.0	4	4	-	-	0.4	2.1	95	0.100	10
17.23	5.5	5.6	-	0.3	0.0	5.8	3	silty CLAY to CLAY	115	1.5	4	4	-	-	0.3	2.7	93	0.005	15
17.39	5.0	5.0	-	0.2	0.0	5.3	3	silty CLAY to CLAY	115	1.5	3	3	-	-	0.3	2.4	95	0.005	15
17.55	4.6	4.6	-	0.2	0.0	4.5	3	silty CLAY to CLAY	115	1.5	3	3	-	-	0.3	2.1	95	0.005	15
17.72	4.0	4.0	-	0.1	0.0	4.7	3	silty CLAY to CLAY	115	1.5	3	3	-	-	0.2	1.8	95	0.005	15
17.88	4.6	4.5	-	0.5	0.0	9.9	2	Organic SOILS - Peats	100	1.0	4	5	-	-	0.4	2.1	95	0.100	10
18.05	17.2	16.7	-	0.8	0.0	5.0	3	silty CLAY to CLAY	115	1.5	11	11	-	-	1.2	9.4	57	0.005	15
18.21	13.3	12.9	-	0.9	0.0	7.0	3	silty CLAY to CLAY	115	1.5	9	9	-	-	0.9	7.1	70	0.005	15
18.37	10.1	9.8	-	0.7	0.0	7.8	3	silty CLAY to CLAY	115	1.5	7	7	-	-	0.7	5.2	81	0.005	15
18.54	7.7	7.4	-	0.4	0.0	6.0	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	3.8	84	0.005	15
18.70	6.4	6.2	-	0.3	0.0	5.1	3	silty CLAY to CLAY	115	1.5	4	4	-	-	0.4	3.0	87	0.005	15
18.87	5.3	5.1	-	0.4	0.0	9.1	2	Organic SOILS - Peats	100	1.0	5	5	-	-	0.5	2.4	95	0.100	10
19.03	8.5	8.1	-	0.5	0.0	6.1	3	silty CLAY to CLAY	115	1.5	5	6	-	-	0.6	4.2	81	0.005	15
19.19	8.6	8.2	-	0.6	0.0	7.6	3	silty CLAY to CLAY	115	1.5	5	6	-	-	0.6	4.2	86	0.005	15
19.36	10.0	9.4	-	0.5	0.0	5.4	3	silty CLAY to CLAY	115	1.5	6	7	-	-	0.7	4.9	74	0.005	15
19.52	15.4	14.5	-	0.4	0.0	2.5	4	clayy SILT to silty CLAY	115	2.0	7	8	-	-	1.0	7.8	49	0.070	15
19.69	25.1	23.6	72.4	0.4	0.0	1.6	4	clayy SILT to silty CLAY	115	2.0	12	13	-	-	1.7	9.9	33	0.070	15
19.85	21.7	20.2	-	0.5	0.0	2.4	4	clayy SILT to silty CLAY	115	2.0	10	11	-	-	1.5	9.9	41	0.070	15
20.01	17.0	15.7	-	0.5	0.0	3.5	3	silty CLAY to CLAY	115	1.5	10	11	-	-	1.2	8.5	52	0.005	15
20.18	19.7	18.2	-	0.4	0.0	2.2	4	clayy SILT to silty CLAY	115	2.0	9	10	-	-	1.4	9.9	42	0.070	15
20.34	16.6	15.2	-	0.3	0.0	1.8	4	clayy SILT to silty CLAY	115	2.0	8	8	-	-	1.1	8.1	43	0.070	15
20.51	10.5	9.7	-	0.2	0.0	2.6	3	silty CLAY to CLAY	115	1.5	6	7	-	-	0.7	4.9	60	0.005	15
20.67	5.8	5.3	-	0.2	0.0	5.1	3	silty CLAY to CLAY	115	1.5	4	4	-	-	0.4	2.4	93	0.005	15
20.83	4.2	3.8	-	0.2	0.0	6.7	2	Organic SOILS - Peats	100	1.0	4	4	-	-	0.4	1.5	95	0.100	10
21.00	5.0	4.5	-	0.2	0.0	4.5	3	silty CLAY to CLAY	115	1.5	3	3	-	-	0.3	1.9	95	0.005	15
21.16	4.8	4.3	-	0.1	0.0	3.5	3	silty CLAY to CLAY	115	1.5	3	3	-	-	0.3	1.8	94	0.005	15
21.33	4.2	3.7	-	0.1	0.0	2.5	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	1.5	94	0.005	15
21.49	3.9	3.5	-	0.1	0.0	2.1	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	1.4	94	0.005	15
21.65	3.8	3.4	-	0.1	0.0	2.7	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	1.3	95	0.005	15
21.82	4.2	3.7	-	0.1	0.0	2.2	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	1.5	93	0.005	15
21.98	3.8	3.4	-	0.1	0.0	2.1	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	1.3	95	0.005	15
22.15	3.3	3.0	-	0.0	0.0	1.9	3	silty CLAY to CLAY	115	1.5	2	2	-	-	0.2	1.0	95	0.005	15
22.31	3.5	3.1	-	0.0	0.0	1.6	3	silty CLAY to CLAY	115	1.5	2	2	-	-	0.2	1.1	95	0.005	15
22.47	3.7	3.2	-	0.0	0.0	2.1	3	silty CLAY to CLAY	115	1.5	2	2	-	-	0.2	1.2	95	0.005	15
22.64	3.8	3.3	-	0.0	0.0	1.8	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	1.2	95	0.005	15
22.80	4.2	3.7	-	0.0	0.0	1.6	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	1.4	89	0.005	15
22.97	4.3	3.7	-	0.0	0.0	1.5	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.3	1.4	87	0.005	15
23.13	4.1	3.6	-	0.0	0.0	1.6	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	1.3	90	0.005	15
23.30	4.0	3.4	-	0.1	0.0	2.4	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	1.2	95	0.005	15
23.46	3.9	3.3	-	0.1	0.0	2.2	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	1.2	95	0.005	15
23.62	4.1	3.5	-	0.0	0.0	1.5	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	1.3	89	0.005	15
23.79	4.0	3.4	-	0.0	0.0	1.8	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	1.2	95	0.005	15
23.95	3.8	3.2	-	0.0	0.0	1.6	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	1.1	95	0.005	15
24.12	3.6	3.1	-	0.0	0.0	2.0	3	silty CLAY to CLAY	115	1.5	2	2	-	-	0.2	1.0	95	0.005	15
24.28	3.7	3.1	-	0.1	0.0	2.7	3	silty CLAY to CLAY	115	1.5	2	2	-	-	0.2	1.0	95	0.005	15
24.44	5.0	4.2	-	0.1	0.0	1.4	3	silty CLAY to CLAY	115	1.5	3	3	-	-	0.3	1.6	81	0.005	15
24.61	4.3	3.6	-	0.1	0.0	1.8	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.3	1.3	91	0.005	15
24.77	4.1	3.4	-	0.0	0.0	1.5	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	1.2	91	0.005	15
24.94	4.2	3.5	-	0.0	0.0	1.1	1	sensitive fine SOIL	115	2.0	2	2	-	-	0.2	1.2	87	0.005	15
25.10	4.4	3.6	-	0.0	0.0	1.4	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.3	1.3	87	0.005	15
25.26	4.7	3.8	-	0.0	0.0	1.4	3	silty CLAY to CLAY	115	1.5	3	3	-	-	0.3	1.4	84	0.005	15
25.43	4.9	4.0	-	0.1	0.0	1.6	3	silty CLAY to CLAY	115	1.5	3	3	-	-	0.3	1.5	84	0.005	15
25.59	5.1	4.2	-	0.1	0.0	1.7	3	silty CLAY to CLAY	115	1.5	3	3	-	-	0.3	1.6	84	0.005	15
25.76	5.4	4.4	-	0.1	0.0	1.5	3	silty CLAY to CLAY	115	1.5	3	4	-	-	0.3	1.7	80	0.005	15
25.92	5.9	4.8	-	0.1	0.0	1.3	3	silty CLAY to CLAY	115	1.5	3	4	-	-	0.4	1.9	74	0.005	15
26.08	5.3	4.3	-	0.1	0.0	1.7	3	silty CLAY to CLAY	115	1.5	3	4	-	-	0.3	1.6	83	0.005	15
26.25	5.3	4.2	-	0.1	0.0	1.7	3	silty CLAY to CLAY	115	1.5	3	4	-	-	0.3	1.6	83	0.005	15
26.41	5.3	4.2	-	0.1	0.0	1.6	3	silty CLAY to CLAY	115	1.5	3	4	-	-	0.3	1.6	82	0.005	15
26.58	5.2	4.1	-	0.1	0.0	1.6	3	silty CLAY to CLAY	115	1.5	3	3	-	-	0.3	1.5	84	0.005	15
26.74	5.5	4.4	-	0.1	0.0	1.7	3	silty CLAY to CLAY	115	1.5	3	4	-	-	0.3	1.7	81	0.005	15
26.90	5.9	4.7	-	0.1	0.0	2.0	3	silty CLAY to CLAY	115	1.5	3	4	-	-	0.4	1.8	81	0.005	15
27.07	6.1	4.8	-	0.1	0.0	2.2	3	silty CLAY to CLAY	115	1.5	3	4	-	-	0.4	1.9	81	0.005	15
27.23	6.5	5.1	-	0.1	0.0	2.0	3	silty CLAY to CLAY	115	1.5	3	4	-	-	0.4	2.0	78	0.005	15
27.40	6.4	5.1	-	0.1	0.0	2.3	3	silty CLAY to CLAY	115	1.5	3	4	-	-	0.4	2.0	81	0.005	15
27.56	6.8	5.3	-	0.1	0.0	2.8	3	silty CLAY to CLAY	115	1.5	4	5	-	-	0.4	2.1	82	0.005	15
27.72	7.2	5.7	-	0.4	0.0	7.2	2	Organic SOILS - Peats	100	1.0	6	7	-	-	0.7	2.3	95	0.100	10
27.89	8.0	6.3	-	0.5	0.0	7.2	3	silty CLAY to CLAY	115	1.5	4	5	-	-	0.5	2.6	95	0.005	15
28.05	10.5	8.2	-	0.4	0.0	4.7	3	silty CLAY to CLAY	115	1.5	5	7	-	-	0.7	3.6	76	0.005	15
28.22	8.4	6.5	-	0.3	0.0	5.1	3	silty CLAY to CLAY	115	1.5	4	6	-	-	0.5	2.7	86	0.005	15
28.38	8.3	6.4	-	0.3	0.0	4.1	3	silty CLAY to CLAY	115	1.5	4	6	-	-	0.5	2.6	82	0.005	15
28.54	7.6	5.9	-	0.2	0.0	4.0	3	silty CLAY to CLAY	115	1.5	4	5	-	-	0.5	2.3	85	0.005	15
28.71	8.1	6.2	-	0.3	0.0	4.4	3	silty CLAY to CLAY	115	1.5	4	5	-	-	0.5	2.5	84	0.005	15
28.87	9.0	6.9	-	0.3	0.0	4.0	3	silty CLAY to CLAY	115	1.5	5	6	-	-	0.6	2.9	79	0.005	15
29.04	9.1	6.9	-	0.3	0.0	3.4	3	silty CLAY to CLAY	115	1.5	5	6	-	-	0.6	2.9	76	0.005	15
29.20	8.8	6.6	-	0.2	0.0	3.1	3	silty CLAY to CLAY	115	1.5	4	6	-	-	0.6	2.7	75	0.005	15
29.36	9.2	7.0	-	0.3	0.0	3.9	3	silty CLAY to CLAY	115	1.5	5	6	-	-	0.6	2.9	78	0.005	15
29.53	7.6	5.7	-	0.3	0.0	5.5	3	silty CLAY to CLAY	115	1.5	4	5	-	-	0.5	2.2	93	0.005	15
29.69	5.8	4.4	-	0.2	0.0	5.4	3	silty CLAY to CLAY	115	1.5	3	4	-	-	0.3	1.6	95	0.005	15
29.86	4.8	3.6	-	0.1	0.0	4.4	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.3	1.2	95	0.005	15
30.02	3.9	2.9	-	0.1	0.0	4.6	2	Organic SOILS - Peats	100	1.0	3	4	-	-	0.3	0.8	95	0.100	10
30.19	3.0	2.2	-	0.1	0.0	6.0	2	Organic SOILS - Peats	100	1.0	2	3	-	-	0.2	0.5	95	0.100	10
30.35	3.1	2.3	-	0.0	0.0	3.7	2	Organic SOILS - Peats	100	1.0	2	3	-	-	0.2	0.5	95	0.100	10
30.51	3.0	2.2	-	0.0	0.0	3.1	2	Organic SOILS - Peats	100	1.0	2	3	-	-	0.2	0.5	95	0.100	10
30.68	3.4	2.5	-	0.0	0.0	2.6	2	Organic SOILS - Peats	100	1.0	2	3	-	-	0.3	0.6	95	0.100	10
30.84	3.9	2.8	-	0.0	0.0	2.1	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	0.8	95	0.005	15

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Middle Earth Geo Testing

Project ID: Associated Soils
Data File: SDF(476).cpt
CPT Date: 2/22/2010 12:48:31 PM
GW During Test: 18 ft

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Sounding ID: CPT-04
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qc1n PS -	q1ncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR -	* Fin Ic %	* D50 mm	* Nk -
31.01	3.9	2.9	-	0.1	0.0	3.1	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	0.8	95	0.005	15
31.17	4.0	3.0	-	0.1	0.0	3.6	2	Organic SOILS - Peats	100	1.0	3	4	-	-	0.3	0.8	95	0.100	10
31.33	5.2	3.8	-	0.1	0.0	2.5	3	silty CLAY to CLAY	115	1.5	3	3	-	-	0.3	1.2	95	0.005	15
31.50	4.9	3.6	-	0.1	0.0	2.4	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.3	1.1	95	0.005	15
31.66	4.6	3.4	-	0.1	0.0	2.5	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.3	1.0	95	0.005	15
31.83	4.6	3.3	-	0.1	0.0	2.2	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.3	1.0	95	0.005	15
31.99	4.5	3.2	-	0.1	0.0	2.2	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.3	0.9	95	0.005	15
32.15	4.3	3.1	-	0.1	0.0	2.6	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	0.9	95	0.005	15
32.32	4.4	3.2	-	0.1	0.0	2.6	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	0.9	95	0.005	15
32.48	4.3	3.1	-	0.0	0.0	1.7	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	0.9	95	0.005	15
32.65	4.1	2.9	-	0.1	0.0	2.3	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	0.8	95	0.005	15
32.81	4.3	3.1	-	0.1	0.0	2.4	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	0.8	95	0.005	15
32.97	4.4	3.1	-	0.1	0.0	3.2	3	silty CLAY to CLAY	115	1.5	2	3	-	-	0.2	0.9	95	0.005	15
33.14	4.7	3.3	-	0.1	0.0	5.1	2	Organic SOILS - Peats	100	1.0	3	5	-	-	0.4	1.0	95	0.100	10
33.30	7.6	5.3	-	0.2	0.0	3.1	3	silty CLAY to CLAY	115	1.5	4	5	-	-	0.5	2.0	85	0.005	15
33.47	10.5	7.4	-	0.3	0.0	3.3	3	silty CLAY to CLAY	115	1.5	5	7	-	-	0.7	2.9	73	0.005	15
33.63	7.7	5.4	-	0.5	0.0	8.1	2	Organic SOILS - Peats	100	1.0	5	8	-	-	0.7	2.0	95	0.100	10
33.79	15.8	11.1	-	0.4	0.0	2.8	3	silty CLAY to CLAY	115	1.5	7	11	-	-	1.0	4.7	58	0.005	15
33.96	8.3	5.8	-	0.4	0.0	5.6	3	silty CLAY to CLAY	115	1.5	4	6	-	-	0.5	2.1	94	0.005	15
34.12	6.7	4.7	-	0.4	0.0	8.5	2	Organic SOILS - Peats	100	1.0	5	7	-	-	0.6	1.6	95	0.100	10
34.29	7.2	5.0	-	0.5	0.0	9.9	2	Organic SOILS - Peats	100	1.0	5	7	-	-	0.7	1.8	95	0.100	10
34.45	33.8	23.4	-	1.1	0.0	3.4	4	clayy SILT to silty CLAY	115	2.0	12	17	-	-	2.3	9.9	43	0.070	15
34.61	61.1	49.3	141.7	2.1	0.0	3.6	4	clayy SILT to silty CLAY	115	2.0	25	31	-	-	4.2	9.9	32	0.070	15
34.78	83.9	67.6	142.0	2.3	0.0	2.8	5	silty SAND to sandy SILT	120	4.0	17	21	54	40	-	-	24	0.200	16
34.94	81.8	65.8	143.2	2.3	0.0	2.9	5	silty SAND to sandy SILT	120	4.0	16	20	53	39	-	-	25	0.200	16
35.11	101.9	81.9	148.2	2.5	0.0	2.5	5	silty SAND to sandy SILT	120	4.0	20	25	60	41	-	-	21	0.200	16
35.27	104.4	83.8	138.9	2.2	0.0	2.1	5	silty SAND to sandy SILT	120	4.0	21	26	61	41	-	-	19	0.200	16
35.43	83.6	67.0	144.5	2.4	0.0	2.9	5	silty SAND to sandy SILT	120	4.0	17	21	54	39	-	-	25	0.200	16
35.60	70.0	56.0	141.9	2.2	0.0	3.3	4	clayy SILT to silty CLAY	115	2.0	28	35	-	-	4.9	9.9	29	0.070	15
35.76	97.4	77.8	158.2	2.9	0.0	3.0	5	silty SAND to sandy SILT	120	4.0	19	24	59	40	-	-	23	0.200	16
35.93	86.8	69.2	159.3	2.9	0.0	3.4	4	clayy SILT to silty CLAY	115	2.0	35	43	-	-	6.1	9.9	26	0.070	15
36.09	54.2	36.4	-	2.9	0.0	5.5	3	silty CLAY to CLAY	115	1.5	24	36	-	-	3.8	9.9	43	0.005	15
36.26	30.2	20.2	-	2.7	0.0	9.6	3	silty CLAY to CLAY	115	1.5	13	20	-	-	2.1	9.0	66	0.005	15
36.42	22.9	15.3	-	1.9	0.0	9.3	3	silty CLAY to CLAY	115	1.5	10	15	-	-	1.5	6.6	73	0.005	15
36.58	33.0	22.0	-	3.0	0.0	9.6	3	silty CLAY to CLAY	115	1.5	15	22	-	-	2.3	9.8	64	0.005	15
36.75	118.7	94.0	153.9	2.7	0.0	2.3	5	silty SAND to sandy SILT	120	4.0	23	30	65	41	-	-	19	0.200	16
36.91	135.7	107.3	209.0	4.9	0.0	3.7	5	silty SAND to sandy SILT	120	4.0	27	34	69	42	-	-	23	0.200	16
37.08	117.1	92.4	214.1	5.1	0.0	4.4	4	clayy SILT to silty CLAY	115	2.0	46	59	-	-	8.2	9.9	26	0.070	15
37.24	119.3	94.0	233.7	5.9	0.0	5.0	9	very stiff fine SOIL	120	2.0	47	60	65	41	-	-	28	0.250	30
37.40	129.2	101.6	198.2	4.5	0.0	3.5	5	silty SAND to sandy SILT	120	4.0	25	32	68	42	-	-	23	0.200	16
37.57	122.7	96.4	182.4	3.9	0.0	3.2	5	silty SAND to sandy SILT	120	4.0	24	31	66	41	-	-	22	0.200	16
37.73	120.0	94.1	212.5	5.1	0.0	4.3	4	clayy SILT to silty CLAY	115	2.0	47	60	-	-	8.4	9.9	26	0.070	15
37.90	129.2	101.2	249.8	6.7	0.0	5.3	9	very stiff fine SOIL	120	2.0	51	65	67	41	-	-	28	0.250	30
38.06	129.7	101.4	255.0	6.9	0.0	5.4	9	very stiff fine SOIL	120	2.0	51	65	67	41	-	-	28	0.250	30
38.22	124.9	97.5	250.8	6.7	0.0	5.5	9	very stiff fine SOIL	120	2.0	49	62	66	41	-	-	29	0.250	30
38.39	126.6	98.7	243.0	6.4	0.0	5.1	9	very stiff fine SOIL	120	2.0	49	63	67	41	-	-	28	0.250	30
38.55	153.0	119.1	236.4	6.3	0.0	4.2	9	very stiff fine SOIL	120	2.0	60	77	73	42	-	-	23	0.250	30
38.72	214.4	166.7	251.4	6.7	0.0	3.2	5	silty SAND to sandy SILT	120	4.0	42	54	84	44	-	-	17	0.200	16
38.88	220.8	171.3	234.0	5.6	0.0	2.6	5	silty SAND to sandy SILT	120	4.0	43	55	85	44	-	-	14	0.200	16
39.04	235.3	182.3	242.0	5.8	0.0	2.5	5	silty SAND to sandy SILT	120	4.0	46	59	87	44	-	-	14	0.200	16
39.21	257.8	199.4	284.1	8.1	0.0	3.2	8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	17.0	9.9	15	0.250	16
39.37	246.0	190.1	328.9	11.1	0.0	4.5	9	very stiff fine SOIL	120	2.0	95	100	88	44	-	-	20	0.250	30
39.54	244.9	189.0	330.0	11.2	0.0	4.6	9	very stiff fine SOIL	120	2.0	94	100	88	44	-	-	20	0.250	30
39.70	207.6	159.9	327.4	11.1	0.0	5.4	9	very stiff fine SOIL	120	2.0	80	100	82	44	-	-	24	0.250	30
39.86	215.4	165.7	336.0	11.6	0.0	5.4	9	very stiff fine SOIL	120	2.0	83	100	84	44	-	-	23	0.250	30
40.03	270.7	207.9	334.9	11.3	0.0	4.2	9	very stiff fine SOIL	120	2.0	100	100	91	45	-	-	18	0.250	30
40.19	241.5	185.2	292.8	9.0	0.0	3.8	8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	15.9	9.9	18	0.250	16
40.36	223.5	171.1	298.3	9.5	0.0	4.3	9	very stiff fine SOIL	120	2.0	86	100	85	44	-	-	20	0.250	30
40.52	154.4	118.1	267.8	7.8	0.0	5.2	9	very stiff fine SOIL	120	2.0	59	77	72	42	-	-	26	0.250	30
40.68	77.0	47.6	-	5.1	0.0	6.9	3	silty CLAY to CLAY	115	1.5	32	51	-	-	5.4	9.9	42	0.005	15
40.85	56.0	34.5	-	2.2	0.0	4.1	4	clayy SILT to silty CLAY	115	2.0	17	28	-	-	3.9	9.9	39	0.070	15
41.01	49.6	30.5	-	3.0	0.0	6.4	3	silty CLAY to CLAY	115	1.5	20	33	-	-	3.4	9.9	49	0.005	15
41.18	68.3	41.9	-	3.3	0.0	5.0	3	silty CLAY to CLAY	115	1.5	28	46	-	-	4.7	9.9	39	0.005	15
41.34	72.9	44.6	-	3.3	0.0	4.7	4	clayy SILT to silty CLAY	115	2.0	22	36	-	-	5.1	9.9	37	0.070	15
41.50	68.5	41.8	-	3.2	0.0	4.8	4	clayy SILT to silty CLAY	115	2.0	21	34	-	-	4.8	9.9	39	0.070	15
41.67	74.4	45.3	-	3.7	0.0	5.1	3	silty CLAY to CLAY	115	1.5	30	50	-	-	5.2	9.9	38	0.005	15
41.83	75.3	45.7	-	5.0	0.0	6.8	3	silty CLAY to CLAY	115	1.5	30	50	-	-	5.2	9.9	43	0.005	15
42.00	63.1	38.2	-	4.5	0.0	7.5	3	silty CLAY to CLAY	115	1.5	25	42	-	-	4.4	9.9	48	0.005	15
42.16	51.9	31.3	-	5.3	0.0	9.9	3	silty CLAY to CLAY	115	1.5	21	35	-	-	3.6	9.9	57	0.005	15
42.32	108.8	82.0	216.0	5.3	0.0	4.9	4	clayy SILT to silty CLAY	115	2.0	41	54	-	-	7.6	9.9	29	0.070	15
42.49	66.2	39.8	-	4.7	0.0	7.4	3	silty CLAY to CLAY	115	1.5	27	44	-	-	4.6	9.9	47	0.005	15
42.65	51.8	31.0	-	3.2	0.0	6.6	3	silty CLAY to CLAY	115	1.5	21	35	-	-	3.6	9.9	49	0.005	15
42.82	42.8	25.6	-	2.6	0.0	6.5	3	silty CLAY to CLAY	115	1.5	17	29	-	-	2.9	9.9	53	0.005	15
42.98	47.3	28.2	-	3.1	0.0	6.9	3	silty CLAY to CLAY	115	1.5	19	32	-	-	3.3	9.9	52	0.005	15
43.15	58.9	35.0	-	3.8	0.0	6.6	3	silty CLAY to CLAY	115	1.5	23	39	-	-	4.1	9.9	47	0.005	15
43.31	53.3	31.6	-	3.4	0.0	6.7	3	silty CLAY to CLAY	115	1.5	21	36	-	-	3.7	9.9	49	0.005	15
43.47	50.6	29.9	-	3.0	0.0	6.2	3	silty CLAY to CLAY	115	1.5	20	34	-	-	3.5	9.9	49	0.005	15
43.64	53.4	31.5	-	3.5	0.0	6.8	3	silty CLAY to CLAY	115	1.5	21	36	-	-	3.7	9.9	50	0.005	15
43.80	52.6	31.0	-	3.4	0.0	6.8	3	silty CLAY to CLAY	115	1.5	21	35	-	-	3.6	9.9	50	0.005	15
43.97	60.8	35.7	-	3.3	0.0	5.6	3	silty CLAY to CLAY	115	1.5	24	41	-	-	4.2	9.9	44	0.005	15
44.13	57.7	33.8	-	3.2	0.0	5.8	3	silty CLAY to CLAY	115	1.5	23	38	-	-	4.0	9.9	45	0.005	15
44.29	57.5	33.6	-	3.1	0.0	5.7	3	silty CLAY to CLAY	115	1.5	22	38	-	-	4.0	9.9	45	0.005	15
44.46	54.3	31.6	-	3.1	0.0	6.0	3	silty CLAY to CLAY	115	1.5	21	36	-	-	3.7	9.9	47	0.005	15
44.62	53.7	31.2	-	3.0	0.0	5.8	3	silty CLAY to CLAY	115	1.5	21	36	-	-	3.7	9.9	47	0.005	15
44.79	57.4	33.3	-	2.7	0.0	5.0	3	silty CLAY to CLAY	115	1.5	22	38	-	-	4.0	9.9	43	0.005	15
44.95	58.6	33.9	-	2.8	0.0	5.0	3	silty CLAY to CLAY	115	1.5	23	39	-	-	4.1	9.9	43	0.005	15
45.11	57.0	32.9	-	2.7	0.0	5.0	3	silty CLAY to CLAY	115	1.5	22	38	-	-	3.9	9.9	43	0.005	15
45.28	57.8	33.3	-	2.6	0.0	4.7	3	silty CLAY to CLAY	115	1.5	22	39	-	-	4.0	9.9	42	0.005	15
45.44	58.5	33.6	-	2.8	0.0	4.9	3	silty CLAY to CLAY	115	1.5	22	39	-	-	4.0	9.9	43	0.005	15
45.61	58.1	33.2	-	2.5	0.0	4.5	3	silty CLAY to CLAY	115	1.5	22	39	-	-	4.0	9.9	41	0.005	15
45.77	57.9	33.1	-	2.5	0.0	4.5	3	silty CLAY to CLAY	115	1.5	22	39	-	-	4.0	9.9	41	0.005	15
45.93	57.3	32.6	-	2.5	0.0	4.6	3	silty CLAY to CLAY	115	1.5	22	38	-	-	4.0	9.9	42	0.005	15
46.10	58.5	33.2	-	2.6	0.0	4.7	3	silty CLAY to CLAY	115	1.5	22	39	-	-	4.0	9.9	42	0.005	15
46.26	59.8	33.9	-	2.6	0.0	4.5	3	silty CLAY to CLAY	115	1.5	23	40	-	-	4.1	9.9	41	0.005	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(476).cpt
CPT Date: 2/22/2010 12:48:31 PM
GW During Test: 18 ft

Sounding ID: CPT-04
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qc1n PS -	q1ncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
46.43	61.7	34.9	-	2.9	0.0	4.9	3	silty CLAY to CLAY	115	1.5	23	41	-	-	4.3	9.9	42	0.005	15
46.59	67.0	37.8	-	3.4	0.0	5.3	3	silty CLAY to CLAY	115	1.5	25	45	-	-	4.6	9.9	42	0.005	15
46.75	65.4	36.8	-	3.1	0.0	4.9	3	silty CLAY to CLAY	115	1.5	25	44	-	-	4.5	9.9	41	0.005	15
46.92	60.4	33.9	-	2.8	0.0	4.9	3	silty CLAY to CLAY	115	1.5	23	40	-	-	4.2	9.9	42	0.005	15
47.08	58.0	32.5	-	2.7	0.0	4.9	3	silty CLAY to CLAY	115	1.5	22	39	-	-	4.0	9.9	43	0.005	15
47.25	54.5	30.5	-	2.8	0.0	5.3	3	silty CLAY to CLAY	115	1.5	20	36	-	-	3.8	9.9	46	0.005	15
47.41	53.5	29.8	-	2.6	0.0	5.1	3	silty CLAY to CLAY	115	1.5	20	36	-	-	3.7	9.9	46	0.005	15
47.57	51.4	28.6	-	2.8	0.0	5.9	3	silty CLAY to CLAY	115	1.5	19	34	-	-	3.5	9.9	49	0.005	15
47.74	43.9	24.3	-	2.6	0.0	6.3	3	silty CLAY to CLAY	115	1.5	16	29	-	-	3.0	9.9	53	0.005	15
47.90	45.7	25.3	-	2.8	0.0	6.6	3	silty CLAY to CLAY	115	1.5	17	30	-	-	3.1	9.9	53	0.005	15
48.07	58.6	32.3	-	3.0	0.0	5.4	3	silty CLAY to CLAY	115	1.5	22	39	-	-	4.0	9.9	45	0.005	15
48.23	88.3	48.6	-	4.3	0.0	5.1	4	clayy SILT to silty CLAY	115	2.0	24	44	-	-	6.1	9.9	37	0.070	15
48.39	86.9	47.7	-	4.9	0.0	5.9	3	silty CLAY to CLAY	115	1.5	32	58	-	-	6.0	9.9	40	0.005	15
48.56	86.0	47.1	-	5.6	0.0	6.7	3	silty CLAY to CLAY	115	1.5	31	57	-	-	6.0	9.9	42	0.005	15
48.72	86.1	47.1	-	4.4	0.0	5.3	3	silty CLAY to CLAY	115	1.5	31	57	-	-	6.0	9.9	38	0.005	15
48.89	84.1	45.9	-	4.2	0.0	5.2	3	silty CLAY to CLAY	115	1.5	31	56	-	-	5.8	9.9	38	0.005	15
49.05	38.7	21.1	-	3.6	0.0	9.9	3	silty CLAY to CLAY	115	1.5	14	26	-	-	2.6	8.6	66	0.005	15
49.22	46.8	25.4	-	3.5	0.0	7.9	3	silty CLAY to CLAY	115	1.5	17	31	-	-	3.2	9.9	57	0.005	15
49.38	51.8	28.0	-	3.7	0.0	7.6	3	silty CLAY to CLAY	115	1.5	19	35	-	-	3.6	9.9	54	0.005	15
49.54	50.5	27.3	-	3.7	0.0	7.7	3	silty CLAY to CLAY	115	1.5	18	34	-	-	3.5	9.9	55	0.005	15
49.71	51.9	28.0	-	3.6	0.0	7.4	3	silty CLAY to CLAY	115	1.5	19	35	-	-	3.6	9.9	53	0.005	15
49.87	53.3	28.7	-	4.4	0.0	8.8	3	silty CLAY to CLAY	115	1.5	19	36	-	-	3.7	9.9	57	0.005	15
50.04	58.8	31.6	-	5.9	0.0	9.9	3	silty CLAY to CLAY	115	1.5	21	39	-	-	4.1	9.9	57	0.005	15
50.20	169.5	120.4	231.7	6.6	0.0	4.0	8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	11.1	9.9	22	0.250	16
50.36	149.1	105.8	272.6	8.5	0.0	5.8	9	very stiff fine SOIL	120	2.0	53	75	69	41	-	-	29	0.250	30
50.53	122.4	86.8	243.5	6.8	0.0	5.7	9	very stiff fine SOIL	120	2.0	43	61	62	40	-	-	31	0.250	30
50.69	136.7	96.8	206.2	5.3	0.0	4.0	4	clayy SILT to silty CLAY	115	2.0	48	68	-	-	9.6	9.9	25	0.070	15
50.86	169.1	119.6	214.9	5.8	0.0	3.5	5	silty SAND to sandy SILT	120	4.0	30	42	73	41	-	-	21	0.200	16
51.02	160.5	113.4	263.3	8.2	0.0	5.2	9	very stiff fine SOIL	120	2.0	57	80	71	41	-	-	27	0.250	30
51.18	173.2	122.2	292.0	9.8	0.0	5.7	9	very stiff fine SOIL	120	2.0	61	87	74	42	-	-	27	0.250	30
51.35	141.4	74.4	-	11.1	0.0	8.0	9	very stiff fine SOIL	120	2.0	37	71	57	40	-	-	39	0.250	30
51.51	112.8	59.2	-	9.6	0.0	8.7	9	very stiff fine SOIL	120	2.0	30	56	50	39	-	-	43	0.250	30
51.68	81.9	42.9	-	6.9	0.0	8.7	3	silty CLAY to CLAY	115	1.5	29	55	-	-	5.7	9.9	49	0.005	15
51.84	84.4	44.1	-	6.1	0.0	7.5	3	silty CLAY to CLAY	115	1.5	29	56	-	-	5.9	9.9	45	0.005	15
52.00	97.2	50.7	-	8.5	0.0	9.0	3	silty CLAY to CLAY	115	1.5	34	65	-	-	6.8	9.9	46	0.005	15
52.17	127.3	66.2	-	9.7	0.0	7.8	9	very stiff fine SOIL	120	2.0	33	64	53	40	-	-	40	0.250	30
52.33	146.2	102.3	290.6	9.5	0.0	6.6	9	very stiff fine SOIL	120	2.0	51	73	68	40	-	-	31	0.250	30
52.50	135.8	94.9	258.0	7.7	0.0	5.8	9	very stiff fine SOIL	120	2.0	47	68	65	40	-	-	30	0.250	30
52.66	124.7	64.4	-	7.8	0.0	6.4	9	very stiff fine SOIL	120	2.0	32	62	52	40	-	-	37	0.250	30
52.82	101.5	52.3	-	9.0	0.0	9.1	3	silty CLAY to CLAY	115	1.5	35	68	-	-	7.1	9.9	46	0.005	15
52.99	81.5	41.9	-	6.3	0.0	8.1	3	silty CLAY to CLAY	115	1.5	28	54	-	-	5.7	9.9	48	0.005	15
53.15	60.4	31.0	-	5.5	0.0	9.6	3	silty CLAY to CLAY	115	1.5	21	40	-	-	4.2	9.9	57	0.005	15
53.32	71.0	36.3	-	5.3	0.0	7.9	3	silty CLAY to CLAY	115	1.5	24	47	-	-	4.9	9.9	50	0.005	15
53.48	78.0	39.8	-	5.6	0.0	7.5	3	silty CLAY to CLAY	115	1.5	27	52	-	-	5.4	9.9	47	0.005	15
53.64	91.1	46.4	-	6.1	0.0	6.9	3	silty CLAY to CLAY	115	1.5	31	61	-	-	6.3	9.9	43	0.005	15
53.81	77.3	39.3	-	5.3	0.0	7.1	3	silty CLAY to CLAY	115	1.5	26	52	-	-	5.4	9.9	46	0.005	15
53.97	58.9	29.9	-	4.4	0.0	7.9	3	silty CLAY to CLAY	115	1.5	20	39	-	-	4.1	9.9	54	0.005	15
54.14	51.6	26.1	-	4.1	0.0	8.4	3	silty CLAY to CLAY	115	1.5	17	34	-	-	3.5	9.9	58	0.005	15
54.30	56.9	28.8	-	4.2	0.0	7.8	3	silty CLAY to CLAY	115	1.5	19	38	-	-	3.9	9.9	54	0.005	15
54.46	60.5	30.5	-	4.9	0.0	8.6	3	silty CLAY to CLAY	115	1.5	20	40	-	-	4.2	9.9	55	0.005	15
54.63	70.1	35.2	-	5.7	0.0	8.6	3	silty CLAY to CLAY	115	1.5	23	47	-	-	4.8	9.9	52	0.005	15
54.79	71.4	35.8	-	5.9	0.0	8.6	3	silty CLAY to CLAY	115	1.5	24	48	-	-	4.9	9.9	52	0.005	15
54.96	151.6	104.2	214.0	5.9	0.0	3.9	9	very stiff fine SOIL	120	2.0	52	76	68	40	-	-	24	0.250	30
55.12	205.6	141.2	218.5	6.0	0.0	2.9	5	silty SAND to sandy SILT	120	4.0	35	51	78	42	-	-	17	0.200	16

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

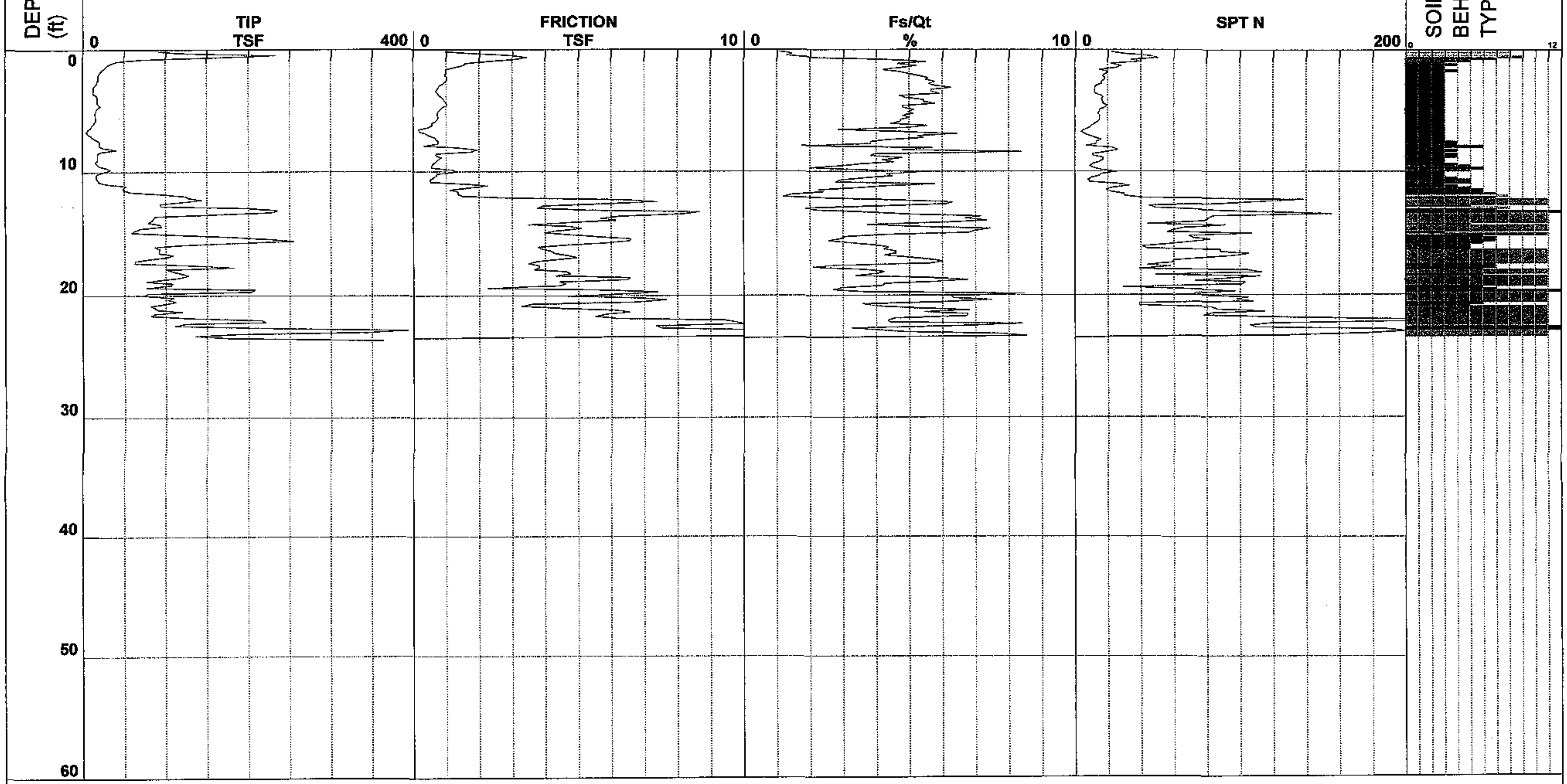
Middle Earth Geo Testing

Associated Soils Engineering

Project	Big Canyon Country Club	Operator	BH-AH	Filename	SDF(477).cpt
Job Number	6169	Cone Number	DSG1104	GPS	
Hole Number	CPT-05	Date and Time	2/22/2010 1:41:54 PM	Maximum Depth	23.62 ft
Water Table Depth		.No GW			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

*Soil behavior type and SPT based on data from UBC-1983

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(477).cpt
CPT Date: 2/22/2010 1:41:54 PM
GW During Test: 24 ft

Page: 1
Sounding ID: CPT-05
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qc1n PS -	q1ncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
0.33	122.0	195.7	218.7	1.8	0.0	1.4	6	clean SAND to silty SAND	125	5.0	39	24	89	48	-	-	8	0.350	16
0.49	233.0	373.7	373.7	2.9	0.0	1.3	6	clean SAND to silty SAND	125	5.0	75	47	95	48	-	-	5	0.350	16
0.66	156.6	251.1	296.8	3.4	0.0	2.2	6	clean SAND to silty SAND	125	5.0	50	31	95	48	-	-	10	0.350	16
0.82	71.5	114.7	236.8	3.1	0.0	4.4	9	very stiff fine SOIL	120	2.0	57	36	72	48	-	-	24	0.250	30
0.98	41.6	66.7	206.5	2.3	0.0	5.5	4	clayy SILT to silty CLAY	115	2.0	33	21	-	-	2.9	9.9	34	0.070	15
1.15	33.8	54.3	169.5	1.6	0.0	4.7	4	clayy SILT to silty CLAY	115	2.0	27	17	-	-	2.4	9.9	34	0.070	15
1.31	29.4	47.1	-	1.5	0.0	5.2	4	clayy SILT to silty CLAY	115	2.0	24	15	-	-	2.1	9.9	38	0.070	15
1.48	26.5	42.5	-	1.2	0.0	4.7	4	clayy SILT to silty CLAY	115	2.0	21	13	-	-	1.9	9.9	37	0.070	15
1.64	23.7	38.0	-	1.0	0.0	4.2	4	clayy SILT to silty CLAY	115	2.0	19	12	-	-	1.7	9.9	38	0.070	15
1.80	21.3	34.2	-	1.0	0.0	4.7	3	silty CLAY to CLAY	115	1.5	23	14	-	-	1.5	9.9	41	0.005	15
1.97	19.8	31.8	-	1.0	0.0	5.0	3	silty CLAY to CLAY	115	1.5	21	13	-	-	1.4	9.9	43	0.005	15
2.13	18.3	29.3	-	1.0	0.0	5.3	3	silty CLAY to CLAY	115	1.5	20	12	-	-	1.3	9.9	46	0.005	15
2.30	18.5	29.7	-	1.0	0.0	5.6	3	silty CLAY to CLAY	115	1.5	20	12	-	-	1.3	9.9	46	0.005	15
2.46	18.7	30.1	-	1.0	0.0	5.5	3	silty CLAY to CLAY	115	1.5	20	12	-	-	1.3	9.9	46	0.005	15
2.62	17.1	27.5	-	1.0	0.0	5.8	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	49	0.005	15
2.79	16.2	26.0	-	0.9	0.0	5.7	3	silty CLAY to CLAY	115	1.5	17	11	-	-	1.1	9.9	49	0.005	15
2.95	13.8	22.2	-	0.8	0.0	5.9	3	silty CLAY to CLAY	115	1.5	15	9	-	-	1.0	9.9	53	0.005	15
3.12	12.2	19.5	-	0.8	0.0	6.4	3	silty CLAY to CLAY	115	1.5	13	8	-	-	0.8	9.9	57	0.005	15
3.28	12.9	20.7	-	0.7	0.0	5.8	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	54	0.005	15
3.45	12.2	19.5	-	0.7	0.0	5.8	3	silty CLAY to CLAY	115	1.5	13	8	-	-	0.8	9.9	55	0.005	15
3.61	12.7	20.4	-	0.8	0.0	6.0	3	silty CLAY to CLAY	115	1.5	14	8	-	-	0.9	9.9	55	0.005	15
3.77	16.8	27.0	-	0.8	0.0	4.8	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	45	0.005	15
3.94	17.7	28.4	-	0.9	0.0	5.0	3	silty CLAY to CLAY	115	1.5	19	12	-	-	1.2	9.9	45	0.005	15
4.10	17.2	27.5	-	0.9	0.0	5.5	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	48	0.005	15
4.27	17.7	28.3	-	1.0	0.0	5.5	3	silty CLAY to CLAY	115	1.5	19	12	-	-	1.2	9.9	47	0.005	15
4.43	17.7	28.3	-	1.0	0.0	5.9	3	silty CLAY to CLAY	115	1.5	19	12	-	-	1.2	9.9	48	0.005	15
4.59	21.2	34.1	-	1.0	0.0	4.9	3	silty CLAY to CLAY	115	1.5	23	14	-	-	1.5	9.9	42	0.005	15
4.76	18.3	29.3	-	0.9	0.0	4.9	3	silty CLAY to CLAY	115	1.5	20	12	-	-	1.3	9.9	44	0.005	15
4.92	16.0	25.7	-	0.8	0.0	5.2	3	silty CLAY to CLAY	115	1.5	17	11	-	-	1.1	9.9	48	0.005	15
5.09	15.3	24.6	-	0.8	0.0	5.1	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.1	9.9	48	0.005	15
5.25	14.4	23.0	-	0.7	0.0	5.2	3	silty CLAY to CLAY	115	1.5	15	10	-	-	1.0	9.9	50	0.005	15
5.41	15.3	24.5	-	0.7	0.0	4.9	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.1	9.9	48	0.005	15
5.58	15.3	24.5	-	0.8	0.0	5.1	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.1	9.9	49	0.005	15
5.74	15.6	25.0	-	0.7	0.0	4.9	3	silty CLAY to CLAY	115	1.5	17	10	-	-	1.1	9.9	47	0.005	15
5.91	14.2	22.8	-	0.7	0.0	4.8	3	silty CLAY to CLAY	115	1.5	15	9	-	-	1.0	9.9	49	0.005	15
6.07	12.8	20.5	-	0.6	0.0	4.6	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	50	0.005	15
6.23	10.4	16.7	-	0.6	0.0	5.7	3	silty CLAY to CLAY	115	1.5	11	7	-	-	0.7	9.9	59	0.005	15
6.40	9.3	14.9	-	0.5	0.0	5.1	3	silty CLAY to CLAY	115	1.5	10	6	-	-	0.6	9.9	59	0.005	15
6.56	6.0	9.6	-	0.2	0.0	3.0	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.4	6.8	61	0.005	15
6.73	4.2	6.8	-	0.2	0.0	5.3	3	silty CLAY to CLAY	115	1.5	5	3	-	-	0.3	4.6	82	0.005	15
6.89	5.9	9.5	-	0.4	0.0	6.9	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.4	6.4	78	0.005	15
7.05	9.2	14.7	-	0.5	0.0	5.5	3	silty CLAY to CLAY	115	1.5	10	6	-	-	0.6	9.9	61	0.005	15
7.22	12.0	19.3	-	0.7	0.0	5.6	3	silty CLAY to CLAY	115	1.5	13	8	-	-	0.8	9.9	55	0.005	15
7.38	16.4	26.3	-	0.7	0.0	4.4	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.1	9.9	45	0.005	15
7.55	20.1	32.3	-	0.8	0.0	3.9	4	clayy SILT to silty CLAY	115	2.0	16	10	-	-	1.4	9.9	39	0.070	15
7.71	19.8	31.7	-	0.8	0.0	3.9	4	clayy SILT to silty CLAY	115	2.0	16	10	-	-	1.4	9.9	40	0.070	15
7.87	19.3	27.7	78.6	0.3	0.0	1.8	5	silty SAND to sandy SILT	120	4.0	7	5	25	38	-	-	31	0.200	16
8.04	24.1	38.7	-	1.4	0.0	5.8	3	silty CLAY to CLAY	115	1.5	26	16	-	-	1.7	9.9	43	0.005	15
8.20	40.3	56.7	178.0	1.9	0.0	4.9	4	clayy SILT to silty CLAY	115	2.0	28	20	-	-	2.8	9.9	34	0.070	15
8.37	21.2	33.9	-	1.8	0.0	8.6	3	silty CLAY to CLAY	115	1.5	23	14	-	-	1.5	9.9	52	0.005	15
8.53	17.7	28.4	-	0.7	0.0	4.1	4	clayy SILT to silty CLAY	115	2.0	14	9	-	-	1.2	9.9	42	0.070	15
8.69	17.9	28.7	-	0.7	0.0	4.0	4	clayy SILT to silty CLAY	115	2.0	14	9	-	-	1.2	9.9	42	0.070	15
8.86	18.0	28.8	-	0.9	0.0	4.9	3	silty CLAY to CLAY	115	1.5	19	12	-	-	1.2	9.9	45	0.005	15
9.02	17.9	28.7	-	0.8	0.0	4.3	3	silty CLAY to CLAY	115	1.5	19	12	-	-	1.2	9.9	43	0.005	15
9.19	15.2	24.4	-	0.7	0.0	4.7	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.1	9.9	47	0.005	15
9.35	17.0	27.3	-	0.6	0.0	3.7	4	clayy SILT to silty CLAY	115	2.0	14	9	-	-	1.2	9.9	41	0.070	15
9.51	19.3	30.9	-	0.6	0.0	3.0	4	clayy SILT to silty CLAY	115	2.0	15	10	-	-	1.3	9.9	36	0.070	15
9.68	28.0	36.3	93.1	0.6	0.0	2.1	5	silty SAND to sandy SILT	120	4.0	9	7	34	39	-	-	29	0.200	16
9.84	33.1	42.5	133.1	1.2	0.0	3.6	4	clayy SILT to silty CLAY	115	2.0	21	17	-	-	2.3	9.9	34	0.070	15
10.01	25.6	41.1	-	1.4	0.0	5.5	3	silty CLAY to CLAY	115	1.5	27	17	-	-	1.8	9.9	41	0.005	15
10.17	16.7	26.8	-	0.7	0.0	4.5	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	45	0.005	15
10.34	16.0	25.6	-	0.7	0.0	4.7	3	silty CLAY to CLAY	115	1.5	17	11	-	-	1.1	9.9	46	0.005	15
10.50	16.1	25.9	-	0.6	0.0	3.9	4	clayy SILT to silty CLAY	115	2.0	13	8	-	-	1.1	9.9	43	0.070	15
10.66	17.5	28.1	-	0.5	0.0	3.1	4	clayy SILT to silty CLAY	115	2.0	14	9	-	-	1.2	9.9	38	0.070	15
10.83	19.4	31.0	-	0.5	0.0	2.9	4	clayy SILT to silty CLAY	115	2.0	16	10	-	-	1.3	9.9	36	0.070	15
10.99	27.3	42.9	-	1.6	0.0	5.9	3	silty CLAY to CLAY	115	1.5	29	18	-	-	1.9	9.9	41	0.005	15
11.16	52.4	63.3	175.9	2.3	0.0	4.4	4	clayy SILT to silty CLAY	115	2.0	32	26	-	-	3.7	9.9	31	0.070	15
11.32	48.4	58.0	148.5	1.7	0.0	3.5	4	clayy SILT to silty CLAY	115	2.0	29	24	-	-	3.4	9.9	29	0.070	15
11.48	49.0	58.4	119.3	1.1	0.0	2.3	5	silty SAND to sandy SILT	120	4.0	15	12	49	42	-	-	24	0.200	16
11.65	57.1	67.5	131.8	1.4	0.0	2.4	5	silty SAND to sandy SILT	120	4.0	17	14	54	42	-	-	23	0.200	16
11.81	94.6	111.1	142.8	1.4	0.0	1.5	6	clean SAND to silty SAND	125	5.0	22	19	70	45	-	-	13	0.350	16
11.98	123.7	144.2	165.3	1.5	0.0	1.2	6	clean SAND to silty SAND	125	5.0	29	25	79	46	-	-	9	0.350	16
12.14	128.2	148.3	209.3	3.2	0.0	2.5	5	silty SAND to sandy SILT	120	4.0	37	32	80	46	-	-	15	0.200	16
12.30	143.7	165.1	298.0	6.4	0.0	4.5	9	very stiff fine SOIL	120	2.0	83	72	84	46	-	-	21	0.250	30
12.47	117.0	133.5	325.8	7.4	0.0	6.3	9	very stiff fine SOIL	120	2.0	67	58	77	45	-	-	28	0.250	30
12.63	93.2	105.6	281.3	5.7	0.0	6.2	9	very stiff fine SOIL	120	2.0	53	47	69	44	-	-	30	0.250	30
12.80	94.5	106.4	222.9	3.9	0.0	4.2	9	very stiff fine SOIL	120	2.0	53	47	69	44	-	-	24	0.250	30
12.96	202.7	226.7	262.0	3.8	0.0	1.9	6	clean SAND to silty SAND	125	5.0	45	41	94	48	-	-	10	0.350	16
13.12	236.1	262.3	308.0	5.2	0.0	2.2	6	clean SAND to silty SAND	125	5.0	52	47	95	48	-	-	10	0.350	16
13.29	229.1	252.8	364.5	8.7	0.0	3.8	8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	15.1	9.9	16	0.250	16
13.45	161.3	177.0	333.8	8.1	0.0	5.1	9	very stiff fine SOIL	120	2.0	88	81	86	47	-	-	22	0.250	30
13.62	87.6	95.5	295.6	6.3	0.0	7.2	9	very stiff fine SOIL	120	2.0	48	44	65	44	-	-	33	0.250	30
13.78	84.9	92.0	276.6	5.7	0.0	6.7	9	very stiff fine SOIL	120	2.0	46	42	64	44	-	-	33	0.250	30
13.94	83.4	89.8	290.7	6.1	0.0	7.4	9	very stiff fine SOIL	120	2.0	45	42	63	43	-	-	35	0.250	30
14.11	78.6	84.1	253.1	4.9	0.0	6.3	9	very stiff fine SOIL	120	2.0	42	39	61	43	-	-	33	0.250	30
14.27	92.9	98.8	201.3	3.5	0.0	3.8	5	silty SAND to sandy SILT	120	4.0	25	23	67	44	-	-	24	0.200	16
14.44	94.9	100.4	242.3	4.8	0.0	5.1	9	very stiff fine SOIL	120	2.0	50	47	67	44	-	-	27	0.250	30
14.60	68.4	80.2	-	5.1	0.0	7.5	9	very stiff fine SOIL	120	2.0	40	34	60	42	-	-	36	0.250	30
14.76	62.6	72.6	-	4.4	0.0	7.1	9	very stiff fine SOIL	120	2.0	36	31	56	42	-	-	37	0.250	30
14.93	58.4	66.9	-	4.0	0.0	6.9	9	very stiff fine SOIL	120	2.0	33	29	54	41	-	-	37	0.250	30
15.09	112.2	116.0	235.7	4.7	0.0	4.3	9	very stiff fine SOIL	120	2.0	58	56	72	44	-	-	23	0.250	30
15.26	180.8	185.9	267.2	5.6	0.0	3.1	8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	11.9	9.9	16	0.250	16
15.42	224.9	230.0	305.6	6.6	0.0	2.9	8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	14.9	9.9	14	0.250	16

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(477).cpt
CPT Date: 2/22/2010 1:41:54 PM
GW During Test: 24 ft

Sounding ID: CPT-05
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qc1n PS -	q1ncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
15.58	255.5	259.9	320.2	6.5	0.0	2.6	8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	16.9	9.9	11	0.250	16
15.75	181.3	183.6	270.3	5.8	0.0	3.2	8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	12.0	9.9	16	0.250	16
15.91	119.2	120.0	229.8	4.7	0.0	3.9	8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	7.9	9.9	22	0.250	16
16.08	86.6	86.7	206.9	3.8	0.0	4.4	4	clayy SILT to silty CLAY	115	2.0	43	43	-	-	6.1	9.9	27	0.070	15
16.24	92.3	92.0	209.2	3.9	0.0	4.3	4	clayy SILT to silty CLAY	115	2.0	46	46	-	-	6.5	9.9	26	0.070	15
16.40	91.5	90.8	217.6	4.2	0.0	4.6	9	very stiff fine SOIL	120	2.0	45	46	64	43	-	-	27	0.250	30
16.57	92.3	91.1	218.7	4.3	0.0	4.7	9	very stiff fine SOIL	120	2.0	46	46	64	43	-	-	27	0.250	30
16.73	109.1	107.2	227.1	4.7	0.0	4.3	9	very stiff fine SOIL	120	2.0	54	55	69	44	-	-	24	0.250	30
16.90	98.7	96.5	236.8	4.9	0.0	5.1	9	very stiff fine SOIL	120	2.0	48	49	66	43	-	-	28	0.250	30
17.06	77.0	74.9	224.9	4.3	0.0	5.7	9	very stiff fine SOIL	120	2.0	37	39	57	42	-	-	33	0.250	30
17.23	62.4	61.9	-	3.8	0.0	6.1	3	silty CLAY to CLAY	115	1.5	41	42	-	-	4.4	9.9	36	0.005	15
17.39	61.9	60.8	-	3.5	0.0	5.7	4	clayy SILT to silty CLAY	115	2.0	30	31	-	-	4.3	9.9	36	0.070	15
17.55	136.5	130.8	203.3	3.8	0.0	2.8	5	silty SAND to sandy SILT	120	4.0	33	34	76	45	-	-	17	0.200	16
17.72	182.3	173.9	220.6	3.8	0.0	2.1	6	clean SAND to silty SAND	125	5.0	35	36	85	46	-	-	12	0.350	16
17.88	100.7	95.6	195.4	3.7	0.0	3.7	5	silty SAND to sandy SILT	120	4.0	24	25	66	43	-	-	24	0.200	16
18.05	108.9	102.9	221.7	4.6	0.0	4.3	9	very stiff fine SOIL	120	2.0	51	54	68	44	-	-	25	0.250	30
18.21	118.4	111.3	224.1	4.8	0.0	4.1	9	very stiff fine SOIL	120	2.0	56	59	71	44	-	-	23	0.250	30
18.37	127.3	119.2	211.7	4.3	0.0	3.4	5	silty SAND to sandy SILT	120	4.0	30	32	73	44	-	-	20	0.200	16
18.54	117.4	109.4	270.8	6.6	0.0	5.6	9	very stiff fine SOIL	120	2.0	55	59	70	44	-	-	28	0.250	30
18.70	95.7	88.8	274.6	6.5	0.0	6.8	9	very stiff fine SOIL	120	2.0	44	48	63	43	-	-	33	0.250	30
18.87	75.9	70.1	222.9	4.4	0.0	5.9	9	very stiff fine SOIL	120	2.0	35	38	55	42	-	-	34	0.250	30
19.03	108.0	99.4	218.5	4.6	0.0	4.3	9	very stiff fine SOIL	120	2.0	50	54	67	43	-	-	25	0.250	30
19.19	105.8	96.9	213.0	4.4	0.0	4.2	4	clayy SILT to silty CLAY	115	2.0	48	53	-	-	7.4	9.9	25	0.070	15
19.36	75.7	69.1	148.6	2.2	0.0	3.0	5	silty SAND to sandy SILT	120	4.0	17	19	55	41	-	-	25	0.200	16
19.52	208.1	189.0	256.4	5.6	0.0	2.7	5	silty SAND to sandy SILT	120	4.0	47	52	88	46	-	-	14	0.200	16
19.69	203.0	183.5	286.9	7.4	0.0	3.7	8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	13.4	9.9	18	0.250	16
19.85	77.6	66.7	-	6.6	0.0	8.6	9	very stiff fine SOIL	120	2.0	33	39	54	42	-	-	41	0.250	30
20.01	74.4	63.4	-	4.7	0.0	6.4	9	very stiff fine SOIL	120	2.0	32	37	52	41	-	-	37	0.250	30
20.18	109.5	97.8	276.5	6.9	0.0	6.4	9	very stiff fine SOIL	120	2.0	49	55	66	43	-	-	31	0.250	30
20.34	102.1	85.6	-	7.7	0.0	7.6	9	very stiff fine SOIL	120	2.0	43	51	62	43	-	-	36	0.250	30
20.51	112.5	99.6	269.4	6.7	0.0	6.0	9	very stiff fine SOIL	120	2.0	50	56	67	43	-	-	30	0.250	30
20.67	100.6	88.7	186.7	3.6	0.0	3.6	4	clayy SILT to silty CLAY	115	2.0	44	50	-	-	7.1	9.9	24	0.070	15
20.83	81.0	71.2	179.5	3.3	0.0	4.1	4	clayy SILT to silty CLAY	115	2.0	36	41	-	-	5.7	9.9	28	0.070	15
21.00	86.5	75.7	214.0	4.5	0.0	5.2	4	clayy SILT to silty CLAY	115	2.0	38	43	-	-	6.1	9.9	31	0.070	15
21.16	89.8	72.3	-	6.1	0.0	6.9	9	very stiff fine SOIL	120	2.0	36	45	56	42	-	-	36	0.250	30
21.33	119.8	104.0	260.4	6.6	0.0	5.5	9	very stiff fine SOIL	120	2.0	52	60	68	43	-	-	28	0.250	30
21.49	86.9	68.9	-	5.9	0.0	6.9	9	very stiff fine SOIL	120	2.0	34	43	55	42	-	-	37	0.250	30
21.65	81.8	64.4	-	5.5	0.0	6.8	9	very stiff fine SOIL	120	2.0	32	41	52	41	-	-	38	0.250	30
21.82	134.2	115.2	246.2	6.1	0.0	4.6	9	very stiff fine SOIL	120	2.0	58	67	72	44	-	-	25	0.250	30
21.98	216.1	184.8	316.6	9.4	0.0	4.4	9	very stiff fine SOIL	120	2.0	92	100	87	46	-	-	20	0.250	30
22.15	220.9	188.1	322.2	9.7	0.0	4.4	9	very stiff fine SOIL	120	2.0	94	100	88	46	-	-	20	0.250	30
22.31	124.3	94.9	-	10.5	0.0	8.5	9	very stiff fine SOIL	120	2.0	47	62	65	43	-	-	36	0.250	30
22.47	110.7	93.5	279.0	7.3	0.0	6.7	9	very stiff fine SOIL	120	2.0	47	55	65	43	-	-	33	0.250	30
22.64	229.5	193.3	282.3	7.5	0.0	3.3	8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	15.2	9.9	16	0.250	16
22.80	393.8	330.5	460.5	16.0	0.0	4.1	8	stiff SAND to clayy SAND	115	1.0	100	100	-	-	26.0	9.9	15	0.250	16
22.97	346.7	289.9	456.4	16.9	0.0	4.9	9	very stiff fine SOIL	120	2.0	100	100	95	48	-	-	18	0.250	30
23.13	185.9	154.9	406.8	14.4	0.0	7.8	9	very stiff fine SOIL	120	2.0	77	93	81	45	-	-	29	0.250	30
23.30	135.5	99.0	-	11.6	0.0	8.6	9	very stiff fine SOIL	120	2.0	49	68	67	44	-	-	36	0.250	30

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

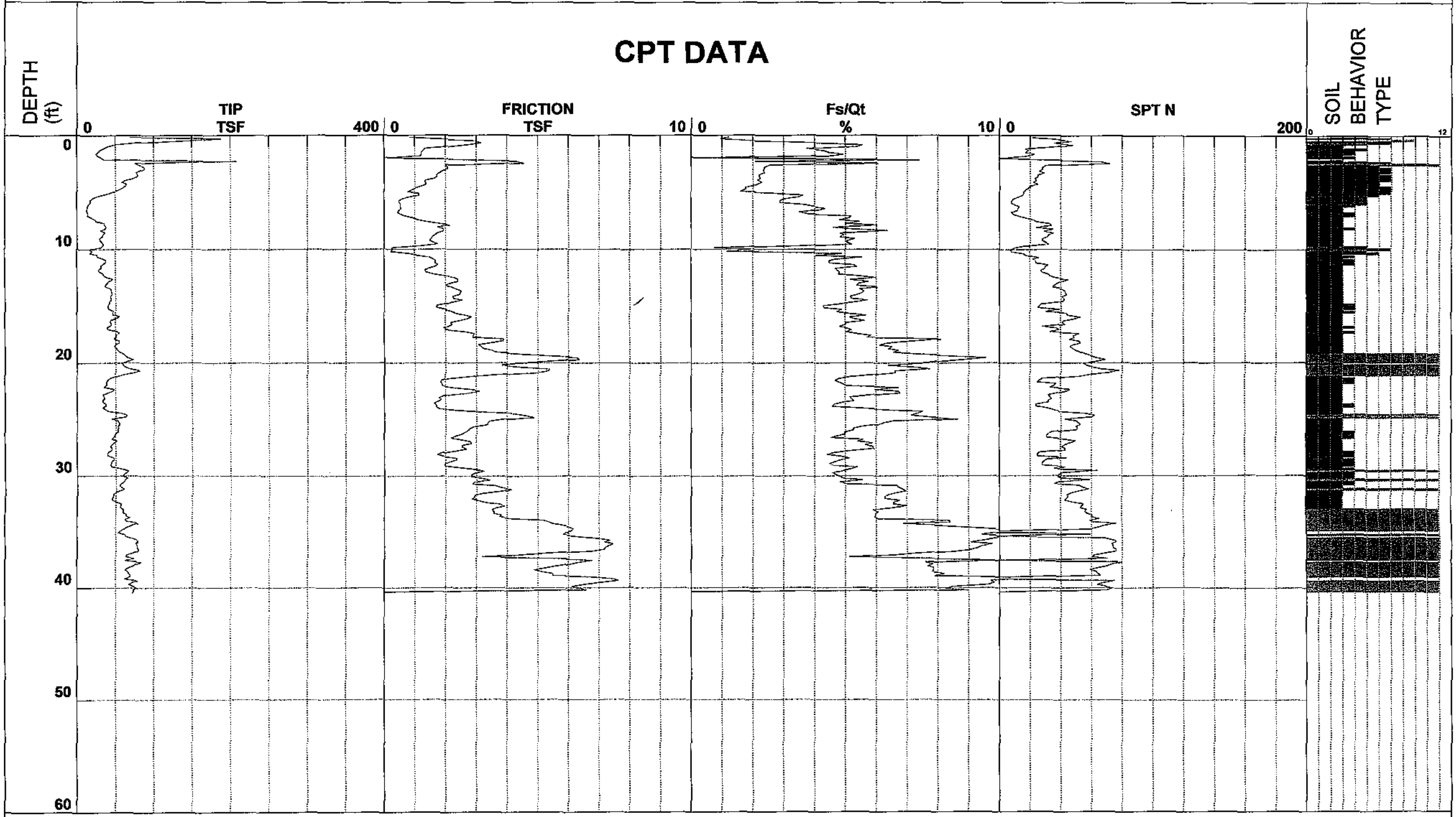
Middle Earth Geo Testing

Associated Soils Engineering

Project	Big Canyon Country Club	Operator	BH-AH	Filename	SDF(479).cpt
Job Number	6169	Cone Number	DSG1104	GPS	
Hole Number	CPT-06	Date and Time	2/22/2010 2:20:51 PM	Maximum Depth	40.52 ft
Water Table Depth	18.00 ft				

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

*Soil behavior type and SPT based on data from UBC-1983

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(479).cpt
CPT Date: 2/22/2010 2:20:51 PM
GW During Test: 18 ft

Sounding ID: CPT-06
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qcln PS -	qlncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
0.33	187.5	300.6	300.6	1.8	0.0	1.0	6	clean SAND to silty SAND	125	5.0	60	37	95	48	-	-	5	0.350	16
0.49	146.1	234.4	274.0	2.9	0.0	2.0	6	clean SAND to silty SAND	125	5.0	47	29	95	48	-	-	10	0.350	16
0.66	75.0	120.3	238.6	3.2	0.0	4.2	9	very stiff fine SOIL	120	2.0	60	38	73	48	-	-	23	0.250	30
0.82	49.9	80.0	227.1	2.8	0.0	5.6	9	very stiff fine SOIL	120	2.0	40	25	60	48	-	-	31	0.250	30
0.98	39.8	63.8	198.8	2.1	0.0	5.4	4	clayy SILT to silty CLAY	115	2.0	32	20	-	-	2.8	9.9	34	0.070	15
1.15	35.3	56.6	152.4	1.3	0.0	3.8	4	clayy SILT to silty CLAY	115	2.0	28	18	-	-	2.5	9.9	30	0.070	15
1.31	29.9	48.0	152.9	1.3	0.0	4.3	4	clayy SILT to silty CLAY	115	2.0	24	15	-	-	2.1	9.9	34	0.070	15
1.48	27.4	43.9	-	1.2	0.0	4.5	4	clayy SILT to silty CLAY	115	2.0	22	14	-	-	1.9	9.9	36	0.070	15
1.64	24.5	39.3	-	1.2	0.0	4.9	3	silty CLAY to CLAY	115	1.5	26	16	-	-	1.7	9.9	39	0.005	15
1.80	26.8	43.0	-	1.2	0.0	4.5	4	clayy SILT to silty CLAY	115	2.0	21	13	-	-	1.9	9.9	36	0.070	15
1.97	30.6	49.0	54.3	0.0	0.0	0.1	6	clean SAND to silty SAND	125	5.0	10	6	43	45	-	-	8	0.350	16
2.13	34.8	55.8	-	2.6	0.0	7.4	3	silty CLAY to CLAY	115	1.5	37	23	-	-	2.4	9.9	41	0.005	15
2.30	207.9	333.4	370.5	4.3	0.0	2.1	6	clean SAND to silty SAND	125	5.0	67	42	95	48	-	-	8	0.350	16
2.46	75.0	120.4	298.2	4.6	0.0	6.1	9	very stiff fine SOIL	120	2.0	60	38	73	48	-	-	28	0.250	30
2.62	79.5	127.5	190.7	2.0	0.0	2.5	5	silty SAND to sandy SILT	120	4.0	32	20	75	48	-	-	16	0.200	16
2.79	86.9	139.3	196.6	2.1	0.0	2.4	5	silty SAND to sandy SILT	120	4.0	35	22	78	48	-	-	15	0.200	16
2.95	87.7	140.7	197.8	2.1	0.0	2.4	5	silty SAND to sandy SILT	120	4.0	35	22	78	48	-	-	15	0.200	16
3.12	82.3	132.0	188.6	1.9	0.0	2.3	5	silty SAND to sandy SILT	120	4.0	33	21	76	48	-	-	15	0.200	16
3.28	76.5	122.6	181.0	1.8	0.0	2.4	5	silty SAND to sandy SILT	120	4.0	31	19	74	47	-	-	16	0.200	16
3.45	78.1	125.2	177.8	1.7	0.0	2.2	5	silty SAND to sandy SILT	120	4.0	31	20	74	47	-	-	15	0.200	16
3.61	78.7	126.2	178.9	1.7	0.0	2.2	5	silty SAND to sandy SILT	120	4.0	32	20	75	47	-	-	15	0.200	16
3.77	73.3	117.5	172.1	1.6	0.0	2.2	5	silty SAND to sandy SILT	120	4.0	29	18	72	47	-	-	16	0.200	16
3.94	62.2	99.7	152.9	1.3	0.0	2.2	5	silty SAND to sandy SILT	120	4.0	25	16	67	46	-	-	17	0.200	16
4.10	58.0	93.1	150.9	1.3	0.0	2.3	5	silty SAND to sandy SILT	120	4.0	23	15	65	45	-	-	18	0.200	16
4.27	64.0	102.6	155.8	1.4	0.0	2.2	5	silty SAND to sandy SILT	120	4.0	26	16	68	46	-	-	17	0.200	16
4.43	62.4	100.1	149.3	1.3	0.0	2.0	5	silty SAND to sandy SILT	120	4.0	25	16	67	46	-	-	16	0.200	16
4.59	59.1	94.8	136.5	1.0	0.0	1.7	5	silty SAND to sandy SILT	120	4.0	24	15	65	45	-	-	16	0.200	16
4.76	54.0	86.7	129.6	0.9	0.0	1.8	5	silty SAND to sandy SILT	120	4.0	22	14	62	45	-	-	16	0.200	16
4.92	48.9	78.4	117.8	0.8	0.0	1.6	5	silty SAND to sandy SILT	120	4.0	20	12	59	44	-	-	17	0.200	16
5.09	42.3	67.9	138.9	1.1	0.0	2.7	5	silty SAND to sandy SILT	120	4.0	17	11	54	43	-	-	24	0.200	16
5.25	31.6	50.7	143.8	1.1	0.0	3.7	4	clayy SILT to silty CLAY	115	2.0	25	16	-	-	2.2	9.9	31	0.070	15
5.41	24.2	38.8	125.9	0.8	0.0	3.5	4	clayy SILT to silty CLAY	115	2.0	19	12	-	-	1.7	9.9	35	0.070	15
5.58	19.4	31.2	-	0.6	0.0	3.1	4	clayy SILT to silty CLAY	115	2.0	16	10	-	-	1.4	9.9	36	0.070	15
5.74	17.2	27.5	-	0.5	0.0	2.9	4	clayy SILT to silty CLAY	115	2.0	14	9	-	-	1.2	9.9	38	0.070	15
5.91	17.7	28.5	-	0.5	0.0	3.0	4	clayy SILT to silty CLAY	115	2.0	14	9	-	-	1.2	9.9	37	0.070	15
6.07	15.1	24.2	-	0.5	0.0	3.7	4	clayy SILT to silty CLAY	115	2.0	12	8	-	-	1.0	9.9	44	0.070	15
6.23	13.5	21.6	-	0.5	0.0	4.1	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	47	0.005	15
6.40	13.0	20.8	-	0.6	0.0	4.5	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	50	0.005	15
6.56	12.3	19.8	-	0.5	0.0	4.2	3	silty CLAY to CLAY	115	1.5	13	8	-	-	0.9	9.9	50	0.005	15
6.73	13.1	20.9	-	0.5	0.0	3.6	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	46	0.005	15
6.89	13.5	21.7	-	0.5	0.0	3.9	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	47	0.005	15
7.05	13.3	21.4	-	0.7	0.0	5.4	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	52	0.005	15
7.22	17.9	28.8	-	0.9	0.0	5.2	3	silty CLAY to CLAY	115	1.5	19	12	-	-	1.2	9.9	46	0.005	15
7.38	22.6	36.2	-	1.1	0.0	4.9	3	silty CLAY to CLAY	115	1.5	24	15	-	-	1.6	9.9	41	0.005	15
7.55	24.7	39.5	-	1.3	0.0	5.6	3	silty CLAY to CLAY	115	1.5	26	16	-	-	1.7	9.9	42	0.005	15
7.71	34.7	55.7	180.8	1.7	0.0	5.1	4	clayy SILT to silty CLAY	115	2.0	28	17	-	-	2.4	9.9	35	0.070	15
7.87	35.4	56.7	-	2.1	0.0	6.1	3	silty CLAY to CLAY	115	1.5	38	24	-	-	2.5	9.9	38	0.005	15
8.04	37.5	52.9	168.6	1.7	0.0	4.7	4	clayy SILT to silty CLAY	115	2.0	26	19	-	-	2.6	9.9	34	0.070	15
8.20	36.4	58.4	192.0	1.9	0.0	5.4	4	clayy SILT to silty CLAY	115	2.0	29	18	-	-	2.6	9.9	35	0.070	15
8.37	30.3	48.6	-	1.9	0.0	6.5	3	silty CLAY to CLAY	115	1.5	32	20	-	-	2.1	9.9	41	0.005	15
8.53	36.3	57.8	180.7	1.8	0.0	4.9	4	clayy SILT to silty CLAY	115	2.0	29	18	-	-	2.5	9.9	34	0.070	15
8.69	33.6	52.8	-	1.7	0.0	5.0	4	clayy SILT to silty CLAY	115	2.0	26	17	-	-	2.4	9.9	35	0.070	15
8.86	32.6	50.5	-	1.6	0.0	4.9	4	clayy SILT to silty CLAY	115	2.0	25	16	-	-	2.3	9.9	36	0.070	15
9.02	29.1	46.6	-	1.5	0.0	5.4	3	silty CLAY to CLAY	115	1.5	31	19	-	-	2.0	9.9	38	0.005	15
9.19	29.3	47.0	-	1.5	0.0	5.2	4	clayy SILT to silty CLAY	115	2.0	23	15	-	-	2.0	9.9	38	0.070	15
9.35	31.3	50.3	-	1.6	0.0	5.1	4	clayy SILT to silty CLAY	115	2.0	25	16	-	-	2.2	9.9	36	0.070	15
9.51	33.3	53.4	-	1.7	0.0	5.3	4	clayy SILT to silty CLAY	115	2.0	27	17	-	-	2.3	9.9	36	0.070	15
9.68	33.0	42.5	131.9	1.2	0.0	3.6	4	clayy SILT to silty CLAY	115	2.0	21	16	-	-	2.3	9.9	34	0.070	15
9.84	30.5	39.0	63.3	0.2	0.0	0.7	5	silty SAND to sandy SILT	120	4.0	10	8	36	39	-	-	18	0.200	16
10.01	16.3	23.3	76.8	0.3	0.0	1.9	4	clayy SILT to silty CLAY	115	2.0	12	8	-	-	1.1	9.9	35	0.070	15
10.17	20.0	25.1	64.2	0.2	0.0	1.2	5	silty SAND to sandy SILT	120	4.0	6	5	21	37	-	-	29	0.200	16
10.34	16.7	26.8	-	0.8	0.0	5.1	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	47	0.005	15
10.50	26.0	41.8	-	1.1	0.0	4.1	4	clayy SILT to silty CLAY	115	2.0	21	13	-	-	1.8	9.9	36	0.070	15
10.66	26.7	42.7	-	1.5	0.0	5.7	3	silty CLAY to CLAY	115	1.5	28	18	-	-	1.9	9.9	41	0.005	15
10.83	34.4	46.5	-	1.6	0.0	4.7	4	clayy SILT to silty CLAY	115	2.0	23	17	-	-	2.4	9.9	36	0.070	15
10.99	37.7	50.3	162.7	1.7	0.0	4.5	4	clayy SILT to silty CLAY	115	2.0	25	19	-	-	2.6	9.9	35	0.070	15
11.16	37.1	49.0	161.3	1.7	0.0	4.6	4	clayy SILT to silty CLAY	115	2.0	25	19	-	-	2.6	9.9	35	0.070	15
11.32	33.6	50.6	-	1.8	0.0	5.4	4	clayy SILT to silty CLAY	115	2.0	25	17	-	-	2.3	9.9	37	0.070	15
11.48	31.1	46.2	-	1.7	0.0	5.5	3	silty CLAY to CLAY	115	1.5	31	21	-	-	2.2	9.9	39	0.005	15
11.65	31.4	46.1	-	1.5	0.0	4.8	4	clayy SILT to silty CLAY	115	2.0	23	16	-	-	2.2	9.9	37	0.070	15
11.81	27.7	40.1	-	1.3	0.0	4.9	3	silty CLAY to CLAY	115	1.5	27	18	-	-	1.9	9.9	39	0.005	15
11.98	28.9	41.1	-	1.4	0.0	4.9	3	silty CLAY to CLAY	115	1.5	27	19	-	-	2.0	9.9	39	0.005	15
12.14	33.5	47.1	-	1.6	0.0	4.9	4	clayy SILT to silty CLAY	115	2.0	24	17	-	-	2.3	9.9	37	0.070	15
12.30	34.8	48.3	-	1.9	0.0	5.6	3	silty CLAY to CLAY	115	1.5	32	23	-	-	2.4	9.9	38	0.005	15
12.47	38.7	53.0	-	2.3	0.0	6.1	3	silty CLAY to CLAY	115	1.5	35	26	-	-	2.7	9.9	39	0.005	15
12.63	46.8	56.8	186.9	2.4	0.0	5.2	4	clayy SILT to silty CLAY	115	2.0	28	23	-	-	3.3	9.9	35	0.070	15
12.80	41.6	55.6	-	2.4	0.0	5.9	3	silty CLAY to CLAY	115	1.5	37	28	-	-	2.9	9.9	37	0.005	15
12.96	39.4	52.0	-	2.1	0.0	5.5	3	silty CLAY to CLAY	115	1.5	35	26	-	-	2.8	9.9	37	0.005	15
13.12	37.2	48.4	-	2.0	0.0	5.5	3	silty CLAY to CLAY	115	1.5	32	25	-	-	2.6	9.9	38	0.005	15
13.29	36.5	46.9	-	2.2	0.0	6.2	3	silty CLAY to CLAY	115	1.5	31	24	-	-	2.5	9.9	41	0.005	15
13.45	42.5	54.1	-	2.3	0.0	5.6	4	clayy SILT to silty CLAY	115	2.0	27	21	-	-	3.0	9.9	37	0.070	15
13.62	44.6	56.0	-	2.5	0.0	5.7	3	silty CLAY to CLAY	115	1.5	37	30	-	-	3.1	9.9	37	0.005	15
13.78	44.6	55.5	-	2.5	0.0	5.7	4	clayy SILT to silty CLAY	115	2.0	28	22	-	-	3.1	9.9	37	0.070	15
13.94	45.5	55.8	-	2.4	0.0	5.5	4	clayy SILT to silty CLAY	115	2.0	28	23	-	-	3.2	9.9	36	0.070	15
14.11	43.3	52.6	-	2.2	0.0	5.3	4	clayy SILT to silty CLAY	115	2.0	26	22	-	-	3.0	9.9	36	0.070	15
14.27	43.4	52.1	-	2.3	0.0	5.3	4	clayy SILT to silty CLAY	115	2.0	26	22	-	-	3.0	9.9	37	0.070	15
14.44	44.4	52.6	-	2.5	0.0	5.8	3	silty CLAY to CLAY	115	1.5	35	30	-	-	3.1	9.9	38	0.005	15
14.60	42.0	49.3	-	2.2	0.0	5.4	3	silty CLAY to CLAY	115	1.5	33	28	-	-	2.9	9.9	38	0.005	15
14.76	42.1	48.8	-	2.0	0.0	4.9	4	clayy SILT to silty CLAY	115	2.0	24	21	-	-	2.9	9.9	36	0.070	15
14.93	40.0	45.9	-	1.7	0.0	4.4	4	clayy SILT to silty CLAY	115	2.0	23	20	-	-	2.8	9.9	35	0.070	15
15.09	39.7	45.1	-	1.7	0.0	4.4	4	clayy SILT to silty CLAY	115	2.0	23	20	-	-	2.8	9.9	36	0.070	15
15.26	40.5	45.5	-	2.0	0.0	5.0	4	clayy SILT to silty CLAY	115	2.0	23	20	-	-	2.8	9.9	38	0.070	15
15.42	46.8	49.5	-	2.2	0.0	4.8	4	clayy SILT to silty CLAY	115	2.0	25	23	-	-	3.3	9.9	36	0.070	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(479).cpt
CPT Date: 2/22/2010 2:20:51 PM
GW During Test: 18 ft

Sounding ID: CPT-06
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qc1n PS -	q1ncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
15.58	46.3	51.0	-	2.3	0.0	5.1	4	clayy SILT to silty CLAY	115	2.0	25	23	-	-	3.2	9.9	36	0.070	15
15.75	46.5	50.7	-	2.6	0.0	5.8	3	silty CLAY to CLAY	115	1.5	34	31	-	-	3.3	9.9	38	0.005	15
15.91	55.2	57.2	187.6	2.8	0.0	5.2	4	clayy SILT to silty CLAY	115	2.0	29	28	-	-	3.9	9.9	35	0.070	15
16.08	51.2	54.6	-	2.7	0.0	5.4	4	clayy SILT to silty CLAY	115	2.0	27	26	-	-	3.6	9.9	36	0.070	15
16.24	44.1	46.6	-	2.5	0.0	5.8	3	silty CLAY to CLAY	115	1.5	31	29	-	-	3.1	9.9	40	0.005	15
16.40	43.1	45.0	-	2.2	0.0	5.1	3	silty CLAY to CLAY	115	1.5	30	29	-	-	3.0	9.9	38	0.005	15
16.57	44.5	46.1	-	2.2	0.0	5.1	4	clayy SILT to silty CLAY	115	2.0	23	22	-	-	3.1	9.9	38	0.070	15
16.73	43.9	45.0	-	2.1	0.0	4.9	4	clayy SILT to silty CLAY	115	2.0	23	22	-	-	3.1	9.9	38	0.070	15
16.90	38.3	39.0	-	1.9	0.0	5.2	3	silty CLAY to CLAY	115	1.5	26	26	-	-	2.7	9.9	41	0.005	15
17.06	40.8	41.1	-	2.1	0.0	5.3	3	silty CLAY to CLAY	115	1.5	27	27	-	-	2.8	9.9	40	0.005	15
17.23	51.8	51.7	-	2.6	0.0	5.1	4	clayy SILT to silty CLAY	115	2.0	26	26	-	-	3.6	9.9	36	0.070	15
17.39	54.5	53.8	-	2.9	0.0	5.5	4	clayy SILT to silty CLAY	115	2.0	27	27	-	-	3.8	9.9	37	0.070	15
17.55	49.7	48.7	-	2.9	0.0	6.0	3	silty CLAY to CLAY	115	1.5	32	33	-	-	3.5	9.9	39	0.005	15
17.72	50.7	49.1	-	2.9	0.0	5.8	3	silty CLAY to CLAY	115	1.5	33	34	-	-	3.5	9.9	39	0.005	15
17.88	48.0	46.1	-	3.9	0.0	8.3	3	silty CLAY to CLAY	115	1.5	31	32	-	-	3.3	9.9	46	0.005	15
18.05	54.1	51.8	-	3.9	0.0	7.3	3	silty CLAY to CLAY	115	1.5	35	36	-	-	3.8	9.9	42	0.005	15
18.21	54.8	52.2	-	3.5	0.0	6.5	3	silty CLAY to CLAY	115	1.5	35	37	-	-	3.8	9.9	40	0.005	15
18.37	50.4	47.8	-	3.1	0.0	6.2	3	silty CLAY to CLAY	115	1.5	32	34	-	-	3.5	9.9	41	0.005	15
18.54	48.3	45.7	-	3.2	0.0	6.7	3	silty CLAY to CLAY	115	1.5	30	32	-	-	3.4	9.9	42	0.005	15
18.70	50.6	47.6	-	3.2	0.0	6.5	3	silty CLAY to CLAY	115	1.5	32	34	-	-	3.5	9.9	41	0.005	15
18.87	52.0	48.7	-	3.5	0.0	6.9	3	silty CLAY to CLAY	115	1.5	32	35	-	-	3.6	9.9	42	0.005	15
19.03	55.1	51.4	-	3.6	0.0	6.7	3	silty CLAY to CLAY	115	1.5	34	37	-	-	3.8	9.9	41	0.005	15
19.19	59.5	55.4	-	4.3	0.0	7.4	3	silty CLAY to CLAY	115	1.5	37	40	-	-	4.2	9.9	41	0.005	15
19.36	62.4	57.8	-	5.3	0.0	8.7	3	silty CLAY to CLAY	115	1.5	39	42	-	-	4.4	9.9	44	0.005	15
19.52	65.4	60.4	-	6.3	0.0	9.7	9	very stiff fine SOIL	120	2.0	30	33	50	41	-	-	45	0.250	30
19.69	72.5	66.6	-	6.4	0.0	8.9	9	very stiff fine SOIL	120	2.0	33	36	54	41	-	-	42	0.250	30
19.85	66.0	60.3	-	5.3	0.0	8.1	9	very stiff fine SOIL	120	2.0	30	33	50	41	-	-	42	0.250	30
20.01	57.8	52.7	-	4.3	0.0	7.6	3	silty CLAY to CLAY	115	1.5	35	39	-	-	4.0	9.9	42	0.005	15
20.18	59.9	54.3	-	3.8	0.0	6.5	3	silty CLAY to CLAY	115	1.5	36	40	-	-	4.2	9.9	39	0.005	15
20.34	62.3	56.3	-	4.5	0.0	7.3	3	silty CLAY to CLAY	115	1.5	38	42	-	-	4.4	9.9	41	0.005	15
20.51	69.4	62.4	-	5.4	0.0	7.9	9	very stiff fine SOIL	120	2.0	31	35	51	41	-	-	41	0.250	30
20.67	80.9	72.5	-	5.3	0.0	6.7	9	very stiff fine SOIL	120	2.0	36	40	56	42	-	-	36	0.250	30
20.83	74.4	66.4	-	4.9	0.0	6.7	9	very stiff fine SOIL	120	2.0	33	37	53	41	-	-	37	0.250	30
21.00	61.6	54.7	-	3.7	0.0	6.1	3	silty CLAY to CLAY	115	1.5	36	41	-	-	4.3	9.9	38	0.005	15
21.16	53.9	47.7	-	2.8	0.0	5.3	3	silty CLAY to CLAY	115	1.5	32	36	-	-	3.8	9.9	38	0.005	15
21.33	44.0	38.8	-	2.1	0.0	4.9	3	silty CLAY to CLAY	115	1.5	26	29	-	-	3.1	9.9	40	0.005	15
21.49	39.9	35.1	-	1.9	0.0	4.8	3	silty CLAY to CLAY	115	1.5	23	27	-	-	2.8	9.9	41	0.005	15
21.65	38.6	33.8	-	1.9	0.0	5.0	3	silty CLAY to CLAY	115	1.5	23	26	-	-	2.7	9.9	42	0.005	15
21.82	38.4	33.5	-	1.9	0.0	5.1	3	silty CLAY to CLAY	115	1.5	22	26	-	-	2.7	9.9	43	0.005	15
21.98	38.0	33.0	-	1.9	0.0	5.2	3	silty CLAY to CLAY	115	1.5	22	25	-	-	2.6	9.9	44	0.005	15
22.15	34.5	29.9	-	2.3	0.0	7.0	3	silty CLAY to CLAY	115	1.5	20	23	-	-	2.4	9.9	51	0.005	15
22.31	48.0	41.4	-	2.9	0.0	6.1	3	silty CLAY to CLAY	115	1.5	28	32	-	-	3.3	9.9	43	0.005	15
22.47	46.1	39.6	-	3.1	0.0	6.9	3	silty CLAY to CLAY	115	1.5	26	31	-	-	3.2	9.9	46	0.005	15
22.64	39.3	33.6	-	2.7	0.0	7.0	3	silty CLAY to CLAY	115	1.5	22	26	-	-	2.7	9.9	49	0.005	15
22.80	33.3	28.4	-	1.9	0.0	6.1	3	silty CLAY to CLAY	115	1.5	19	22	-	-	2.3	9.9	49	0.005	15
22.97	34.6	29.4	-	1.8	0.0	5.4	3	silty CLAY to CLAY	115	1.5	20	23	-	-	2.4	9.9	46	0.005	15
23.13	35.9	30.4	-	1.9	0.0	5.4	3	silty CLAY to CLAY	115	1.5	20	24	-	-	2.5	9.9	46	0.005	15
23.30	33.1	27.9	-	1.7	0.0	5.5	3	silty CLAY to CLAY	115	1.5	19	22	-	-	2.3	9.9	48	0.005	15
23.46	33.2	27.9	-	1.6	0.0	5.1	3	silty CLAY to CLAY	115	1.5	19	22	-	-	2.3	9.9	47	0.005	15
23.62	36.8	30.8	-	1.7	0.0	4.8	3	silty CLAY to CLAY	115	1.5	21	25	-	-	2.6	9.9	44	0.005	15
23.79	37.2	31.0	-	1.7	0.0	4.8	3	silty CLAY to CLAY	115	1.5	21	25	-	-	2.6	9.9	43	0.005	15
23.95	32.9	27.3	-	1.8	0.0	5.7	3	silty CLAY to CLAY	115	1.5	18	22	-	-	2.3	9.9	49	0.005	15
24.12	36.5	30.2	-	2.3	0.0	6.5	3	silty CLAY to CLAY	115	1.5	20	24	-	-	2.5	9.9	49	0.005	15
24.28	40.7	33.6	-	3.1	0.0	7.8	3	silty CLAY to CLAY	115	1.5	22	27	-	-	2.8	9.9	51	0.005	15
24.44	58.2	47.9	-	4.3	0.0	7.5	3	silty CLAY to CLAY	115	1.5	32	39	-	-	4.1	9.9	44	0.005	15
24.61	64.6	52.9	-	4.6	0.0	7.3	3	silty CLAY to CLAY	115	1.5	35	43	-	-	4.5	9.9	42	0.005	15
24.77	62.8	51.3	-	4.9	0.0	7.9	3	silty CLAY to CLAY	115	1.5	34	42	-	-	4.4	9.9	44	0.005	15
24.94	44.8	36.5	-	3.9	0.0	9.0	3	silty CLAY to CLAY	115	1.5	24	30	-	-	3.1	9.9	52	0.005	15
25.10	52.3	42.4	-	3.4	0.0	6.7	3	silty CLAY to CLAY	115	1.5	28	35	-	-	3.6	9.9	44	0.005	15
25.26	53.7	43.4	-	3.4	0.0	6.5	3	silty CLAY to CLAY	115	1.5	29	36	-	-	3.7	9.9	43	0.005	15
25.43	55.3	44.5	-	3.4	0.0	6.2	3	silty CLAY to CLAY	115	1.5	30	37	-	-	3.8	9.9	42	0.005	15
25.59	52.7	42.3	-	2.9	0.0	5.7	3	silty CLAY to CLAY	115	1.5	28	35	-	-	3.7	9.9	41	0.005	15
25.76	53.1	42.5	-	2.8	0.0	5.4	3	silty CLAY to CLAY	115	1.5	28	35	-	-	3.7	9.9	40	0.005	15
25.92	51.9	41.4	-	2.7	0.0	5.4	3	silty CLAY to CLAY	115	1.5	28	35	-	-	3.6	9.9	41	0.005	15
26.08	52.9	42.0	-	2.6	0.0	5.1	3	silty CLAY to CLAY	115	1.5	28	35	-	-	3.7	9.9	39	0.005	15
26.25	50.6	40.0	-	2.5	0.0	5.2	3	silty CLAY to CLAY	115	1.5	27	34	-	-	3.5	9.9	40	0.005	15
26.41	49.0	38.7	-	2.3	0.0	4.9	3	silty CLAY to CLAY	115	1.5	26	33	-	-	3.4	9.9	40	0.005	15
26.58	47.9	37.7	-	2.2	0.0	4.7	3	silty CLAY to CLAY	115	1.5	25	32	-	-	3.3	9.9	40	0.005	15
26.74	45.1	35.3	-	2.5	0.0	5.8	3	silty CLAY to CLAY	115	1.5	24	30	-	-	3.1	9.9	44	0.005	15
26.90	51.7	40.4	-	2.8	0.0	5.6	3	silty CLAY to CLAY	115	1.5	27	34	-	-	3.6	9.9	41	0.005	15
27.07	48.3	37.6	-	2.8	0.0	6.1	3	silty CLAY to CLAY	115	1.5	25	32	-	-	3.4	9.9	44	0.005	15
27.23	45.0	34.9	-	2.5	0.0	5.9	3	silty CLAY to CLAY	115	1.5	23	30	-	-	3.1	9.9	45	0.005	15
27.40	43.3	33.4	-	2.5	0.0	6.1	3	silty CLAY to CLAY	115	1.5	22	29	-	-	3.0	9.9	46	0.005	15
27.56	45.3	34.9	-	2.7	0.0	6.2	3	silty CLAY to CLAY	115	1.5	23	30	-	-	3.1	9.9	46	0.005	15
27.72	44.9	34.5	-	2.3	0.0	5.4	3	silty CLAY to CLAY	115	1.5	23	30	-	-	3.1	9.9	44	0.005	15
27.89	40.8	31.2	-	1.9	0.0	4.9	3	silty CLAY to CLAY	115	1.5	21	27	-	-	2.8	9.9	44	0.005	15
28.05	39.4	30.1	-	1.7	0.0	4.6	3	silty CLAY to CLAY	115	1.5	20	26	-	-	2.7	9.9	43	0.005	15
28.22	39.7	30.2	-	1.9	0.0	5.1	3	silty CLAY to CLAY	115	1.5	20	26	-	-	2.7	9.9	45	0.005	15
28.38	46.1	35.0	-	2.4	0.0	5.3	3	silty CLAY to CLAY	115	1.5	23	31	-	-	3.2	9.9	43	0.005	15
28.54	47.9	36.2	-	2.3	0.0	5.1	3	silty CLAY to CLAY	115	1.5	24	32	-	-	3.3	9.9	42	0.005	15
28.71	44.9	33.8	-	2.1	0.0	4.9	3	silty CLAY to CLAY	115	1.5	23	30	-	-	3.1	9.9	42	0.005	15
28.87	44.1	33.1	-	2.0	0.0	4.7	3	silty CLAY to CLAY	115	1.5	22	29	-	-	3.1	9.9	42	0.005	15
29.04	43.2	32.3	-	2.0	0.0	4.8	3	silty CLAY to CLAY	115	1.5	22	29	-	-	3.0	9.9	43	0.005	15
29.20	44.4	33.1	-	2.4	0.0	5.6	3	silty CLAY to CLAY	115	1.5	22	30	-	-	3.1	9.9	45	0.005	15
29.36	56.5	42.0	-	2.9	0.0	5.3	3	silty CLAY to CLAY	115	1.5	28	38	-	-	3.9	9.9	40	0.005	15
29.53	66.5	49.2	-	3.3	0.0	5.0	4	clayy SILT to silty CLAY	115	2.0	25	33	-	-	4.6	9.9	37	0.070	15
29.69	64.5	47.7	-	3.0	0.0	4.7	4	clayy SILT to silty CLAY	115	2.0	24	32	-	-	4.5	9.9	36	0.070	15
29.86	60.6	44.6	-	2.8	0.0	4.8	4	clayy SILT to silty CLAY	115	2.0	22	30	-	-	4.2	9.9	38	0.070	15
30.02	58.9	43.2	-	2.8	0.0	5.0	3	silty CLAY to CLAY	115	1.5	29	39	-	-	4.1	9.9	38	0.005	15
30.19	65.0	47.5	-	3.2	0.0	5.1	4	clayy SILT to silty CLAY	115	2.0	24	32	-	-	4.5	9.9	37	0.070	15
30.35	61.7	45.0	-	3.4	0.0	5.7	3	silty CLAY to CLAY	115	1.5	30	41	-	-	4.3	9.9	40	0.005	15
30.51	60.5	44.0	-	2.9	0.0	5.0	4	clayy SILT to silty CLAY	115	2.0	22	30	-	-	4.2	9.9	38	0.070	15
30.68	56.9	41.2	-	2.9	0.0	5.2	3	silty CLAY to CLAY	115	1.5	27	38	-	-	4.0	9.9	40	0.005	15
30.84	54.5	39.4	-	3.6	0.0	6.9	3	silty CLAY to CLAY	115	1.5	26	36	-	-	3.8	9.9	46	0.005	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(479).cpt
CPT Date: 2/22/2010 2:20:51 PM
GW During Test: 18 ft

Sounding ID: CPT-06
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qc1n PS -	qlncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
31.01	56.2	40.5	-	3.8	0.0	7.0	3	silty CLAY to CLAY	115	1.5	27	37	-	-	3.9	9.9	45	0.005	15
31.17	60.5	43.5	-	4.1	0.0	7.1	3	silty CLAY to CLAY	115	1.5	29	40	-	-	4.2	9.9	44	0.005	15
31.33	54.5	39.0	-	3.8	0.0	7.2	3	silty CLAY to CLAY	115	1.5	26	36	-	-	3.8	9.9	47	0.005	15
31.50	48.9	34.9	-	3.2	0.0	6.9	3	silty CLAY to CLAY	115	1.5	23	33	-	-	3.4	9.9	48	0.005	15
31.66	46.2	32.9	-	2.9	0.0	6.6	3	silty CLAY to CLAY	115	1.5	22	31	-	-	3.2	9.9	48	0.005	15
31.83	47.0	33.3	-	3.0	0.0	6.6	3	silty CLAY to CLAY	115	1.5	22	31	-	-	3.3	9.9	48	0.005	15
31.99	45.7	32.3	-	2.9	0.0	6.6	3	silty CLAY to CLAY	115	1.5	22	30	-	-	3.2	9.9	48	0.005	15
32.15	45.2	31.8	-	3.1	0.0	7.1	3	silty CLAY to CLAY	115	1.5	21	30	-	-	3.1	9.9	50	0.005	15
32.32	50.3	35.4	-	3.3	0.0	6.8	3	silty CLAY to CLAY	115	1.5	24	34	-	-	3.5	9.9	47	0.005	15
32.48	57.4	40.2	-	3.8	0.0	6.8	3	silty CLAY to CLAY	115	1.5	27	38	-	-	4.0	9.9	45	0.005	15
32.65	56.2	39.3	-	3.9	0.0	7.2	3	silty CLAY to CLAY	115	1.5	26	37	-	-	3.9	9.9	47	0.005	15
32.81	55.6	38.7	-	3.6	0.0	6.8	3	silty CLAY to CLAY	115	1.5	26	37	-	-	3.9	9.9	46	0.005	15
32.97	59.4	41.3	-	3.5	0.0	6.1	3	silty CLAY to CLAY	115	1.5	28	40	-	-	4.1	9.9	43	0.005	15
33.14	59.0	40.8	-	3.6	0.0	6.3	3	silty CLAY to CLAY	115	1.5	27	39	-	-	4.1	9.9	43	0.005	15
33.30	59.5	41.1	-	3.6	0.0	6.2	3	silty CLAY to CLAY	115	1.5	27	40	-	-	4.1	9.9	43	0.005	15
33.47	63.7	43.9	-	3.8	0.0	6.2	3	silty CLAY to CLAY	115	1.5	29	42	-	-	4.4	9.9	42	0.005	15
33.63	63.0	43.2	-	3.8	0.0	6.2	3	silty CLAY to CLAY	115	1.5	29	42	-	-	4.4	9.9	42	0.005	15
33.79	68.3	46.7	-	4.1	0.0	6.2	3	silty CLAY to CLAY	115	1.5	31	46	-	-	4.8	9.9	41	0.005	15
33.96	61.6	42.0	-	5.2	0.0	8.7	3	silty CLAY to CLAY	115	1.5	28	41	-	-	4.3	9.9	49	0.005	15
34.12	63.6	43.2	-	5.3	0.0	8.7	3	silty CLAY to CLAY	115	1.5	29	42	-	-	4.4	9.9	48	0.005	15
34.29	79.5	53.9	-	5.5	0.0	7.1	3	silty CLAY to CLAY	115	1.5	36	53	-	-	5.5	9.9	41	0.005	15
34.45	72.3	48.9	-	5.8	0.0	8.3	3	silty CLAY to CLAY	115	1.5	33	48	-	-	5.0	9.9	45	0.005	15
34.61	66.4	44.7	-	6.0	0.0	9.4	3	silty CLAY to CLAY	115	1.5	30	44	-	-	4.6	9.9	49	0.005	15
34.78	61.7	41.5	-	6.2	0.0	9.9	3	silty CLAY to CLAY	115	1.5	28	41	-	-	4.3	9.9	52	0.005	15
34.94	56.8	38.1	-	6.1	0.0	9.9	3	silty CLAY to CLAY	115	1.5	25	38	-	-	3.9	9.9	53	0.005	15
35.11	52.9	35.3	-	5.9	0.0	9.9	3	silty CLAY to CLAY	115	1.5	24	35	-	-	3.7	9.9	55	0.005	15
35.27	61.9	41.2	-	5.8	0.0	9.7	3	silty CLAY to CLAY	115	1.5	27	41	-	-	4.3	9.9	52	0.005	15
35.43	62.3	41.4	-	6.2	0.0	9.9	3	silty CLAY to CLAY	115	1.5	28	42	-	-	4.3	9.9	52	0.005	15
35.60	70.7	46.9	-	7.0	0.0	9.9	3	silty CLAY to CLAY	115	1.5	31	47	-	-	4.9	9.9	50	0.005	15
35.76	77.4	51.2	-	7.3	0.0	9.7	3	silty CLAY to CLAY	115	1.5	34	52	-	-	5.4	9.9	48	0.005	15
35.93	79.0	52.1	-	7.2	0.0	9.3	3	silty CLAY to CLAY	115	1.5	35	53	-	-	5.5	9.9	47	0.005	15
36.09	76.2	50.1	-	7.4	0.0	9.9	3	silty CLAY to CLAY	115	1.5	33	51	-	-	5.3	9.9	49	0.005	15
36.26	77.3	50.6	-	7.3	0.0	9.7	3	silty CLAY to CLAY	115	1.5	34	52	-	-	5.4	9.9	48	0.005	15
36.42	77.3	50.5	-	7.2	0.0	9.6	3	silty CLAY to CLAY	115	1.5	34	52	-	-	5.4	9.9	48	0.005	15
36.58	79.1	51.5	-	7.2	0.0	9.3	3	silty CLAY to CLAY	115	1.5	34	53	-	-	5.5	9.9	47	0.005	15
36.75	78.8	51.2	-	6.8	0.0	8.8	3	silty CLAY to CLAY	115	1.5	34	53	-	-	5.5	9.9	46	0.005	15
36.91	71.5	46.3	-	5.3	0.0	7.6	3	silty CLAY to CLAY	115	1.5	31	48	-	-	5.0	9.9	45	0.005	15
37.08	64.2	41.5	-	4.2	0.0	6.8	3	silty CLAY to CLAY	115	1.5	28	43	-	-	4.5	9.9	45	0.005	15
37.24	62.3	40.1	-	3.2	0.0	5.3	3	silty CLAY to CLAY	115	1.5	27	42	-	-	4.3	9.9	41	0.005	15
37.40	73.3	47.1	-	5.7	0.0	8.0	3	silty CLAY to CLAY	115	1.5	31	49	-	-	5.1	9.9	46	0.005	15
37.57	62.6	40.1	-	6.8	0.0	9.9	3	silty CLAY to CLAY	115	1.5	27	42	-	-	4.3	9.9	52	0.005	15
37.73	83.1	53.1	-	6.3	0.0	7.8	3	silty CLAY to CLAY	115	1.5	35	55	-	-	5.8	9.9	43	0.005	15
37.90	76.8	49.0	-	6.0	0.0	8.1	3	silty CLAY to CLAY	115	1.5	33	51	-	-	5.4	9.9	45	0.005	15
38.06	73.0	46.4	-	5.6	0.0	7.9	3	silty CLAY to CLAY	115	1.5	31	49	-	-	5.1	9.9	45	0.005	15
38.22	66.5	42.1	-	5.2	0.0	8.1	3	silty CLAY to CLAY	115	1.5	28	44	-	-	4.6	9.9	48	0.005	15
38.39	62.1	39.2	-	4.9	0.0	8.2	3	silty CLAY to CLAY	115	1.5	26	41	-	-	4.3	9.9	49	0.005	15
38.55	65.7	41.4	-	5.1	0.0	8.1	3	silty CLAY to CLAY	115	1.5	28	44	-	-	4.6	9.9	48	0.005	15
38.72	66.7	41.9	-	5.5	0.0	8.5	3	silty CLAY to CLAY	115	1.5	28	44	-	-	4.6	9.9	49	0.005	15
38.88	69.3	43.4	-	5.5	0.0	8.2	3	silty CLAY to CLAY	115	1.5	29	46	-	-	4.8	9.9	47	0.005	15
39.04	67.4	42.1	-	6.8	0.0	9.9	3	silty CLAY to CLAY	115	1.5	28	45	-	-	4.7	9.9	52	0.005	15
39.21	60.9	37.9	-	7.5	0.0	9.9	3	silty CLAY to CLAY	115	1.5	25	41	-	-	4.2	9.9	53	0.005	15
39.37	78.2	48.6	-	7.6	0.0	9.9	3	silty CLAY to CLAY	115	1.5	32	52	-	-	5.4	9.9	49	0.005	15
39.54	71.2	44.1	-	7.0	0.0	9.9	3	silty CLAY to CLAY	115	1.5	29	47	-	-	4.9	9.9	51	0.005	15
39.70	67.3	41.6	-	6.5	0.0	10.0	3	silty CLAY to CLAY	115	1.5	28	45	-	-	4.7	9.9	52	0.005	15
39.86	72.0	44.4	-	6.1	0.0	8.8	3	silty CLAY to CLAY	115	1.5	30	48	-	-	5.0	9.9	48	0.005	15
40.03	76.3	46.9	-	6.3	0.0	8.5	3	silty CLAY to CLAY	115	1.5	31	51	-	-	5.3	9.9	47	0.005	15
40.19	73.1	44.9	-	6.6	0.0	9.3	3	silty CLAY to CLAY	115	1.5	30	49	-	-	5.1	9.9	49	0.005	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

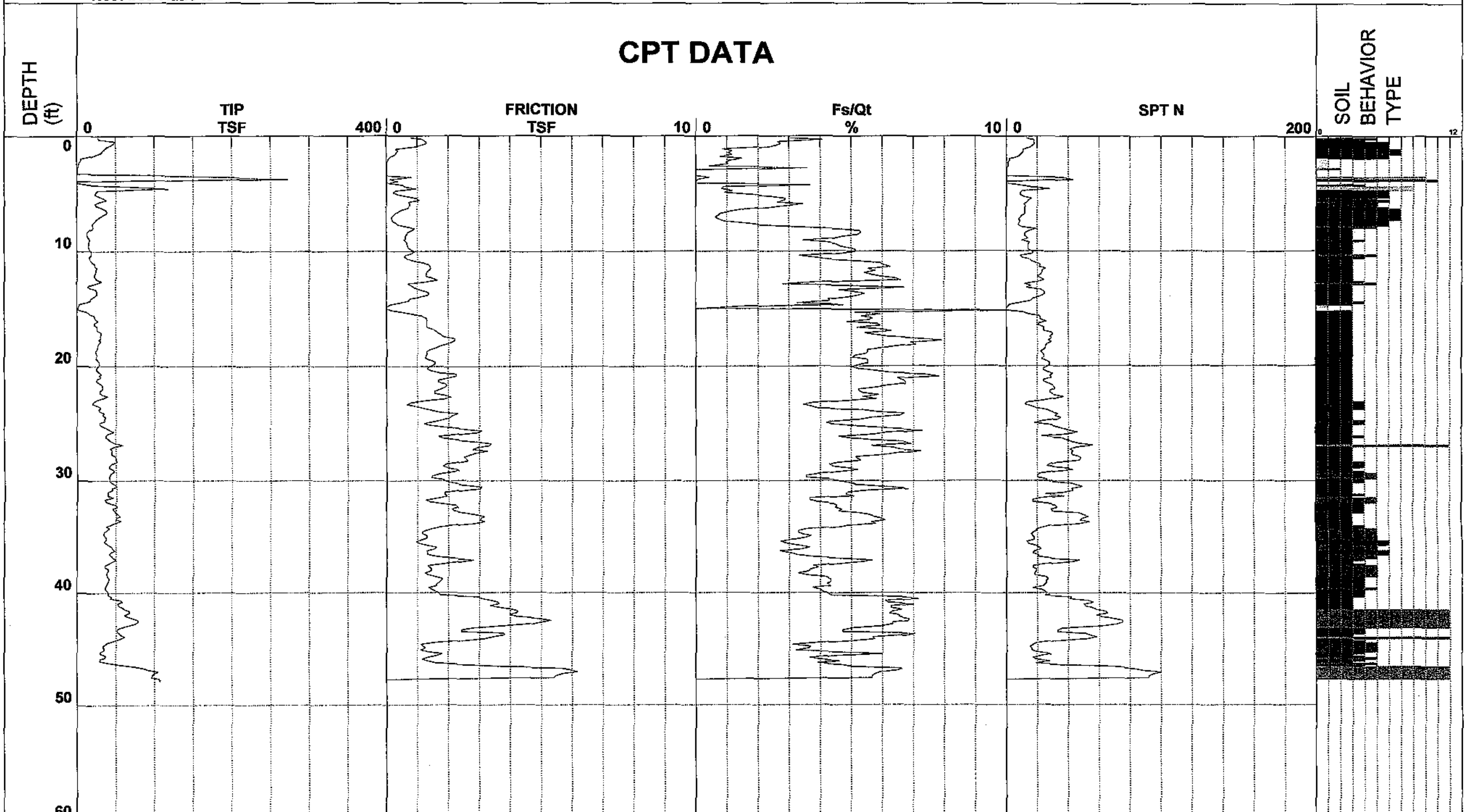
Middle Earth Geo Testing

Associated Soils Engineering

Project	Big Canyon Country Club	Operator	BH-AH	Filename	SDF(481)S.cpt
Job Number	6169	Cone Number	DSG1104	GPS	
Hole Number	CPT-07	Date and Time	2/22/2010 3:13:15 PM	Maximum Depth	47.90 ft
Water Table Depth	19.00 ft				

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

*Soil behavior type and SPT based on data from UBC-1983

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(481)S.cpt
CPT Date: 2/22/2010 3:13:15 PM
GW During Test: 19 ft

Sounding ID: CPT-07
Project No: 6169
Cone/Rig: DSG1104

. Depth ft	. qc PS tsf	* qcln PS -	. qlncs PS -	. Slv Stss tsf	. pore prss (psi)	. Frct Rato %	* Mat Typ Zon	* Material Behavior Description	. Unit Wght pcf	. Qc to N	* SPT R-N1 60%	. SPT R-N 60%	* Rel Den %	* Ftn Ang deg	. Und Shr tsf	. OCR -	* Fin Ic %	* D50 mm	* Nk -
0.33	29.0	46.5	145.9	1.2	0.0	4.1	4	clayy SILT to silty CLAY	115	2.0	23	14	-	-	2.0	9.9	34	0.070	15
0.49	48.1	77.2	145.1	1.3	0.0	2.6	5	silty SAND to sandy SILT	120	4.0	19	12	58	48	-	-	22	0.200	16
0.66	47.6	76.4	147.4	1.3	0.0	2.7	5	silty SAND to sandy SILT	120	4.0	19	12	58	48	-	-	22	0.200	16
0.82	43.5	69.8	137.1	1.1	0.0	2.6	5	silty SAND to sandy SILT	120	4.0	17	11	55	48	-	-	23	0.200	16
0.98	38.9	62.3	123.2	0.9	0.0	2.3	5	silty SAND to sandy SILT	120	4.0	16	10	51	48	-	-	23	0.200	16
1.15	35.8	57.4	80.0	0.3	0.0	0.9	5	silty SAND to sandy SILT	120	4.0	14	9	49	48	-	-	15	0.200	16
1.31	33.4	53.6	84.7	0.4	0.0	1.2	5	silty SAND to sandy SILT	120	4.0	13	8	46	47	-	-	18	0.200	16
1.48	31.2	50.0	78.9	0.3	0.0	1.0	5	silty SAND to sandy SILT	120	4.0	12	8	44	47	-	-	18	0.200	16
1.64	24.6	39.4	73.6	0.3	0.0	1.2	5	silty SAND to sandy SILT	120	4.0	10	6	36	45	-	-	22	0.200	16
1.80	18.4	29.5	56.5	0.1	0.0	0.8	5	silty SAND to sandy SILT	120	4.0	7	5	27	43	-	-	22	0.200	16
1.97	5.0	8.1	-	0.1	0.0	1.5	4	clayy SILT to silty CLAY	115	2.0	4	3	-	-	0.3	9.9	54	0.070	15
2.13	4.7	7.6	-	0.1	0.0	1.1	4	clayy SILT to silty CLAY	115	2.0	4	2	-	-	0.3	9.9	51	0.070	15
2.30	2.7	4.4	-	0.0	0.0	1.0	3	silty CLAY to CLAY	115	1.5	3	2	-	-	0.2	6.3	66	0.005	15
2.46	1.7	2.7	-	0.0	0.0	1.1	1	sensitive fine SOIL	115	2.0	1	1	-	-	0.1	3.5	83	0.005	15
2.62	1.5	2.4	-	0.0	0.0	0.5	1	sensitive fine SOIL	115	2.0	1	1	-	-	0.1	2.8	78	0.005	15
2.79	1.1	0.5	-	0.0	0.0	7.5	2	Organic SOILS - Peats	100	1.0	1	1	-	-	0.1	1.9	95	0.100	10
2.95	1.1	0.3	-	0.0	0.0	0.1	1	sensitive fine SOIL	115	2.0	0	1	-	-	0.1	1.8	95	0.005	15
3.12	1.1	0.3	-	0.0	0.0	0.1	1	sensitive fine SOIL	115	2.0	0	1	-	-	0.1	1.7	95	0.005	15
3.28	1.1	0.5	-	0.0	0.0	0.1	1	sensitive fine SOIL	115	2.0	0	1	-	-	0.1	1.6	95	0.005	15
3.45	108.8	174.4	174.4	0.0	0.0	0.1	7	grvly SAND to dense SAND	130	6.0	29	18	85	48	-	-	5	1.000	16
3.61	194.6	312.1	312.1	0.8	0.0	0.4	7	grvly SAND to dense SAND	130	6.0	52	32	95	48	-	-	5	1.000	16
3.77	272.0	436.2	436.2	0.1	0.0	0.1	7	grvly SAND to dense SAND	130	6.0	73	45	95	48	-	-	5	1.000	16
3.94	1.1	-0.8	-	0.4	0.0	0.1	1	sensitive fine SOIL	115	2.0	1	1	-	-	0.1	1.4	95	0.005	15
4.10	1.1	-0.8	-	0.0	0.0	0.1	1	sensitive fine SOIL	115	2.0	1	1	-	-	0.1	1.3	95	0.005	15
4.27	13.5	21.7	-	0.5	0.0	3.7	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	45	0.005	15
4.43	68.6	110.1	125.6	0.6	0.0	0.9	6	clean SAND to silty SAND	125	5.0	22	14	70	46	-	-	9	0.350	16
4.59	117.8	188.9	189.1	1.0	0.0	0.8	6	clean SAND to silty SAND	125	5.0	38	24	88	48	-	-	5	0.350	16
4.76	26.3	42.2	76.0	0.3	0.0	1.2	5	silty SAND to sandy SILT	120	4.0	11	7	38	41	-	-	21	0.200	16
4.92	24.0	38.5	67.3	0.2	0.0	0.9	5	silty SAND to sandy SILT	120	4.0	10	6	36	41	-	-	20	0.200	16
5.09	23.0	36.8	85.2	0.4	0.0	1.7	5	silty SAND to sandy SILT	120	4.0	9	6	34	40	-	-	26	0.200	16
5.25	28.4	45.5	110.2	0.7	0.0	2.4	5	silty SAND to sandy SILT	120	4.0	11	7	41	41	-	-	27	0.200	16
5.41	33.5	53.7	129.3	1.0	0.0	2.9	4	clayy SILT to silty CLAY	115	2.0	27	17	-	-	2.3	9.9	27	0.070	15
5.58	37.4	60.0	134.9	1.1	0.0	2.9	5	silty SAND to sandy SILT	120	4.0	15	9	50	43	-	-	26	0.200	16
5.74	27.4	44.0	113.1	0.7	0.0	2.6	4	clayy SILT to silty CLAY	115	2.0	22	14	-	-	1.9	9.9	29	0.070	15
5.91	22.0	35.3	-	0.8	0.0	3.5	4	clayy SILT to silty CLAY	115	2.0	18	11	-	-	1.5	9.9	36	0.070	15
6.07	25.4	40.8	115.8	0.7	0.0	2.9	4	clayy SILT to silty CLAY	115	2.0	20	13	-	-	1.8	9.9	31	0.070	15
6.23	31.4	50.3	113.7	0.7	0.0	2.4	5	silty SAND to sandy SILT	120	4.0	13	8	44	41	-	-	26	0.200	16
6.40	36.5	57.6	96.1	0.5	0.0	1.4	5	silty SAND to sandy SILT	120	4.0	14	9	49	42	-	-	19	0.200	16
6.56	38.8	60.5	88.8	0.4	0.0	1.1	5	silty SAND to sandy SILT	120	4.0	15	10	50	42	-	-	16	0.200	16
6.73	37.8	58.2	79.2	0.3	0.0	0.8	6	clean SAND to silty SAND	125	5.0	12	8	49	42	-	-	14	0.350	16
6.89	32.8	49.8	70.4	0.2	0.0	0.7	5	silty SAND to sandy SILT	120	4.0	12	8	44	41	-	-	15	0.200	16
7.05	29.0	43.5	63.4	0.2	0.0	0.6	5	silty SAND to sandy SILT	120	4.0	11	7	40	40	-	-	16	0.200	16
7.22	25.5	37.8	62.5	0.2	0.0	0.8	5	silty SAND to sandy SILT	120	4.0	9	6	35	40	-	-	19	0.200	16
7.38	23.4	34.4	63.9	0.2	0.0	0.9	5	silty SAND to sandy SILT	120	4.0	9	6	32	39	-	-	21	0.200	16
7.55	20.8	30.2	74.7	0.3	0.0	1.5	5	silty SAND to sandy SILT	120	4.0	8	5	27	38	-	-	28	0.200	16
7.71	19.7	28.3	84.6	0.4	0.0	2.1	4	clayy SILT to silty CLAY	115	2.0	14	10	-	-	1.4	9.9	33	0.070	15
7.87	20.8	33.4	-	0.7	0.0	3.2	4	clayy SILT to silty CLAY	115	2.0	17	10	-	-	1.4	9.9	36	0.070	15
8.04	20.2	32.4	-	0.9	0.0	4.6	3	silty CLAY to CLAY	115	1.5	22	13	-	-	1.4	9.9	42	0.005	15
8.20	15.4	24.7	-	0.8	0.0	5.5	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.1	9.9	50	0.005	15
8.37	12.8	20.5	-	0.7	0.0	5.5	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	54	0.005	15
8.53	12.8	20.5	-	0.7	0.0	5.4	3	silty CLAY to CLAY	115	1.5	14	9	-	-	0.9	9.9	54	0.005	15
8.69	12.7	20.3	-	0.6	0.0	4.9	3	silty CLAY to CLAY	115	1.5	14	8	-	-	0.9	9.9	52	0.005	15
8.86	14.3	23.0	-	0.6	0.0	4.6	3	silty CLAY to CLAY	115	1.5	15	10	-	-	1.0	9.9	48	0.005	15
9.02	16.4	26.2	-	0.6	0.0	3.6	4	clayy SILT to silty CLAY	115	2.0	13	8	-	-	1.1	9.9	42	0.070	15
9.19	15.2	24.4	-	0.6	0.0	4.4	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.0	9.9	46	0.005	15
9.35	14.7	23.6	-	0.7	0.0	4.7	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.0	9.9	48	0.005	15
9.51	14.7	23.5	-	0.7	0.0	4.8	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.0	9.9	49	0.005	15
9.68	14.3	22.9	-	0.7	0.0	5.1	3	silty CLAY to CLAY	115	1.5	15	10	-	-	1.0	9.9	50	0.005	15
9.84	15.1	24.3	-	0.8	0.0	5.3	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.0	9.9	50	0.005	15
10.01	17.5	28.1	-	0.9	0.0	5.3	3	silty CLAY to CLAY	115	1.5	19	12	-	-	1.2	9.9	47	0.005	15
10.17	17.9	28.7	-	0.8	0.0	4.7	3	silty CLAY to CLAY	115	1.5	19	12	-	-	1.2	9.9	44	0.005	15
10.34	18.2	29.1	-	0.6	0.0	3.4	4	clayy SILT to silty CLAY	115	2.0	15	9	-	-	1.3	9.9	39	0.070	15
10.50	15.4	24.7	-	0.6	0.0	3.9	4	clayy SILT to silty CLAY	115	2.0	12	8	-	-	1.1	9.9	44	0.070	15
10.66	15.8	25.2	-	0.7	0.0	4.4	3	silty CLAY to CLAY	115	1.5	17	11	-	-	1.1	9.9	46	0.005	15
10.83	17.2	27.0	-	0.9	0.0	5.5	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.2	9.9	48	0.005	15
10.99	19.8	30.7	-	1.2	0.0	6.1	3	silty CLAY to CLAY	115	1.5	20	13	-	-	1.4	9.9	48	0.005	15
11.16	22.9	34.9	-	1.4	0.0	6.2	3	silty CLAY to CLAY	115	1.5	23	15	-	-	1.6	9.9	46	0.005	15
11.32	22.4	33.7	-	1.4	0.0	6.4	3	silty CLAY to CLAY	115	1.5	22	15	-	-	1.6	9.9	47	0.005	15
11.48	25.6	38.0	-	1.4	0.0	5.7	3	silty CLAY to CLAY	115	1.5	25	17	-	-	1.8	9.9	43	0.005	15
11.65	23.5	34.4	-	1.4	0.0	5.9	3	silty CLAY to CLAY	115	1.5	23	16	-	-	1.6	9.9	45	0.005	15
11.81	23.8	34.3	-	1.3	0.0	5.6	3	silty CLAY to CLAY	115	1.5	23	16	-	-	1.6	9.9	44	0.005	15
11.98	22.5	32.1	-	1.3	0.0	5.8	3	silty CLAY to CLAY	115	1.5	21	15	-	-	1.6	9.9	46	0.005	15
12.14	21.3	29.9	-	1.3	0.0	6.2	3	silty CLAY to CLAY	115	1.5	20	14	-	-	1.5	9.9	48	0.005	15
12.30	23.1	32.0	-	1.5	0.0	6.6	3	silty CLAY to CLAY	115	1.5	21	15	-	-	1.6	9.9	48	0.005	15
12.47	24.8	34.0	-	1.6	0.0	6.8	3	silty CLAY to CLAY	115	1.5	23	17	-	-	1.7	9.9	48	0.005	15
12.63	31.8	38.5	-	1.3	0.0	4.1	4	clayy SILT to silty CLAY	115	2.0	19	16	-	-	2.2	9.9	37	0.070	15
12.80	25.2	30.3	-	0.7	0.0	2.9	4	clayy SILT to silty CLAY	115	2.0	15	13	-	-	1.7	9.9	36	0.070	15
12.96	16.3	21.5	-	0.8	0.0	5.3	3	silty CLAY to CLAY	115	1.5	14	11	-	-	1.1	9.9	52	0.005	15
13.12	13.4	17.4	-	0.9	0.0	7.1	3	silty CLAY to CLAY	115	1.5	12	9	-	-	0.9	9.1	63	0.005	15
13.29	22.8	29.3	-	1.1	0.0	4.8	3	silty CLAY to CLAY	115	1.5	20	15	-	-	1.6	9.9	44	0.005	15
13.45	25.1	31.8	-	1.3	0.0	5.2	3	silty CLAY to CLAY	115	1.5	21	17	-	-	1.7	9.9	44	0.005	15
13.62	25.6	32.1	-	1.4	0.0	5.6	3	silty CLAY to CLAY	115	1.5	21	17	-	-	1.8	9.9	45	0.005	15
13.78	25.3	31.3	-	1.3	0.0	5.4	3	silty CLAY to CLAY	115	1.5	21	17	-	-	1.8	9.9	45	0.005	15
13.94	21.7	26.6	-	1.0	0.0	5.0	3	silty CLAY to CLAY	115	1.5	18	14	-	-	1.5	9.9	47	0.005	15
14.11	17.4	21.1	-	0.7	0.0	4.5	3	silty CLAY to CLAY	115	1.5	14	12	-	-	1.2	9.9	50	0.005	15
14.27	16.9	20.2	-	0.7	0.0	4.5	3	silty CLAY to CLAY	115	1.5	13	11	-	-	1.2	9.9	51	0.005	15
14.44	14.1	16.7	-	0.5	0.0	3.5	3	silty CLAY to CLAY	115	1.5	11	9	-	-	1.0	8.9	51	0.005	15
14.60	2.6	3.0	-	0.1	0.0	7.1	2	Organic SOILS - Peats	100	1.0	3	3	-	-	0.2	1.1	95	0.100	10
14.76	1.8	2.1	-	0.0	0.0	3.0	2	Organic SOILS - Peats	100	1.0	2	2	-	-	0.1	0.6	95	0.100	10
14.93	1.0	1.2	-	0.0	0.0	0.1	1	sensitive fine SOIL	115	2.0	1	1	-	-	0.0	0.1	95	0.005	15
15.09	1.1	0.7	-	0.2	0.0	0.1	1	sensitive fine SOIL	115	2.0	0	1	-	-	0.0	0.1	95	0.005	15
15.26	11.0	12.4	-	0.6	0.0	5.6	3	silty CLAY to CLAY	115	1.5	8	7	-	-	0.7	6.5	67	0.005	15
15.42	14.8	16.5	-	0.9	0.0	6.3	3	silty CLAY to CLAY	115	1.5	11	10	-	-	1.0	8.9	62	0.005	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Project ID: Associated Soils
Data File: SDF(481)S.cpt
CPT Date: 2/22/2010 3:13:15 PM
GW During Test: 19 ft

Sounding ID: CPT-07
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qc1n PS -	q1ncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
31.01	38.5	27.2	-	1.9	0.0	5.1	3	silty CLAY to CLAY	115	1.5	18	26	-	-	2.7	9.9	47	0.005	15
31.17	38.7	27.3	-	1.9	0.0	5.1	3	silty CLAY to CLAY	115	1.5	18	26	-	-	2.7	9.9	47	0.005	15
31.33	38.4	27.0	-	1.9	0.0	5.3	3	silty CLAY to CLAY	115	1.5	18	26	-	-	2.6	9.9	48	0.005	15
31.50	45.1	31.6	-	1.6	0.0	3.8	4	clayy SILT to silty CLAY	115	2.0	16	23	-	-	3.1	9.9	40	0.070	15
31.66	34.6	24.2	-	1.3	0.0	3.8	4	clayy SILT to silty CLAY	115	2.0	12	17	-	-	2.4	9.9	45	0.070	15
31.83	36.2	25.2	-	1.4	0.0	4.1	3	silty CLAY to CLAY	115	1.5	17	24	-	-	2.5	9.9	45	0.005	15
31.99	42.0	29.1	-	1.9	0.0	4.6	3	silty CLAY to CLAY	115	1.5	19	28	-	-	2.9	9.9	44	0.005	15
32.15	49.4	34.2	-	2.2	0.0	4.7	3	silty CLAY to CLAY	115	1.5	23	33	-	-	3.4	9.9	42	0.005	15
32.32	51.6	35.6	-	2.3	0.0	4.7	3	silty CLAY to CLAY	115	1.5	24	34	-	-	3.6	9.9	41	0.005	15
32.48	45.2	31.1	-	2.1	0.0	4.9	3	silty CLAY to CLAY	115	1.5	21	30	-	-	3.1	9.9	44	0.005	15
32.65	47.5	32.6	-	2.2	0.0	4.8	3	silty CLAY to CLAY	115	1.5	22	32	-	-	3.3	9.9	43	0.005	15
32.81	49.1	33.5	-	2.6	0.0	5.5	3	silty CLAY to CLAY	115	1.5	22	33	-	-	3.4	9.9	44	0.005	15
32.97	52.1	35.5	-	2.9	0.0	5.8	3	silty CLAY to CLAY	115	1.5	24	35	-	-	3.6	9.9	44	0.005	15
33.14	55.0	37.4	-	3.2	0.0	5.9	3	silty CLAY to CLAY	115	1.5	25	37	-	-	3.8	9.9	44	0.005	15
33.30	50.9	34.5	-	3.0	0.0	6.2	3	silty CLAY to CLAY	115	1.5	23	34	-	-	3.5	9.9	46	0.005	15
33.47	49.9	33.7	-	3.0	0.0	6.3	3	silty CLAY to CLAY	115	1.5	22	33	-	-	3.5	9.9	47	0.005	15
33.63	56.3	37.9	-	3.2	0.0	5.8	3	silty CLAY to CLAY	115	1.5	25	38	-	-	3.9	9.9	43	0.005	15
33.79	49.5	33.3	-	2.9	0.0	6.0	3	silty CLAY to CLAY	115	1.5	22	33	-	-	3.4	9.9	46	0.005	15
33.96	43.9	29.4	-	2.1	0.0	5.1	3	silty CLAY to CLAY	115	1.5	20	29	-	-	3.0	9.9	46	0.005	15
34.12	37.4	25.0	-	1.7	0.0	4.9	3	silty CLAY to CLAY	115	1.5	17	25	-	-	2.6	9.9	48	0.005	15
34.29	41.5	27.6	-	1.5	0.0	3.8	4	clayy SILT to silty CLAY	115	2.0	14	21	-	-	2.9	9.9	42	0.070	15
34.45	38.9	25.8	-	1.3	0.0	3.5	4	clayy SILT to silty CLAY	115	2.0	13	19	-	-	2.7	9.9	42	0.070	15
34.61	35.4	23.4	-	1.2	0.0	3.5	4	clayy SILT to silty CLAY	115	2.0	12	18	-	-	2.4	9.9	44	0.070	15
34.78	34.0	22.4	-	1.2	0.0	3.6	4	clayy SILT to silty CLAY	115	2.0	11	17	-	-	2.3	9.9	45	0.070	15
34.94	35.3	23.2	-	1.3	0.0	3.9	3	silty CLAY to CLAY	115	1.5	15	24	-	-	2.4	9.9	46	0.005	15
35.11	37.3	24.5	-	1.3	0.0	3.7	4	clayy SILT to silty CLAY	115	2.0	12	19	-	-	2.6	9.9	44	0.070	15
35.27	36.7	24.0	-	1.1	0.0	3.3	4	clayy SILT to silty CLAY	115	2.0	12	18	-	-	2.5	9.9	42	0.070	15
35.43	34.8	22.7	-	0.9	0.0	2.9	4	clayy SILT to silty CLAY	115	2.0	11	17	-	-	2.4	9.9	42	0.070	15
35.60	36.9	24.0	-	1.1	0.0	3.1	4	clayy SILT to silty CLAY	115	2.0	12	18	-	-	2.5	9.9	42	0.070	15
35.76	40.7	26.4	-	1.4	0.0	3.5	4	clayy SILT to silty CLAY	115	2.0	13	20	-	-	2.8	9.9	42	0.070	15
35.93	44.1	28.5	-	1.6	0.0	3.8	4	clayy SILT to silty CLAY	115	2.0	14	22	-	-	3.0	9.9	41	0.070	15
36.09	45.3	29.3	-	1.5	0.0	3.5	4	clayy SILT to silty CLAY	115	2.0	15	23	-	-	3.1	9.9	40	0.070	15
36.26	48.2	31.0	-	1.3	0.0	2.8	4	clayy SILT to silty CLAY	115	2.0	16	24	-	-	3.3	9.9	35	0.070	15
36.42	43.3	27.8	-	1.3	0.0	3.2	4	clayy SILT to silty CLAY	115	2.0	14	22	-	-	3.0	9.9	39	0.070	15
36.58	41.1	26.3	-	1.3	0.0	3.4	4	clayy SILT to silty CLAY	115	2.0	13	21	-	-	2.8	9.9	41	0.070	15
36.75	43.5	27.8	-	1.6	0.0	3.8	4	clayy SILT to silty CLAY	115	2.0	14	22	-	-	3.0	9.9	42	0.070	15
36.91	46.2	29.4	-	2.1	0.0	4.8	3	silty CLAY to CLAY	115	1.5	20	31	-	-	3.2	9.9	45	0.005	15
37.08	49.5	31.4	-	2.8	0.0	5.9	3	silty CLAY to CLAY	115	1.5	21	33	-	-	3.4	9.9	47	0.005	15
37.24	44.3	28.1	-	2.4	0.0	5.6	3	silty CLAY to CLAY	115	1.5	19	30	-	-	3.1	9.9	48	0.005	15
37.40	39.7	25.1	-	1.8	0.0	4.9	3	silty CLAY to CLAY	115	1.5	17	26	-	-	2.7	9.9	48	0.005	15
37.57	35.3	22.2	-	1.3	0.0	4.0	3	silty CLAY to CLAY	115	1.5	15	24	-	-	2.4	9.9	47	0.005	15
37.73	35.4	22.2	-	1.4	0.0	4.2	3	silty CLAY to CLAY	115	1.5	15	24	-	-	2.4	9.9	48	0.005	15
37.90	39.7	24.9	-	1.5	0.0	3.9	4	clayy SILT to silty CLAY	115	2.0	12	20	-	-	2.7	9.9	44	0.070	15
38.06	39.1	24.4	-	1.4	0.0	3.8	4	clayy SILT to silty CLAY	115	2.0	12	20	-	-	2.7	9.9	44	0.070	15
38.22	37.7	23.5	-	1.2	0.0	3.5	4	clayy SILT to silty CLAY	115	2.0	12	19	-	-	2.6	9.9	44	0.070	15
38.39	37.6	23.4	-	1.3	0.0	3.7	4	clayy SILT to silty CLAY	115	2.0	12	19	-	-	2.6	9.9	45	0.070	15
38.55	38.6	23.9	-	1.6	0.0	4.4	3	silty CLAY to CLAY	115	1.5	16	26	-	-	2.6	9.9	47	0.005	15
38.72	41.7	25.8	-	1.8	0.0	4.6	3	silty CLAY to CLAY	115	1.5	17	28	-	-	2.9	9.9	46	0.005	15
38.88	41.0	25.3	-	1.8	0.0	4.6	3	silty CLAY to CLAY	115	1.5	17	27	-	-	2.8	9.9	47	0.005	15
39.04	40.0	24.6	-	1.7	0.0	4.6	3	silty CLAY to CLAY	115	1.5	16	27	-	-	2.7	9.9	47	0.005	15
39.21	38.6	23.7	-	1.6	0.0	4.5	3	silty CLAY to CLAY	115	1.5	16	26	-	-	2.6	9.9	48	0.005	15
39.37	37.4	22.9	-	1.6	0.0	4.6	3	silty CLAY to CLAY	115	1.5	15	25	-	-	2.6	9.9	49	0.005	15
39.54	36.5	22.3	-	1.4	0.0	4.0	3	silty CLAY to CLAY	115	1.5	15	24	-	-	2.5	9.8	47	0.005	15
39.70	36.6	22.3	-	1.5	0.0	4.3	3	silty CLAY to CLAY	115	1.5	15	24	-	-	2.5	9.8	48	0.005	15
39.86	38.9	23.6	-	1.6	0.0	4.3	3	silty CLAY to CLAY	115	1.5	16	26	-	-	2.7	9.9	47	0.005	15
40.03	40.3	24.4	-	1.7	0.0	4.5	3	silty CLAY to CLAY	115	1.5	16	27	-	-	2.8	9.9	47	0.005	15
40.19	39.8	24.0	-	1.7	0.0	4.7	3	silty CLAY to CLAY	115	1.5	16	27	-	-	2.7	9.9	48	0.005	15
40.36	44.1	26.6	-	3.0	0.0	7.1	3	silty CLAY to CLAY	115	1.5	18	29	-	-	3.0	9.9	54	0.005	15
40.52	43.0	25.8	-	3.1	0.0	7.6	3	silty CLAY to CLAY	115	1.5	17	29	-	-	3.0	9.9	56	0.005	15
40.68	55.3	33.1	-	3.4	0.0	6.4	3	silty CLAY to CLAY	115	1.5	22	37	-	-	3.8	9.9	47	0.005	15
40.85	58.0	34.6	-	3.6	0.0	6.5	3	silty CLAY to CLAY	115	1.5	23	39	-	-	4.0	9.9	47	0.005	15
41.01	52.0	31.0	-	3.6	0.0	7.3	3	silty CLAY to CLAY	115	1.5	21	35	-	-	3.6	9.9	51	0.005	15
41.18	53.3	31.7	-	3.3	0.0	6.6	3	silty CLAY to CLAY	115	1.5	21	36	-	-	3.7	9.9	49	0.005	15
41.34	58.1	34.4	-	3.6	0.0	6.5	3	silty CLAY to CLAY	115	1.5	23	39	-	-	4.0	9.9	47	0.005	15
41.50	60.8	35.9	-	4.0	0.0	6.9	3	silty CLAY to CLAY	115	1.5	24	41	-	-	4.2	9.9	47	0.005	15
41.67	66.9	39.4	-	4.2	0.0	6.6	3	silty CLAY to CLAY	115	1.5	26	45	-	-	4.6	9.9	45	0.005	15
41.83	67.4	39.6	-	4.2	0.0	6.5	3	silty CLAY to CLAY	115	1.5	26	45	-	-	4.7	9.9	44	0.005	15
42.00	60.8	35.7	-	4.0	0.0	6.8	3	silty CLAY to CLAY	115	1.5	24	41	-	-	4.2	9.9	47	0.005	15
42.16	64.0	37.5	-	4.2	0.0	6.8	3	silty CLAY to CLAY	115	1.5	25	43	-	-	4.4	9.9	46	0.005	15
42.32	72.0	42.0	-	4.9	0.0	7.1	3	silty CLAY to CLAY	115	1.5	28	48	-	-	5.0	9.9	45	0.005	15
42.49	78.0	45.4	-	5.3	0.0	7.0	3	silty CLAY to CLAY	115	1.5	30	52	-	-	5.4	9.9	44	0.005	15
42.65	78.4	45.5	-	4.9	0.0	6.5	3	silty CLAY to CLAY	115	1.5	30	52	-	-	5.5	9.9	42	0.005	15
42.82	74.4	43.1	-	4.7	0.0	6.5	3	silty CLAY to CLAY	115	1.5	29	50	-	-	5.2	9.9	43	0.005	15
42.98	64.7	37.4	-	3.9	0.0	6.2	3	silty CLAY to CLAY	115	1.5	25	43	-	-	4.5	9.9	45	0.005	15
43.15	56.0	32.3	-	2.8	0.0	5.3	3	silty CLAY to CLAY	115	1.5	22	37	-	-	3.9	9.9	45	0.005	15
43.31	51.3	29.5	-	2.4	0.0	5.0	3	silty CLAY to CLAY	115	1.5	20	34	-	-	3.5	9.9	45	0.005	15
43.47	51.3	29.4	-	2.4	0.0	4.9	3	silty CLAY to CLAY	115	1.5	20	34	-	-	3.5	9.9	45	0.005	15
43.64	53.6	30.6	-	3.8	0.0	7.4	3	silty CLAY to CLAY	115	1.5	20	36	-	-	3.7	9.9	52	0.005	15
43.80	56.1	32.0	-	3.8	0.0	7.1	3	silty CLAY to CLAY	115	1.5	21	37	-	-	3.9	9.9	50	0.005	15
43.97	60.4	34.4	-	3.4	0.0	5.9	3	silty CLAY to CLAY	115	1.5	23	40	-	-	4.2	9.9	45	0.005	15
44.13	54.7	31.1	-	3.1	0.0	6.0	3	silty CLAY to CLAY	115	1.5	21	36	-	-	3.8	9.9	48	0.005	15
44.29	47.0	26.7	-	2.3	0.0	5.3	3	silty CLAY to CLAY	115	1.5	18	31	-	-	3.2	9.9	48	0.005	15
44.46	38.8	21.9	-	1.5	0.0	4.2	3	silty CLAY to CLAY	115	1.5	15	26	-	-	2.6	9.3	48	0.005	15
44.62	35.4	20.0	-	1.1	0.0	3.3	3	silty CLAY to CLAY	115	1.5	13	24	-	-	2.4	8.4	47	0.005	15
44.79	32.1	18.1	-	1.2	0.0	4.0	3	silty CLAY to CLAY	115	1.5	12	21	-	-	2.2	7.6	52	0.005	15
44.95	34.2	19.2	-	1.2	0.0	3.9	3	silty CLAY to CLAY	115	1.5	13	23	-	-	2.3	8.1	50	0.005	15
45.11	34.0	19.1	-	1.1	0.0	3.5	3	silty CLAY to CLAY	115	1.5	13	23	-	-	2.3	8.0	48	0.005	15
45.28	29.8	16.6	-	1.3	0.0	4.8	3	silty CLAY to CLAY	115	1.5	11	20	-	-	2.0	6.9	57	0.005	15
45.44	30.0	16.7	-	1.8	0.0	6.6	3	silty CLAY to CLAY	115	1.5	11	20	-	-	2.0	6.9	63	0.005	15
45.61	36.2	20.1	-	1.6	0.0	4.9	3	silty CLAY to CLAY	115	1.5	13	24	-	-	2.5	8.5	53	0.005	15
45.77	36.2	20.1	-	1.3	0.0	3.9	3	silty CLAY to CLAY	115	1.5	13	24	-	-	2.5	8.4	49	0.005	15
45.93	29.3	16.2	-	1.2	0.0	4.4	3	silty CLAY to CLAY	115	1.5	11	20	-	-	2.0	6.7	56	0.005	15
46.10	28.8	15.9	-	1.3	0.0	5.1	3	silty CLAY to CLAY	115	1.5	11	19	-	-	1.9	6.5	59	0.005	15
46.26	40.5	22.3	-	1.6	0.0	4.2	3	silty CLAY to CLAY	115	1.5	15	27	-	-	2.8	9.4	48	0.005	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

Big Canyon Country Club

Project ID: Associated Soils
Data File: SDF(481)S.cpt
CPT Date: 2/22/2010 3:13:15 PM
GW During Test: 19 ft

Sounding ID: CPT-07
Project No: 6169
Cone/Rig: DSG1104

Depth ft	qc PS tsf	* qcln PS -	qlncs PS -	Slv Stss tsf	pore prss (psi)	Frct Rato %	* Mat Typ Zon	* Material Behavior Description	Unit Wght pcf	Qc to N	* SPT R-N1 60%	SPT R-N 60%	* Rel Den %	* Ftn Ang deg	Und Shr tsf	OCR - -	* Fin Ic %	* D50 - mm	* Nk - -
46.43	54.8	30.1	-	2.6	0.0	4.9	3	silty CLAY to CLAY	115	1.5	20	37	-	-	3.8	9.9	45	0.005	15
46.59	73.5	40.3	-	3.7	0.0	5.3	3	silty CLAY to CLAY	115	1.5	27	49	-	-	5.1	9.9	41	0.005	15
46.75	85.5	46.7	-	5.7	0.0	6.8	3	silty CLAY to CLAY	115	1.5	31	57	-	-	5.9	9.9	43	0.005	15
46.92	92.4	50.4	-	6.0	0.0	6.7	3	silty CLAY to CLAY	115	1.5	34	62	-	-	6.4	9.9	41	0.005	15
47.08	104.4	56.8	-	6.2	0.0	6.1	3	silty CLAY to CLAY	115	1.5	38	70	-	-	7.3	9.9	38	0.005	15
47.25	98.7	53.6	-	5.7	0.0	5.9	3	silty CLAY to CLAY	115	1.5	36	66	-	-	6.9	9.9	38	0.005	15
47.41	96.3	52.2	-	5.5	0.0	5.8	3	silty CLAY to CLAY	115	1.5	35	64	-	-	6.7	9.9	38	0.005	15
47.57	95.5	51.6	-	5.4	0.0	5.8	3	silty CLAY to CLAY	115	1.5	34	64	-	-	6.7	9.9	38	0.005	15

* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

APPENDIX B

References

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APPENDIX C

GENERAL EARTHWORK AND GRADING SPECIFICATIONS

1.0 GENERAL

1.1 Intent: These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the project-specific Geotechnical Report(s) (Geotechnical Report). These Specifications are a part of the recommendations contained in the Geotechnical Report. In case of conflict, the specific recommendations in the Geotechnical Report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the Geotechnical Report.

1.2 The Geotechnical Consultant of Record: Prior to commencement of work, the owner shall employ the Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultant shall be responsible for reviewing the approved Geotechnical Report and accepting the adequacy of the preliminary Geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the Geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include natural ground after it has been cleared for receiving fill but before fill is placed, bottoms of all "remedial removal" areas, all key bottoms, and benches made on sloping ground to receive fill.

The Geotechnical Consultant shall observe the moisture-conditions and processing of the subgrade and fill materials and perform relative compaction testing of fill to determine the attained level of compaction. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor: The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, Geotechnical Report and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the plans and specifications.

The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of "spreads" of work and the estimated quantities of daily earthwork contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved Geotechnical Report and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified.

2.0 PREPARATION OF AREAS TO BE FILLED

2.1 Clearing and Grubbing: Vegetation, such as brush grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). No fill lift shall contain more than 5 percent of organic matter. All organic materials should be nested prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

2.2 Processing: Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Overexcavation: In addition to removals and overexcavations recommended in the approved Geotechnical Report and the grading plan(s), soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching: Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas: All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys and benches.

3.0 FILL MATERIAL

3.1 General: Material to be used as fill essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, strong corrosivity, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

3.2 Oversize: Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import: If importing of fill material is required for grading, proposed import material shall meet the requirements of Section 3.1 at the potential import source. The Geotechnical Consultant shall be notified at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 FILL PLACEMENT AND COMPACTION

4.1 Fill Layers: Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning: Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain relatively uniform moisture content at or slightly over optimum. Maximum dry density and optimum soil moisture content tests shall be performed in accordance with the latest edition of the American Society of Testing and Materials (ASTM) Test Method D1557.

4.3 Compaction of Fill: After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (or relative compaction) per the latest edition of ASTM Test Method D1557. Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes: In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent per the latest edition of ASTM Test Method D1557.

4.5 Compaction Testing: Field tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces, near areas of high moisture content, and at the fill/bedrock benches).

4.6 Frequency of Compaction Testing: Tests shall be taken as intervals not exceeding 2 feet in vertical rise and/or 500 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 2,000 square feet of slope face and/or each 5 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical

Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 Compaction Test Locations: The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established to that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than 5 feet apart from potential test locations shall be provided.

5.0 SUBDRAIN INSTALLATION

Subdrain systems shall be installed in accordance with the approved Geotechnical Report, the grading plan(s), and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 EXCAVATION

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on Geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

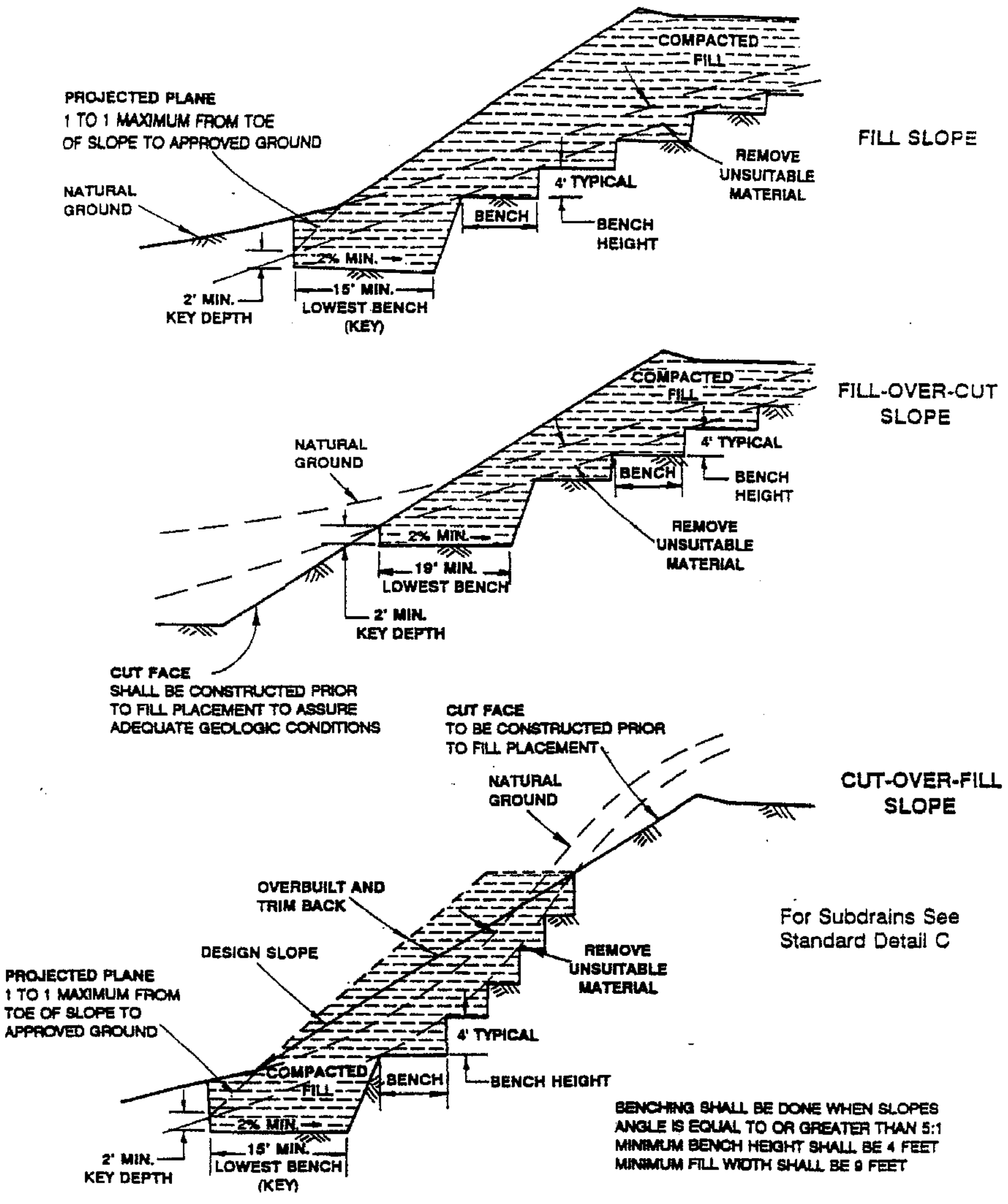
7.0 TRENCH BACKFILLS

7.1 Safety: The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations.

7.2 Bedding and Backfill: All bedding and backfill of utility trenches shall be performed in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent (Cal Test 217) greater than 30 (SE>30). The bedding shall be placed to 1 foot above the top of the conduit to the surface.

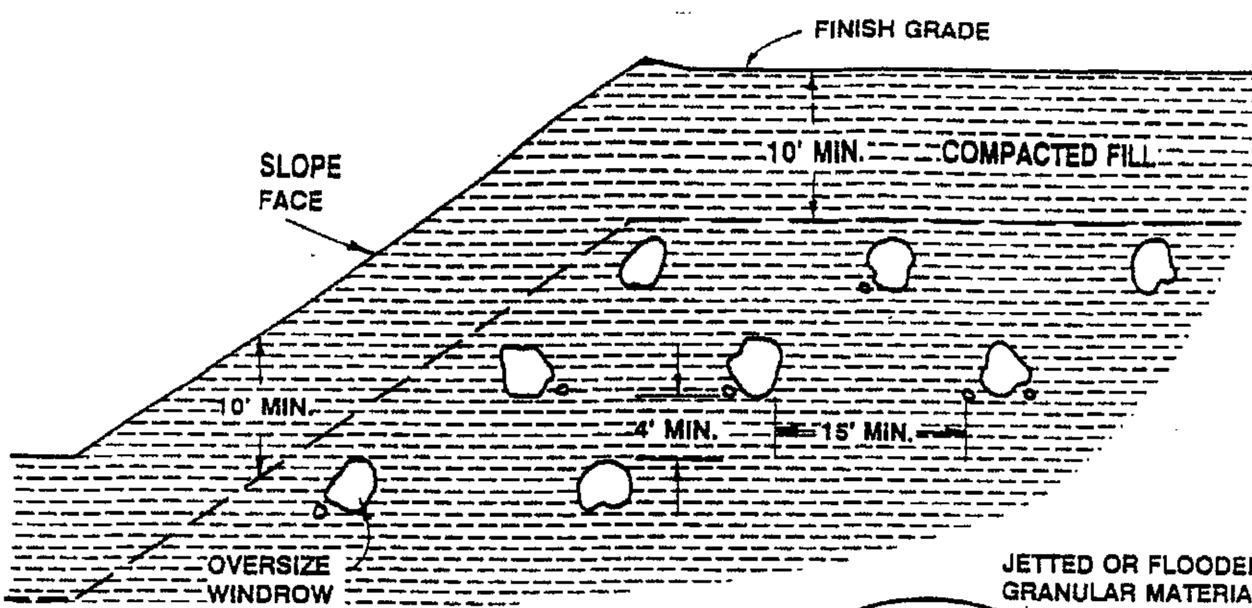
7.3 Lift Thickness: Lift thickness of trench backfill shall not exceed those allowed in the latest edition of Standard Specifications of Public Works Construction (i.e. "Green Book") unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum required relative compaction by his alternative equipment and method.

7.4 Observation and Testing: If acceptable by the Geotechnical Consultant, the jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

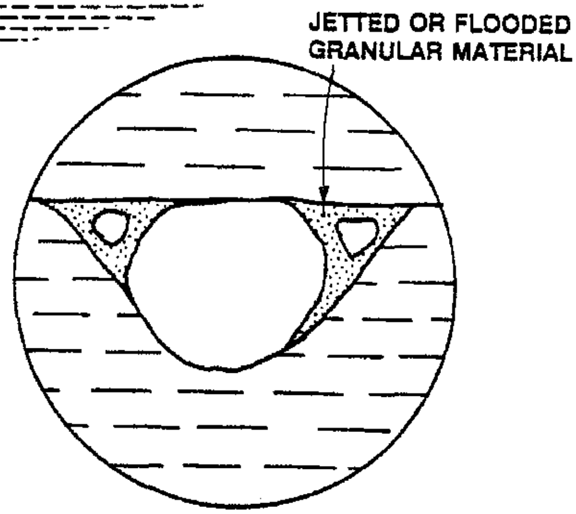


Schematic Not To Scale

ASSOCIATED SOILS ENGINEERING, INC. Consulting Geotechnical Engineers	Associated Soils Engineering, Inc.	Project:	Parcel 1 of Tentative Parcel Map No. 2008-111, Big Canyon Country Club, Newport Beach, California.	
	2860 Walnut Avenue Signal Hill, CA 90755	Details "A"	KEYING & BENCHING	
	Tel (562) 426-7990 Fax (562) 426-1842	Proj. No.:	09-6169	Date: June, 2010

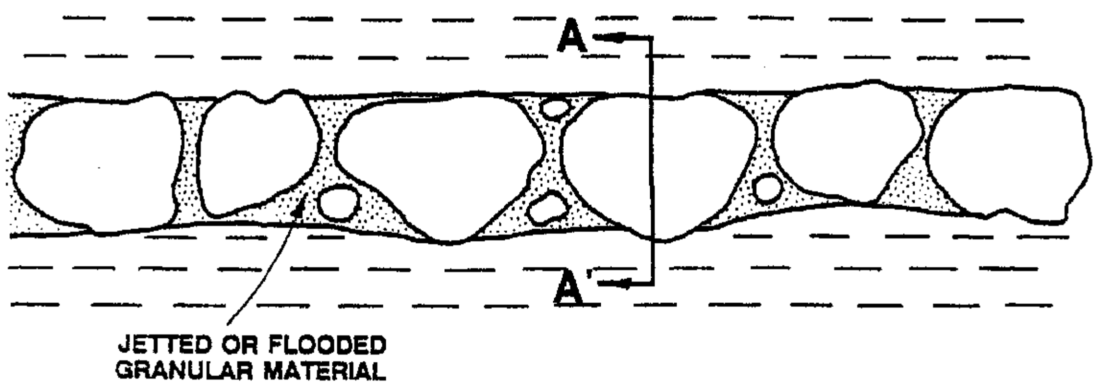


- Oversize rock is larger than 8 inches in largest dimension.
- Excavate a trench in the compacted fill deep enough to bury all the rock.
- Backfill with granular soil jetted or flooded in place to fill all the voids.
- Do not bury rock within 10 feet of finish grade.
- Windrow of buried rock shall be parallel to the finished slope fill.



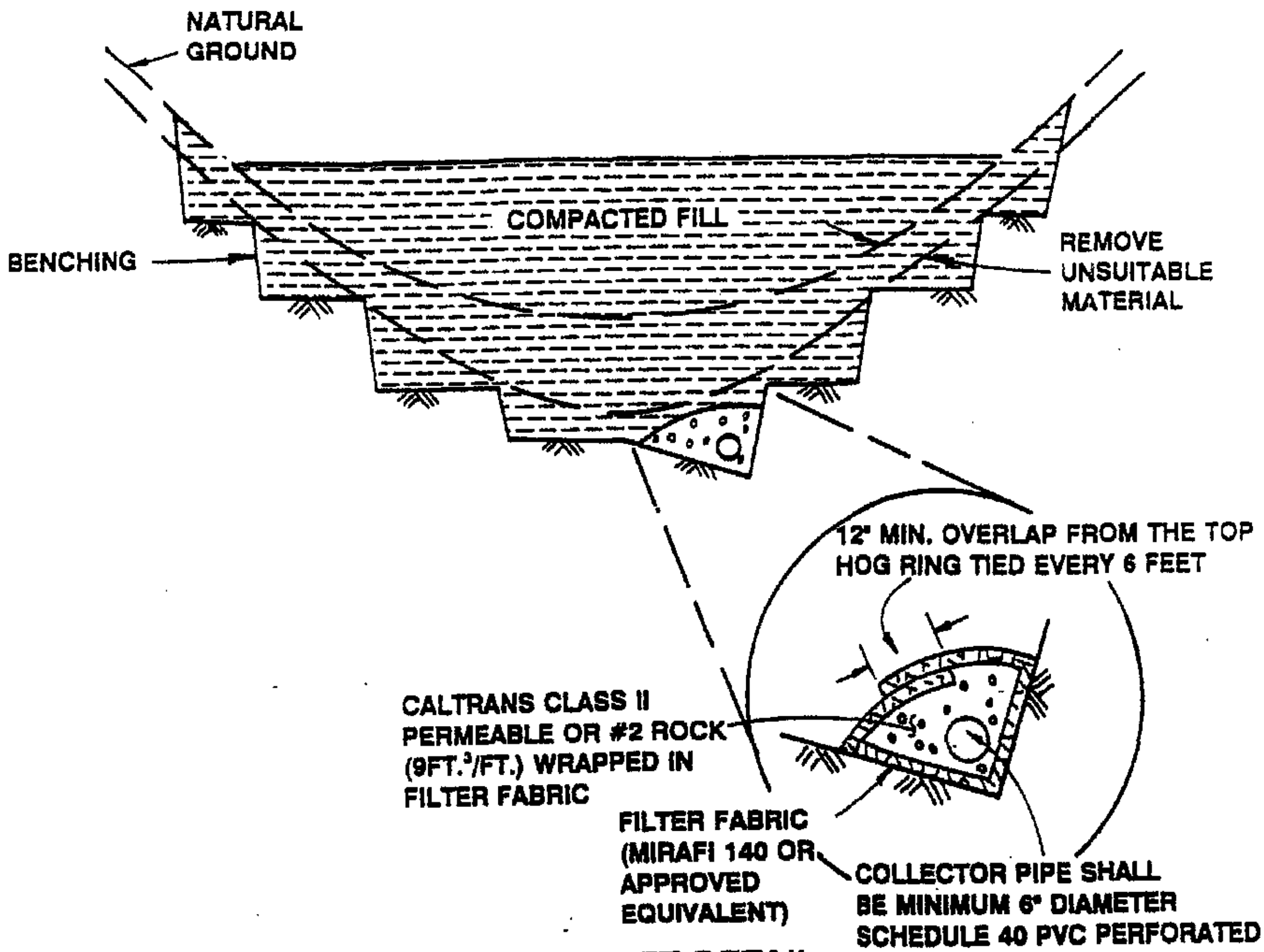
ELEVATION A-A'

PROFILE ALONG WINDROW

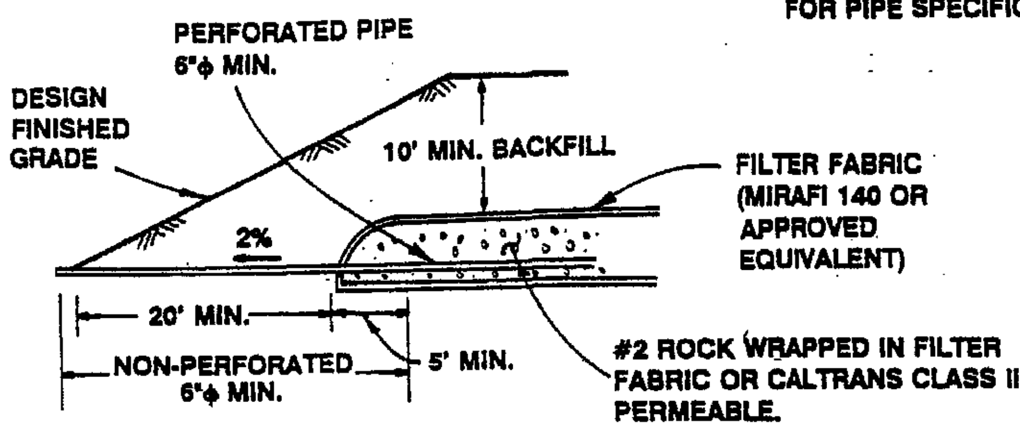


Schematic Not To Scale

ASSOCIATED ASE SOILS ENGINEERING, INC. Consulting Geotechnical Engineers	Associated Soils Engineering, Inc.	Project:	Parcel 1 of Tentative Parcel Map No. 2008-111, Big Canyon Country Club, Newport Beach, California.		
	2860 Walnut Avenue Signal Hill, CA 90755	Details "B"	OVERSIZE ROCK DISPOSAL		
	Tel (562) 426-7990 Fax (562) 426-1842	Proj. No.:	09-6169	Date:	June, 2010

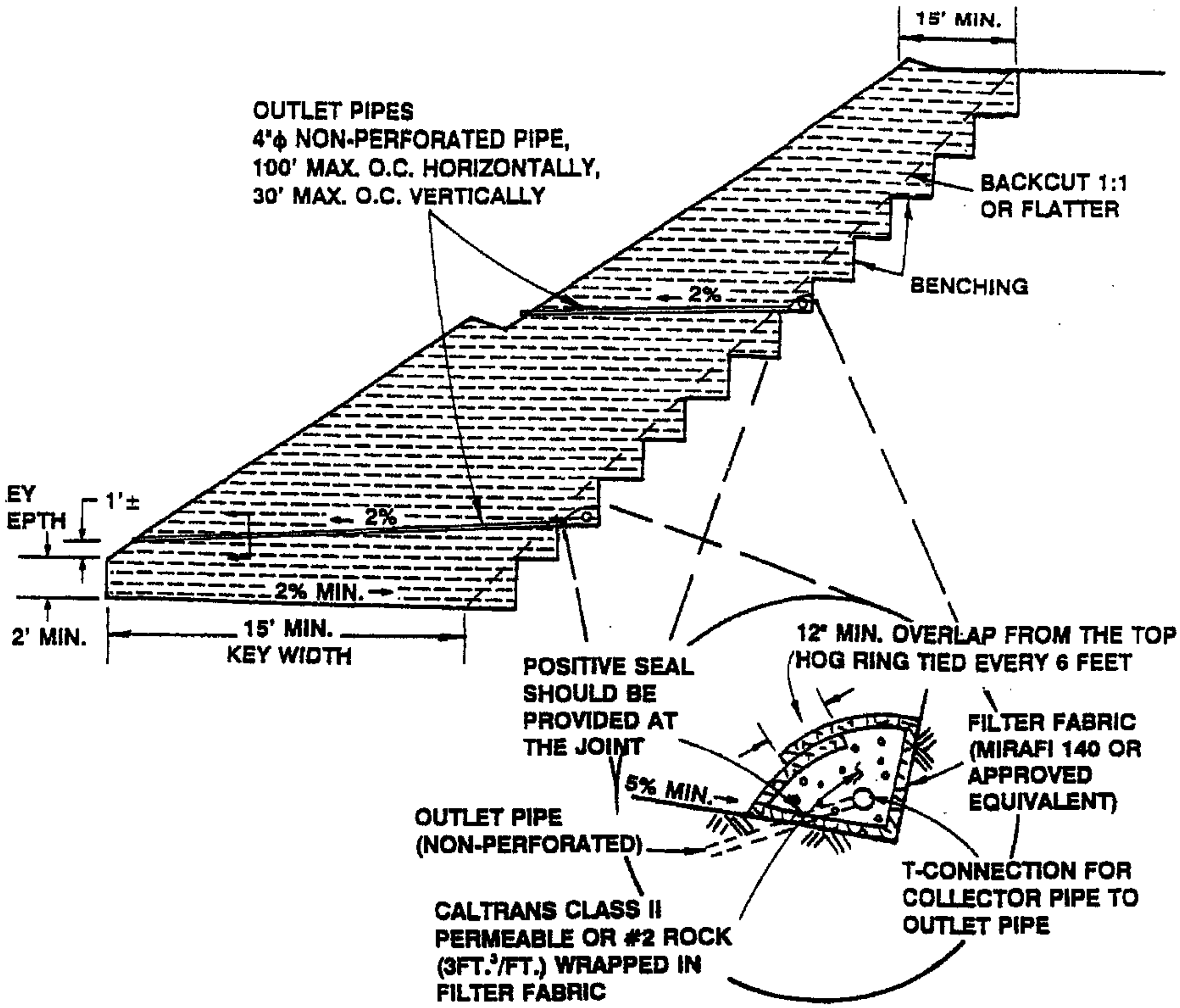


CANYON SUBDRAIN OUTLET DETAIL



Schematic Not To Scale

ASSOCIATED SOILS ENGINEERING, INC. Consulting Geotechnical Engineers	Associated Soils Engineering, Inc.	Project:	Parcel 1 of Tentative Parcel Map No. 2008-111, Big Canyon Country Club, Newport Beach, California.	
	2860 Walnut Avenue Signal Hill, CA 90755	Details "C"	CANYON SUBDRAINS	
	Tel (562) 426-7990 Fax (562) 426-1842	Proj. No.:	09-6169	Date: June, 2010

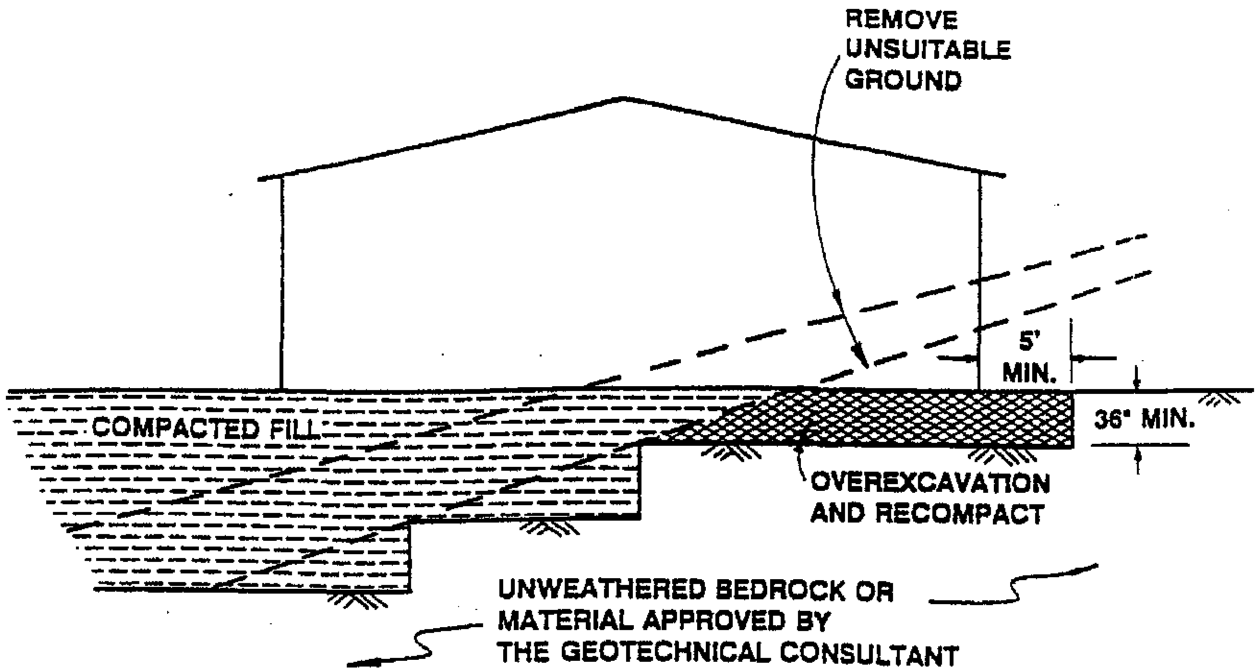


- SUBDRAIN INSTALLATION - Subdrain collector pipe shall be installed with perforations down or, unless otherwise designated by the geotechnical consultant. Outlet pipes shall be non-perforated pipe. The subdrain pipe shall have at least 8 perforations uniformly spaced per foot. Perforation shall be ¼" to ½" if drilled holes are used. All subdrain pipes shall have a gradient at least 2% towards the outlet.
- SUBDRAIN PIPE - Subdrain pipe shall be ASTM D2751, SDR 23.5 or ASTM D1527, Schedule 40, or ASTM D3034, SDR 23.5, Schedule 40 Polyvinyl Chloride Plastic (PVC) pipe.
- All outlet pipe shall be placed in a trench no wider than twice the subdrain pipe. Pipe shall be in soil of SE$\geq$30 jetted or flooded in place except for the outside 5 feet which shall be native soil backfill.

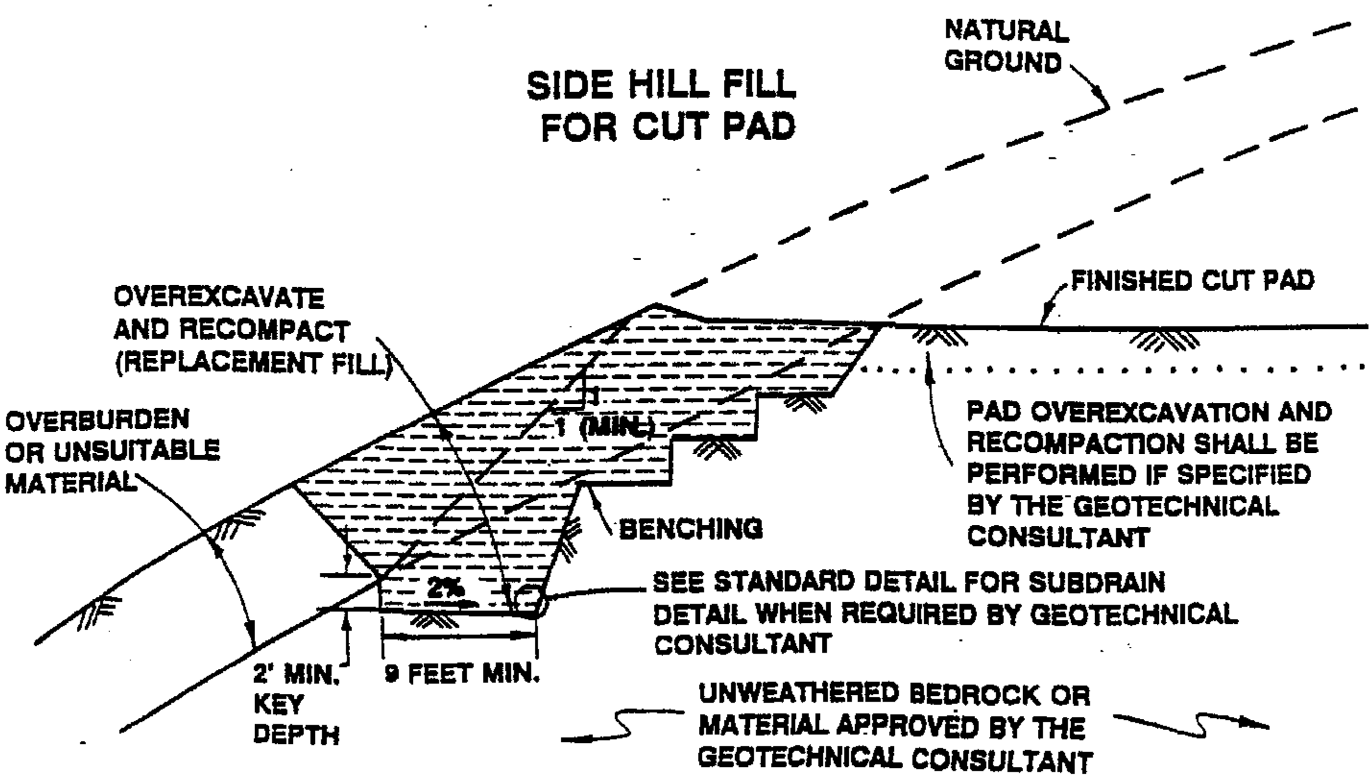
Schematic Not To Scale

ASSOCIATED SOILS ENGINEERING, INC. Consulting Geotechnical Engineers	Associated Soils Engineering, Inc.	Project:	Parcel 1 of Tentative Parcel Map No. 2008-111, Big Canyon Country Club, Newport Beach, California.		
	2860 Walnut Avenue Signal Hill, CA 90755	Details "D"	BUTTRESS OR REPLACEMENT FILL SUBDRAINS		
	Tel (562) 426-7990 Fax (562) 426-1842	Proj. No.:	09-6169	Date:	June, 2010

CUT AND CUT-FILL LOT

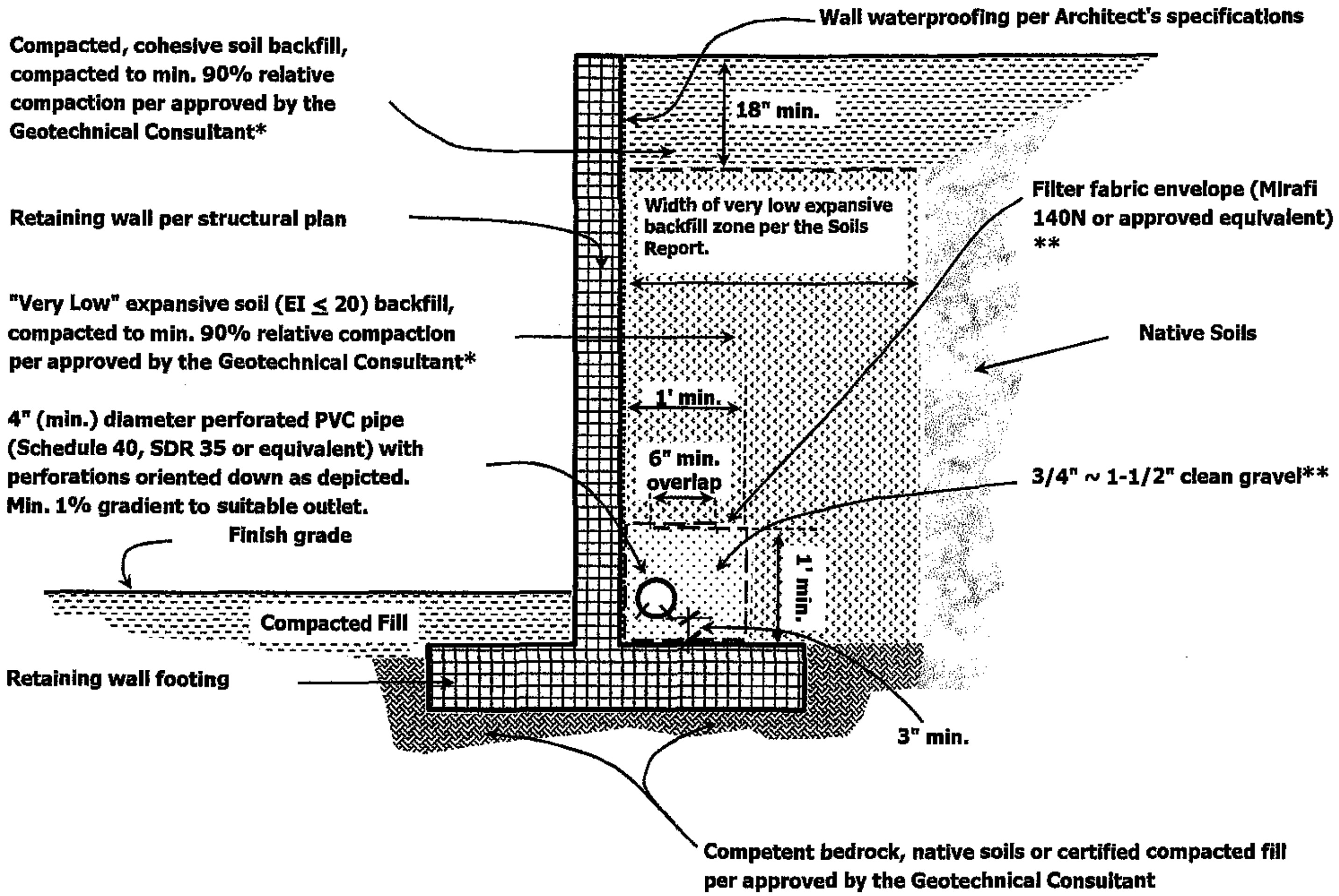


SIDE HILL FILL FOR CUT PAD



Schematic Not To Scale

ASSOCIATED SOILS ENGINEERING, INC. Consulting Geotechnical Engineers	Associated Soils Engineering, Inc.	Project:	Parcel 1 of Tentative Parcel Map No. 2008-111, Big Canyon Country Club, Newport Beach, California.		
	2860 Walnut Avenue Signal Hill, CA 90755	Details "E"	TRANSITION LOT FILLS & SIDE HILL FILLS		
	Tel (562) 426-7990 Fax (562) 426-1842	Proj. No.:	09-6169	Date:	June, 2010



SPECIFICATIONS FOR CALTRANS CLASS 2 PERMEABLE MATERIAL	
U.S. STANDARD SIEVE SIZE	% PASSING
1"	100
3/4"	90 ~ 100
3/8"	40 ~ 100
No. 4	25 ~ 40
No. 8	18 ~ 33
No. 30	5 ~ 15
No. 50	0 ~ 7
No. 200	0 ~ 3
Sand Equivalent > 75	

* Based on ASTM D-1557-02

** If Caltrans Class 2 permeable material (see gradation to left) is used in place of 3/4" ~ 1-1/2" gravel, filter fabric may be deleted. Caltrans Class 2 permeable material should be compacted to minimum 90 percent relative compaction. Unless otherwise specified, a minimum of 1 cubic foot of gravel should be used for each 1 foot run of drain.

Note: Composite drainage products such as Contech C-Drain, Miradrain or J-Drain may be used as alternative to gravel or Class II. Installation should be performed in accordance with manufacturer's specifications.

Schematic Not To Scale

ASSOCIATED SOILS ENGINEERING, INC.
Consulting Geotechnical Engineers

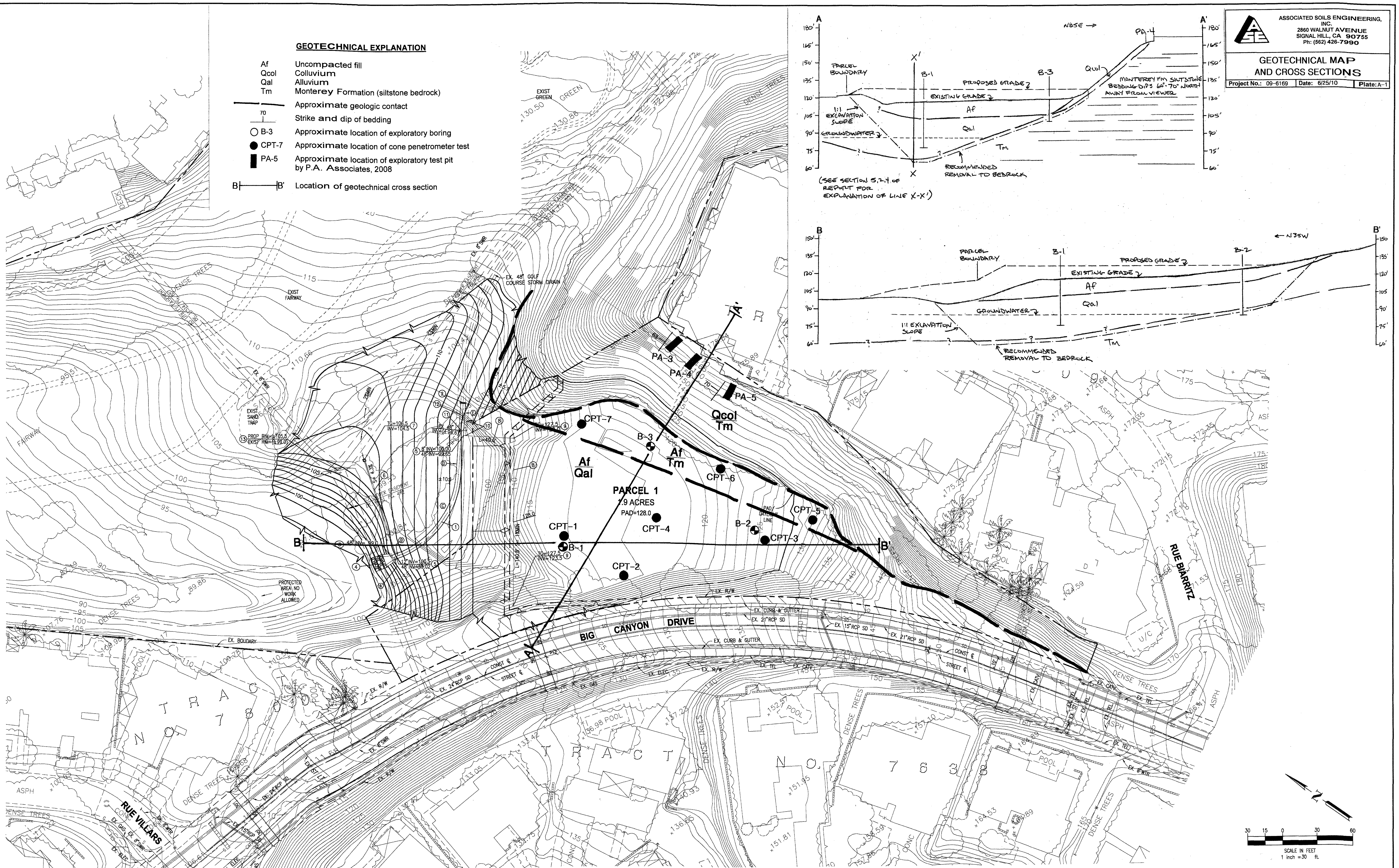
Associated Soils Engineering, Inc.

2860 Walnut Avenue

Signal Hill, CA 90755

Tel (562) 426-7990 Fax (562) 426-1842

Project:	Parcel 1 of Tentative Parcel Map No. 2008-111, Big Canyon Country Club, Newport Beach, California.
Details "F"	RETAINING WALL DRAINAGE DETAILS
Proj. No.:	09-6169
Date:	June, 2010



STORM DRAIN PIPE DATA

	DELTA/BEARING	RADIUS	LENGTH	TANGENT	REMARK
A	N 76°51'42" E		6.60'		STRAIGHT
B	N 76°51'42" E		2.90'		STRAIGHT
C	64°49'46"	80.00'	90.52'	50.80'	CURVE
D	N 38°18'32" E		33.45'		STRAIGHT
E	N 38°18'32" E		28.00'		STRAIGHT

GENERAL NOTES:

1. SEE SHEET 1 FOR GRADING NOTES.
2. SEE SHEET 3 FOR SECTIONS, DETAILS, CONSTRUCTION NOTES AND QUANTITIES
3. SEE SHEET 4 FOR EROSION CONTROL.
4. EXIST. STORM DRAIN, SEWER AND WATER ARE TO BE PROTECTED IN PLACE AT ALL TIMES, NO INTERRUPTION OF SERVICE WILL BE ALLOWED.
5. EXCEPT WHERE NOTED ON THE PLAN, ALL CURB, GUTTERS AND DRIVEWAYS ARE TO BE PROTECTED AT ALL TIMES AND BECOME THE SOLE RESPONSIBILITY OF THE CONTRACTOR THROUGHOUT THE DURATION OF THE CONSTRUCTION.
6. UNLESS OTHERWISE NOTED ON THE PLANS THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION, RESTORATION AND RELOCATION OF ALL TREES, LAWNS, AND SHRUBBERY ADJACENT TO OR AFFECTED BY ITS WORK AND SHALL RESTORED OR REPLACED IN AS NEARLY THE ORIGINAL CONDITION AND LOCATION AS IS REASONABLY POSSIBLE AT THE COMPLETION OF THE WORK.

NUMBER	DATE	DESCRIPTION	INITIAL	DATE

REVISIONS

REGISTERED PROFESSIONAL ENGINEER DAVID LEE BACON No. 40496 Exp. 3-31-11 CIVIL STATE OF CALIFORNIA

WALDEN & ASSOCIATES
CIVIL ENGINEERS
LAND SURVEYORS
PLANNERS
2552 WHITE ROAD, SUITE B, IRVINE, CA 92614
(949) 660-0110 FAX: 660-0418

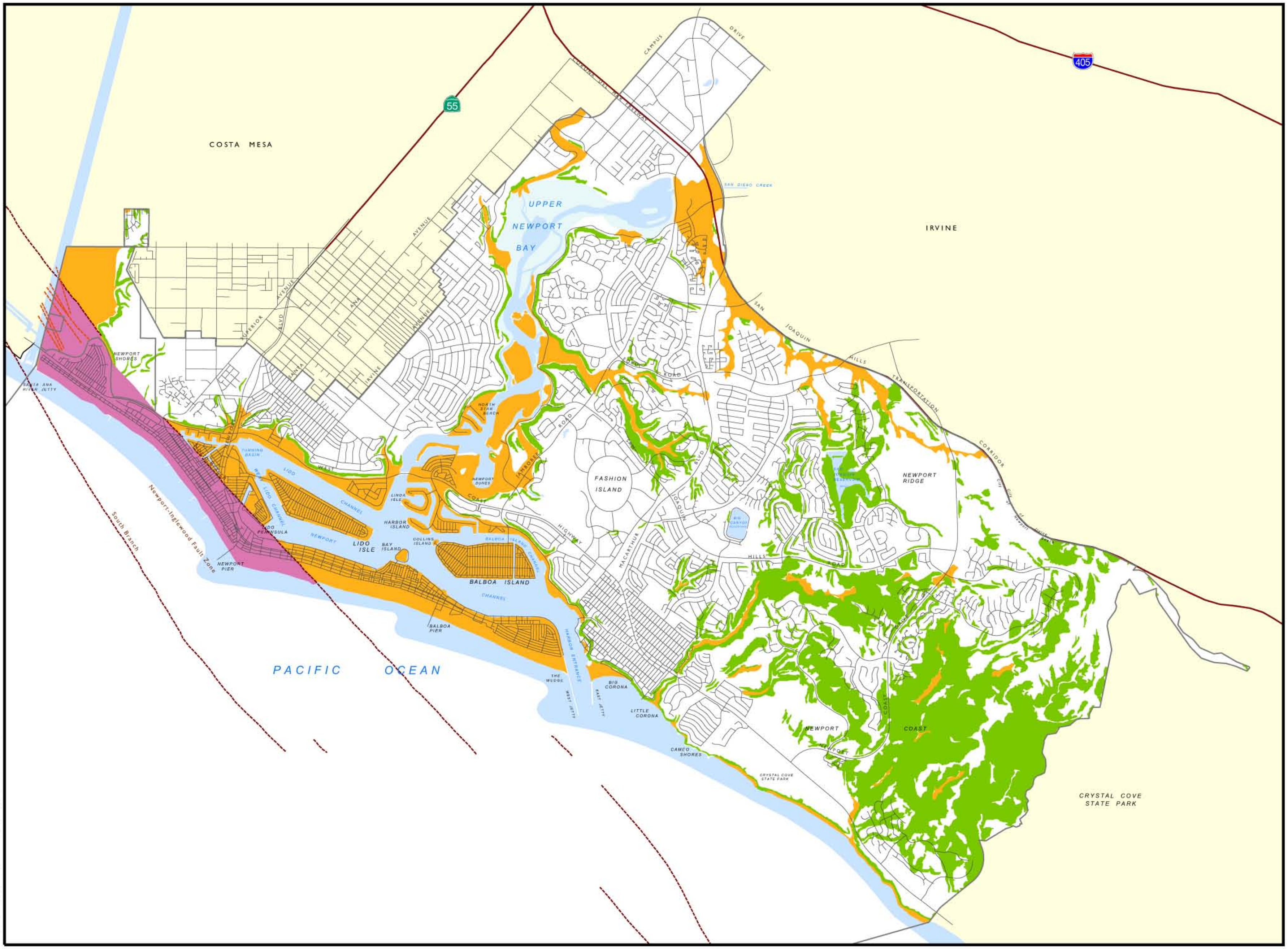
DAVID L. BACON P.E. 40496 DATE

ROUGH GRADING PLAN
FOR
PARCEL 1 OF PARCEL MAP NO. 2008-11
BIG CANYON COUNTRY CLUB
NEWPORT BEACH, CA

JOB NUMBER 1140-458-012
DATE: 06/24/2010
DRAWN: SK
CHECKED: DB
SHEET 2 OF 4

APPENDIX H

Figure S2: Seismic Hazards



CITY of NEWPORT BEACH
GENERAL PLAN

Figure S2
SEISMIC HAZARDS

Legend

- City Boundary
- Areas with liquefaction potential
- Areas with landslide potential
- Fault Disclosure Zone for real-estate disclosure purposes

Fault Line

- Major fault traces as mapped by Morton, 1999. Presumed active, except where shown otherwise based on geological studies
- Southward projection of active fault traces based on a subsurface study on the west bank of the Santa Ana River
- Highway
- Local Road
- County

0 0.5 1
Miles

Source: City of Newport Beach and Earth Consultants, 2003

PROJECT NUMBER: 10579-01

Date: 06/07/06

EIP ASSOCIATES

N:/GISProjects/NewportBeach_10579/SeismicHazards.mxd

APPENDIX I

BMP's for Grading and Construction

Attachment Q

BMPs Selected for the Project

EC-1 – Scheduling

EC-2 – Preservation of Existing Vegetation

EC-5 – Soil Binders

EC-9 – Earth Dikes & Drainage Swales

EC-10 – Velocity Dissipation Devices

SE-1 – Silt Fence

SE-4 – Check Dam

SE-5 – Fiber Rolls

SE-6 – Gravel Bag Berm

SE-10 – Storm Drain Inlet Protection

WE-1 – Wind Erosion Control

TC-1 – Stabilized Construction Entrance

NS-1 – Water Conservation Practices

NS-6 – Illicit Connection/Discharge

NS-7 – Potable Water/Irrigation

WM-3 – Stockpile Management

WM-5 – Solid Waste Management

WM-9 – Sanitary/Septic Waste Management

SS-05 – Soil Binders

Attachment C

BMP Consideration Checklist

CONSTRUCTION SITE BMPs CONSIDERATION CHECKLIST					
The BMPs listed here should be considered for every project. Those BMPs that are not included in the SWPPP must be checked as "Not Used" with a brief statement describing why it is not being used.					
EROSION CONTROL BMPs					
BMP No.	**BMP**	**CONSIDERED FOR PROJECT**	CHECK IF USED	CHECK IF NOT USED	**IF NOT USED, STATE REASON**
EC-1	Scheduling	YES	XX		
EC-2	Preservation of Existing Vegetation	YES	XX		
EC-3	Hydraulic Mulch	YES		XX	Soil Binders Used
EC-4	Hydroseeding	YES		XX	Soil Binders Used
EC-5	Soil Binders	YES	XX		
EC-6	Straw Mulch	YES		XX	Soil Binders Used
EC-7	Geotextiles & Mats	YES		XX	Soil Binders Used
EC-8	Wood Mulching	YES		XX	Soil Binders Used
EC-9	Earth Dikes & Drainage Swales	YES	XX		
EC-10	Velocity Dissipation Devices	YES	XX		
EC-11	Slope Drains	YES		XX	Runoff Diverted Around Slopes

CONSTRUCTION SITE BMPs
CONSIDERATION CHECKLIST

The BMPs listed here should be considered for every project. Those BMPs that are not included in the SWPPP must be checked as "Not Used" with a brief statement describing why it is not being used.

NON-STORM WATER MANAGEMENT BMPs

BMP No.	BMP	CONSIDERED FOR PROJECT	CHECK IF USED	CHECK IF NOT USED	IF NOT USED, STATE REASON
NS-1	Water Conservation Practices	YES	XX		
NS-2	Dewatering Operations	YES		XX	No Groundwater
NS-3	Paving and Grinding Operations	YES		XX	No Paving
NS-4	Temporary Stream Crossing	YES		XX	No Streams
NS-5	Clear Water Diversion	YES		XX	No Water Courses
NS-6	Illicit Connection/ Discharge	YES	XX		
NS-7	Potable Water/Irrigation	YES	XX		
NS-8	Vehicle and Equipment Cleaning	YES		XX	No Cleaning Allowed
NS-9	Vehicle and Equipment Fueling	YES		XX	No Fueling Allowed
NS-10	Vehicle and Equipment Maintenance	YES		XX	No Maintenance Allowed
NS-11	Pile Driving Operations	YES		XX	No Piles
NS-12	Concrete Curing	YES		XX	No Concrete Flatwork
NS-13	Concrete Finishing	YES		XX	No Concrete Flatwork
NS-14	Material and Equipment Use Over Water	YES		XX	Not Over Water
NS-15	Demolition Adjacent to Water	YES		XX	Not Adjacent To Water
NS-16	Temporary Batch Plants	YES		XX	No Batch Plants

CONSTRUCTION SITE BMPs
CONSIDERATION CHECKLIST

The BMPs listed here should be considered for every project. Those BMPs that are not included in the SWPPP must be checked as "Not Used" with a brief statement describing why it is not being used.

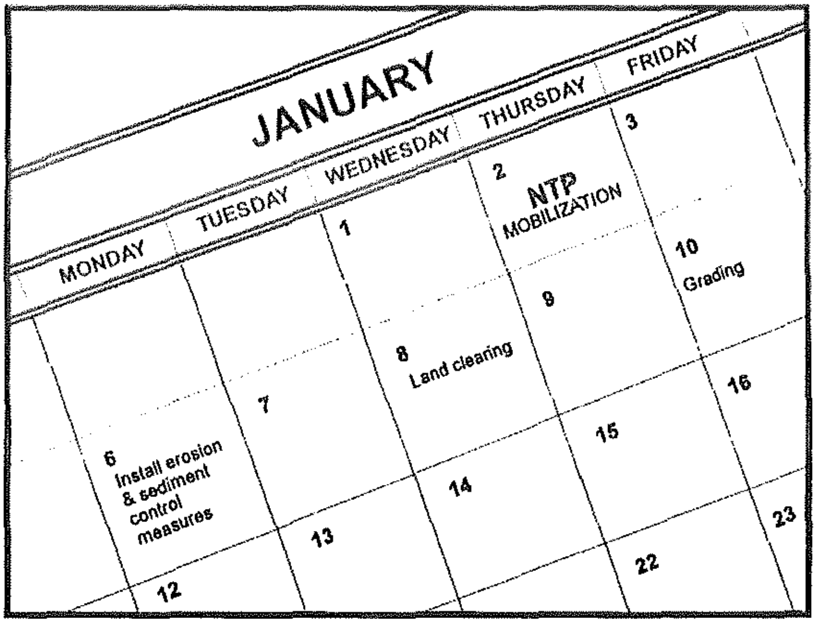
WASTE MANAGEMENT AND MATERIALS POLLUTION CONTROL BMPs

BMP No.	BMP	CONSIDERED FOR PROJECT	CHECK IF USED	CHECK IF NOT USED	IF NOT USED, STATE REASON
WM-1	Material Delivery and Storage	YES		XX	No Potential Pollutants Stored On-Site
WM-2	Material Use	YES		XX	No Potential Pollutants Stored On-Site
WM-3	Stockpile Management	YES	XX		
WM-4	Spill Prevention and Control	YES		XX	No Potential Pollutants Stored On-Site
WM-5	Solid Waste Management	YES	XX		
WM-6	Hazardous Waste Management	YES		XX	No Hazardous Waste
WM-7	Contaminated Soil Management	YES		XX	No Contaminated Soil
WM-8	Concrete Waste Management	YES		XX	No Concrete Flatwork
WM-9	Sanitary/Septic Waste Management	YES	XX		
WM-10	Liquid Waste Management	YES		XX	No Liquid Waste

CONSTRUCTION SITE BMPs
CONSIDERATION CHECKLIST

The BMPs listed here should be considered for every project. Those BMPs that are not included in the SWPPP must be checked as "Not Used" with a brief statement describing why it is not being used.

BMP No.	BMP	CONSIDERED FOR PROJECT	CHECK IF USED	CHECK IF NOT USED	IF NOT USED, STATE REASON
SEDIMENT CONTROL BMPs					
SE-1	Silt Fence	YES	XX		
SE-2	Sediment Basin	YES		XX	Silt Fence Used
SE-3	Sediment Trap	YES		XX	Silt Fence Used
SE-4	Check Dam	YES	XX		
SE-5	Fiber Rolls	YES	XX		
SE-6	Gravel Bag Berm	YES	XX		
SE-7	Street Sweeping and Vacuuming	YES		XX	No Streets
SE-8	Sand Bag Barrier	YES		XX	Gravel Bags Used
SE-9	Straw Bale Barrier	YES		XX	Silt Fence Used
SE-10	Storm Drain Inlet Protection	YES	XX		
WIND EROSION CONTROL BMPs					
WE-1	Wind Erosion Control	YES	XX		
TRACKING CONTROL BMPs					
TC-1	Stabilized Construction Entrance/Exit	YES	XX		
TC-2	Stabilized Construction Roadway	YES		XX	No Roadway
TC-3	Entrance/Outlet Tire Wash	YES		XX	TC-1 Used



Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TC	Tracking Control	☒
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Scheduling is the development of a written plan that includes sequencing of construction activities and the implementation of BMPs such as erosion control and sediment control while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

Suitable Applications

Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project especially during rainy season. Use of other, more costly yet less effective, erosion and sediment control BMPs may often be reduced through proper construction sequencing.

Limitations

- Environmental constraints such as nesting season prohibitions reduce the full capabilities of this BMP.

Implementation

- Avoid rainy periods. Schedule major grading operations during dry months when practical. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means or to install sediment trapping devices.

- Plan the project and develop a schedule showing each phase of construction. Clearly show how the rainy season relates to soil disturbing and re-stabilization activities. Incorporate the construction schedule into the SWPPP.

- Include on the schedule, details on the rainy season implementation and deployment of:
  - Erosion control BMPs
  - Sediment control BMPs
  - Tracking control BMPs
  - Wind erosion control BMPs
  - Non-stormwater BMPs
  - Waste management and materials pollution control BMPs
- Include dates for activities that may require non-stormwater discharges such as dewatering, sawcutting, grinding, drilling, boring, crushing, blasting, painting, hydro-demolition, mortar mixing, pavement cleaning, etc.
- Work out the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, foundation pouring utilities installation, etc., to minimize the active construction area during the rainy season.
  - Sequence trenching activities so that most open portions are closed before new trenching begins.
  - Incorporate staged seeding and re-vegetation of graded slopes as work progresses.
  - Schedule establishment of permanent vegetation during appropriate planting time for specified vegetation.
- Non-active areas should be stabilized as soon as practical after the cessation of soil disturbing activities or one day prior to the onset of precipitation.
- Monitor the weather forecast for rainfall.
- When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment treatment controls on all disturbed areas prior to the onset of rain.
- Be prepared year round to deploy erosion control and sediment control BMPs. Erosion may be caused during dry seasons by un-seasonal rainfall, wind, and vehicle tracking. Keep the site stabilized year round, and retain and maintain rainy season sediment trapping devices in operational condition.
- Apply permanent erosion control to areas deemed substantially complete during the project's defined seeding window.

Costs

Construction scheduling to reduce erosion may increase other construction costs due to reduced economies of scale in performing site grading. The cost effectiveness of scheduling techniques should be compared with the other less effective erosion and sedimentation controls to achieve a cost effective balance.

Inspection and Maintenance

- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.

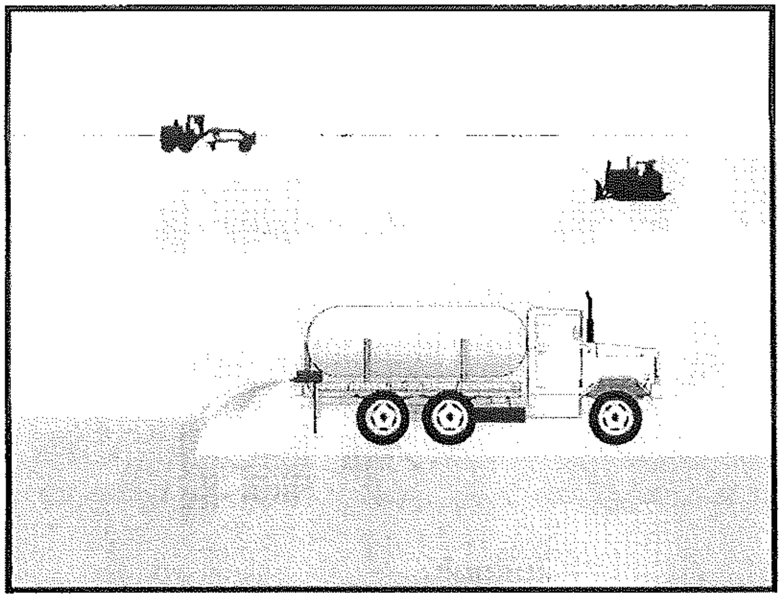
- Amend the schedule when changes are warranted.

- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

References

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities Developing Pollution Prevention Plans and Best Management Practices (EPA 832-R-92-005), U.S. Environmental Protection Agency, Office of Water, September 1992.



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-4 Hydroseeding

EC-6 Straw Mulch

EC-7 Geotextiles and Mats

EC-8 Wood Mulching

Description and Purpose

Soil binding consists of application and maintenance of a soil stabilizer to exposed soil surfaces. Soil binders are materials applied to the soil surface to temporarily prevent water and wind induced erosion of exposed soils on construction sites.

Suitable Applications

Soil binders are typically applied to disturbed areas requiring temporary protection. Because soil binders, when used as a stand-alone practice, can often be incorporated into the soil, they are a good alternative to mulches in areas where grading activities will soon resume. Soil binders are commonly used in the following areas:

- Rough graded soils that will be inactive for a short period of time
- Soil stockpiles
- Temporary haul roads prior to placement of crushed rock
- Compacted soil road base
- Construction staging, materials storage, and layout areas

Limitations

- Soil binders are temporary in nature and may need reapplication.

- Soil binders require a minimum curing time until fully effective, as prescribed by the manufacturer. Curing time may be 24 hours or longer. Soil binders may need reapplication after a storm event.

- Soil binders will generally experience spot failures during heavy rainfall events. If runoff penetrates the soil at the top of a slope treated with a soil binder, it is likely that the runoff will undercut the stabilized soil layer and discharge at a point further down slope.

- Plant-material-based soil binders do not generally hold up to pedestrian or vehicular traffic across treated areas as well as polymeric emulsion blends or cementitious-based binders.

- Soil binders may not sufficiently penetrate compacted soils.

- Some soil binders are soil texture specific in terms of their effectiveness. For example, polyacrylamides (PAMs) work very well on silt and clayey soils but their performance decreases dramatically in sandy soils.

- Some soil binders may not perform well with low relative humidity. Under rainy conditions, some agents may become slippery or leach out of the soil.

- Soil binders may not cure if low temperatures occur within 24 hours of application.

- The water quality impacts of some chemical soil binders are relatively unknown and some may have water quality impacts due to their chemical makeup.

Implementation

General Considerations

- Soil binders should conform to local municipality specifications and requirements.

- Site soil types will dictate appropriate soil binders to be used.

- A soil binder must be environmentally benign (non-toxic to plant and animal life), easy to apply, easy to maintain, economical, and should not stain paved or painted surfaces. Soil binders should not pollute stormwater when cured. Obtain a Material Safety Data Sheet (MSDS) from the manufacturer to ensure non-toxicity.

- Stormwater runoff from PAM treated soils should pass through one of the following sediment control BMP prior to discharging to surface waters.

  - When the total drainage area is greater than or equal to 5 acres, PAM treated areas should drain to a sediment basin.

  - Areas less than 5 acres should drain to sediment control BMPs, such as a sediment trap, or a series of check dams. The total number of check dams used should be maximized to achieve the greatest amount of settlement of sediment prior to discharging from the site. Each check dam should be spaced evenly in the drainage channel through which stormwater flows are discharged off site.

- Performance of soil binders depends on temperature, humidity, and traffic across treated areas.

- Avoid over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Selecting a Soil Binder

Properties of common soil binders used for erosion control are provided on Table 1 at the end of this Fact Sheet. Use Table 1 to select an appropriate soil binder. Refer to WE-1, Wind Erosion Control, for dust control soil binders.

Factors to consider when selecting a soil binder include the following:

- Suitability to situation - Consider where the soil binder will be applied, if it needs a high resistance to leaching or abrasion, and whether it needs to be compatible with any existing vegetation. Determine the length of time soil stabilization will be needed, and if the soil binder will be placed in an area where it will degrade rapidly. In general, slope steepness is not a discriminating factor for the listed soil binders.
- Soil types and surface materials - Fines and moisture content are key properties of surface materials. Consider a soil binder's ability to penetrate, likelihood of leaching, and ability to form a surface crust on the surface materials.
- Frequency of application - The frequency of application is related to the functional longevity of the binder, which can be affected by subgrade conditions, surface type, climate, and maintenance schedule.
- Frequent applications could lead to high costs. Application frequency may be minimized if the soil binder has good penetration, low evaporation, and good longevity. Consider also that frequent application will require frequent equipment clean up.

Plant-Material-Based (Short Lived, <6 months) Binders

Guar: Guar is a non-toxic, biodegradable, natural galactomannan-based hydrocolloid treated with dispersant agents for easy field mixing. It should be mixed with water at the rate of 11 to 15 lb per 1,000 gallons. Recommended minimum application rates are as follows:

Application Rates for Guar Soil Stabilizer

Slope (H:V):	Flat	4:1	3:1	2:1	1:1
lb/acre:	40	45	50	60	70

Psyllium: Psyllium is composed of the finely ground muciloid coating of plantago seeds that is applied as a dry powder or in a wet slurry to the surface of the soil. It dries to form a firm but rewettable membrane that binds soil particles together, but permits germination and growth of seed. Psyllium requires 12 to 18 hours drying time. Application rates should be from 80 to 200 lb/acre, with enough water in solution to allow for a uniform slurry flow.

Starch: Starch is non-ionic, cold water soluble (pre-gelatinized) granular cornstarch. The material is mixed with water and applied at the rate of 150 lb/acre. Approximate drying time is 9 to 12 hours.

Plant-Material-Based (Long Lived, 6-12 months) Binders

Pitch and Rosin Emulsion: Generally, a non-ionic pitch and rosin emulsion has a minimum solids content of 48%. The rosin should be a minimum of 26% of the total solids content. The soil stabilizer should be non-corrosive, water dilutable emulsion that upon application cures to a water insoluble binding and cementing agent. For soil erosion control applications, the emulsion is diluted and should be applied as follows:

- For clayey soil: 5 parts water to 1 part emulsion
- For sandy soil: 10 parts water to 1 part emulsion

Application can be by water truck or hydraulic seeder with the emulsion and product mixture applied at the rate specified by the manufacturer.

Polymeric Emulsion Blend Binders

Acrylic Copolymers and Polymers: Polymeric soil stabilizers should consist of a liquid or solid polymer or copolymer with an acrylic base that contains a minimum of 55% solids. The polymeric compound should be handled and mixed in a manner that will not cause foaming or should contain an anti-foaming agent. The polymeric emulsion should not exceed its shelf life or expiration date; manufacturers should provide the expiration date. Polymeric soil stabilizer should be readily miscible in water, non-injurious to seed or animal life, non-flammable, should provide surface soil stabilization for various soil types without totally inhibiting water infiltration, and should not re-emulsify when cured. The applied compound typically requires 12 to 24 hours drying time. Liquid copolymer should be diluted at a rate of 10 parts water to 1 part polymer and the mixture applied to soil at a rate of 1,175 gallons/acre.

Liquid Polymers of Methacrylates and Acrylates: This material consists of a tackifier/sealer that is a liquid polymer of methacrylates and acrylates. It is an aqueous 100% acrylic emulsion blend of 40% solids by volume that is free from styrene, acetate, vinyl, ethoxylated surfactants or silicates. For soil stabilization applications, it is diluted with water in accordance with the manufacturer's recommendations, and applied with a hydraulic seeder at the rate of 20 gallons/acre. Drying time is 12 to 18 hours after application.

Copolymers of Sodium Acrylates and Acrylamides: These materials are non-toxic, dry powders that are copolymers of sodium acrylate and acrylamide. They are mixed with water and applied to the soil surface for erosion control at rates that are determined by slope gradient:

Slope Gradient (H:V)	lb/acre
Flat to 5:1	3.0 – 5.0
5:1 to 3:1	5.0 – 10.0
2:1 to 1:1	10.0 – 20.0

Poly-Acrylamide (PAM) and Copolymer of Acrylamide: Linear copolymer polyacrylamide for use as a soil binder is packaged as a dry flowable solid, as a liquid. Refer to the manufacturer's recommendation for dilution and application rates as they vary based on liquid or dry form, site conditions and climate.

- Limitations specific to PAM are as follows:

- Do not use PAM on a slope that flows into a water body without passing through a sediment trap or sediment basin.

- The specific PAM copolymer formulation must be anionic. Cationic PAM should not be used in any application because of known aquatic toxicity problems. Only the highest drinking water grade PAM, certified for compliance with ANSI/NSF Standard 60 for drinking water treatment, should be used for soil applications.

- PAM designated for erosion and sediment control should be "water soluble" or "linear" or "non-cross linked".

- PAM should not be used as a stand-alone BMP to protect against water-based erosion. When combined with mulch, its effectiveness increases dramatically.

Hydro-Colloid Polymers: Hydro-Colloid Polymers are various combinations of dry flowable poly-acrylamides, copolymers and hydro-colloid polymers that are mixed with water and applied to the soil surface at rates of 55 to 60 lb/acre. Drying times are 0 to 4 hours.

Cementitious-Based Binders

Gypsum: This is a formulated gypsum based product that readily mixes with water and mulch to form a thin protective crust on the soil surface. It is composed of high purity gypsum that is ground, calcined and processed into calcium sulfate hemihydrate with a minimum purity of 86%. It is mixed in a hydraulic seeder and applied at rates 4,000 to 12,000 lb/acre. Drying time is 4 to 8 hours.

Applying Soil Binders

After selecting an appropriate soil binder, the untreated soil surface must be prepared before applying the soil binder. The untreated soil surface must contain sufficient moisture to assist the agent in achieving uniform distribution. In general, the following steps should be followed:

- Follow manufacturer's written recommendations for application rates, pre-wetting of application area, and cleaning of equipment after use.

- Prior to application, roughen embankment and fill areas.

- Consider the drying time for the selected soil binder and apply with sufficient time before anticipated rainfall. Soil binders should not be applied during or immediately before rainfall.

- Avoid over spray onto roads, sidewalks, drainage channels, sound walls, existing vegetation, etc.

- Soil binders should not be applied to frozen soil, areas with standing water, under freezing or rainy conditions, or when the temperature is below 40°F during the curing period.

- More than one treatment is often necessary, although the second treatment may be diluted or have a lower application rate.

- Generally, soil binders require a minimum curing time of 24 hours before they are fully effective. Refer to manufacturer's instructions for specific cure time.

- For liquid agents:
  - Crown or slope ground to avoid ponding.
  - Uniformly pre-wet ground at 0.03 to 0.3 gal/yd² or according to manufacturer's recommendations.
  - Apply solution under pressure. Overlap solution 6 to 12 in.
  - Allow treated area to cure for the time recommended by the manufacturer; typically at least 24 hours.
  - Apply second treatment before first treatment becomes ineffective, using 50% application rate.
  - In low humidities, reactivate chemicals by re-wetting with water at 0.1 to 0.2 gal/yd².

Costs

Costs vary according to the soil stabilizer selected for implementation. The following are approximate installed costs:

Soil Binder	Cost per Acre (2000)[1]	Estimated Cost per Acre (2009)[2]
Plant-Material-Based (Short Lived) Binders	$700-$900	$770-$990
Plant-Material-Based (Long Lived) Binders	$1,200-$1,500	$1,320-$1,650
Polymeric Emulsion Blend Binders	$700 -$1,500	$770-$1,650
Cementitious-Based Binders	$800-$1,200	$880-$1,350

1. Source: Erosion Control Pilot Study Report, Caltrans, June 2000.
2. 2009 costs reflect a 10% escalation over year 2000 costs. Escalation based on informal survey of industry trends. Note: Expected cost increase is offset by competitive economic conditions.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
- Reapply the selected soil binder as needed to maintain effectiveness.

Table 1 Properties of Soil Binders for Erosion Control				
Evaluation Criteria	Binder Type			
	Plant Material Based (Short Lived)	Plant Material Based (Long Lived)	Polymeric Emulsion Blends	Cementitious-Based Binders
Relative Cost	Low	Moderate to High	Low to High	Low to Moderate
Resistance to Leaching	High	High	Low to Moderate	Moderate
Resistance to Abrasion	Moderate	Low	Moderate to High	Moderate to High
Longevity	Short to Medium	Medium	Medium to Long	Medium
Minimum Curing Time before Rain	9 to 18 hours	19 to 24 hours	0 to 24 hours	4 to 8 hours
Compatibility with Existing Vegetation	Good	Poor	Poor	Poor
Mode of Degradation	Biodegradable	Biodegradable	Photodegradable/ Chemically Degradable	Photodegradable/ Chemically Degradable
Labor Intensive	No	No	No	No
Specialized Application Equipment	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher
Liquid/Powder	Powder	Liquid	Liquid/Powder	Powder
Surface Crusting	Yes, but dissolves on rewetting	Yes	Yes, but dissolves on rewetting	Yes
Clean Up	Water	Water	Water	Water
Erosion Control Application Rate	Varies (1)	Varies (1)	Varies (1)	4,000 to 12,000 lbs/acre

(1) See Implementation for specific rates.

References

Erosion Control Pilot Study Report, State of California Department of Transportation (Caltrans), June 2000.

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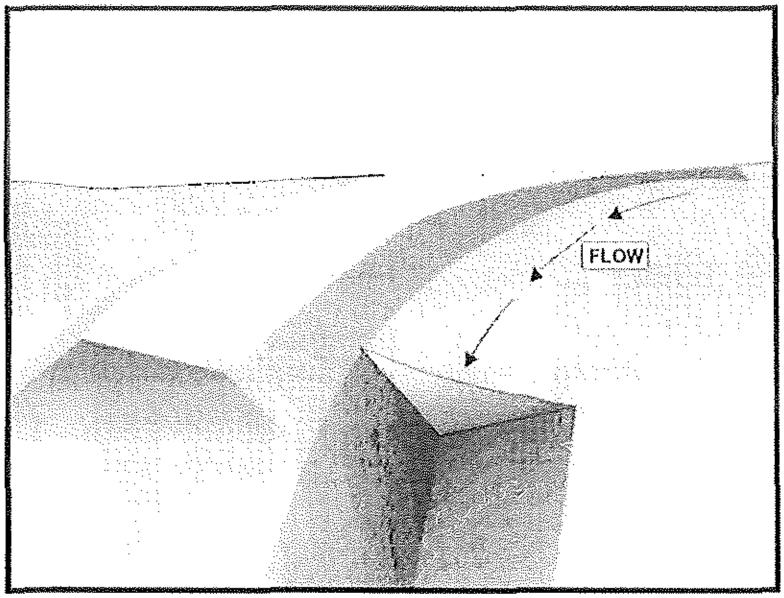
Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Guidance Document: Soil Stabilization for Temporary Slopes, State of California Department of Transportation (Caltrans), November 1999.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Earth Dikes and Drainage Swales EC-9



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

An earth dike is a temporary berm or ridge of compacted soil used to divert runoff or channel water to a desired location. A drainage swale is a shaped and sloped depression in the soil surface used to convey runoff to a desired location. Earth dikes and drainage swales are used to divert off site runoff around the construction site, divert runoff from stabilized areas and disturbed areas, and direct runoff into sediment basins or traps.

Suitable Applications

Earth dikes and drainage swales are suitable for use, individually or together, where runoff needs to be diverted from one area and conveyed to another.

- Earth dikes and drainage swales may be used:
  - To convey surface runoff down sloping land
  - To intercept and divert runoff to avoid sheet flow over sloped surfaces
  - To divert and direct runoff towards a stabilized watercourse, drainage pipe or channel
  - To intercept runoff from paved surfaces
  - Below steep grades where runoff begins to concentrate
  - Along roadways and facility improvements subject to flood drainage

- At the top of slopes to divert runon from adjacent or undisturbed slopes
- At bottom and mid slope locations to intercept sheet flow and convey concentrated flows
- Divert sediment laden runoff into sediment basins or traps

Limitations

Dikes should not be used for drainage areas greater than 10 acres or along slopes greater than 10 percent. For larger areas more permanent drainage structures should be built. All drainage structures should be built in compliance with local municipal requirements.

- Earth dikes may create more disturbed area on site and become barriers to construction equipment.
- Earth dikes must be stabilized immediately, which adds cost and maintenance concerns.
- Diverted stormwater may cause downstream flood damage.
- Dikes should not be constructed of soils that may be easily eroded.
- Regrading the site to remove the dike may add additional cost.
- Temporary drains and swales or any other diversion of runoff should not adversely impact upstream or downstream properties.
- Temporary drains and swales must conform to local floodplain management requirements.
- Earth dikes/drainage swales are not suitable as sediment trapping devices.
- It may be necessary to use other soil stabilization and sediment controls such as check dams, plastics, and blankets, to prevent scour and erosion in newly graded dikes, swales, and ditches.
- Sediment accumulation, scour depressions, and/or persistent non-stormwater discharges can result in areas of standing water suitable for mosquito production in drainage swales.

Implementation

The temporary earth dike is a berm or ridge of compacted soil, located in such a manner as to divert stormwater to a sediment trapping device or a stabilized outlet, thereby reducing the potential for erosion and offsite sedimentation. Earth dikes can also be used to divert runoff from off site and from undisturbed areas away from disturbed areas and to divert sheet flows away from unprotected slopes.

An earth dike does not itself control erosion or remove sediment from runoff. A dike prevents erosion by directing runoff to an erosion control device such as a sediment trap or directing runoff away from an erodible area. Temporary diversion dikes should not adversely impact adjacent properties and must conform to local floodplain management regulations, and should not be used in areas with slopes steeper than 10%.

Slopes that are formed during cut and fill operations should be protected from erosion by runoff. A combination of a temporary drainage swale and an earth dike at the top of a slope can divert runoff to a location where it can be brought to the bottom of the slope (see EC-11, Slope Drains). A combination dike and swale is easily constructed by a single pass of a bulldozer or grader and compacted by a second pass of the tracks or wheels over the ridge. Diversion structures should be installed when the site is initially graded and remain in place until post construction BMPs are installed and the slopes are stabilized.

Diversion practices concentrate surface runoff, increasing its velocity and erosive force. Thus, the flow out of the drain or swale must be directed onto a stabilized area or into a grade stabilization structure. If significant erosion will occur, a swale should be stabilized using vegetation, chemical treatment, rock rip-rap, matting, or other physical means of stabilization. Any drain or swale that conveys sediment laden runoff must be diverted into a sediment basin or trap before it is discharged from the site.

General

- Care must be applied to correctly size and locate earth dikes, drainage swales. Excessively steep, unlined dikes, and swales are subject to erosion and gully formation.
- Conveyances should be stabilized.
- Use a lined ditch for high flow velocities.
- Select flow velocity based on careful evaluation of the risks due to erosion of the measure, soil types, overtopping, flow backups, washout, and drainage flow patterns for each project site.
- Compact any fills to prevent unequal settlement.
- Do not divert runoff onto other property without securing written authorization from the property owner.
- When possible, install and utilize permanent dikes, swales, and ditches early in the construction process.
- Provide stabilized outlets.

Earth Dikes

Temporary earth dikes are a practical, inexpensive BMP used to divert stormwater runoff. Temporary diversion dikes should be installed in the following manner:

- All dikes should be compacted by earth moving equipment.
- All dikes should have positive drainage to an outlet.
- All dikes should have 2:1 or flatter side slopes, 18 in. minimum height, and a minimum top width of 24 in. Wide top widths and flat slopes are usually needed at crossings for construction traffic.
- The outlet from the earth dike must function with a minimum of erosion. Runoff should be conveyed to a sediment trapping device such as a Sediment Trap (SE-3) or Sediment Basin

(SE-2) when either the dike channel or the drainage area above the dike are not adequately stabilized.

- Temporary stabilization may be achieved using seed and mulching for slopes less than 5% and either rip-rap or sod for slopes in excess of 5%. In either case, stabilization of the earth dike should be completed immediately after construction or prior to the first rain.

- If riprap is used to stabilize the channel formed along the toe of the dike, the following typical specifications apply:

Channel Grade	Riprap Stabilization
0.5-1.0%	4 in. Rock
1.1-2.0%	6 in. Rock
2.1-4.0%	8 in. Rock
4.1-5.0%	8 in. -12 in. Riprap

- The stone riprap, recycled concrete, etc. used for stabilization should be pressed into the soil with construction equipment.

- Filter cloth may be used to cover dikes in use for long periods.

- Construction activity on the earth dike should be kept to a minimum.

Drainage Swales

Drainage swales are only effective if they are properly installed. Swales are more effective than dikes because they tend to be more stable. The combination of a swale with a dike on the downhill side is the most cost effective diversion.

Standard engineering design criteria for small open channel and closed conveyance systems should be used (see the local drainage design manual). Unless local drainage design criteria state otherwise, drainage swales should be designed as follows:

- No more than 5 acres may drain to a temporary drainage swale.

- Place drainage swales above or below, not on, a cut or fill slope.

- Swale bottom width should be at least 2 ft

- Depth of the swale should be at least 18 in.

- Side slopes should be 2:1 or flatter.

- Drainage or swales should be laid at a grade of at least 1 percent, but not more than 15 percent.

- The swale must not be overtopped by the peak discharge from a 10-year storm, irrespective of the design criteria stated above.

- Remove all trees, stumps, obstructions, and other objectionable material from the swale when it is built.
- Compact any fill material along the path of the swale.
- Stabilize all swales immediately. Seed and mulch swales at a slope of less than 5 percent, and use rip-rap or sod for swales with a slope between 5 and 15 percent. For temporary swales, geotextiles and mats (EC-7) may provide immediate stabilization.
- Irrigation may be required to establish sufficient vegetation to prevent erosion.
- Do not operate construction vehicles across a swale unless a stabilized crossing is provided.
- Permanent drainage facilities must be designed by a professional engineer (see the local drainage design criteria for proper design).
- At a minimum, the drainage swale should conform to predevelopment drainage patterns and capacities.
- Construct the drainage swale with a positive grade to a stabilized outlet.
- Provide erosion protection or energy dissipation measures if the flow out of the drainage swale can reach an erosive velocity.

Costs

- Cost ranges from $15 to $55 per ft for both earthwork and stabilization and depends on availability of material, site location, and access.
- Small dikes: $2.50 - $6.50/linear ft; Large dikes: $2.50/yd^3.
- The cost of a drainage swale increases with drainage area and slope. Typical swales for controlling internal erosion are inexpensive, as they are quickly formed during routine earthwork.

Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspect ditches and berms for washouts. Replace lost riprap, damaged linings or soil stabilizers as needed.
- Inspect channel linings, embankments, and beds of ditches and berms for erosion and accumulation of debris and sediment. Remove debris and sediment and repair linings and embankments as needed.
- Temporary conveyances should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction

References

Erosion and Sediment Control Handbook, S.J. Goldman, K. Jackson, T.A. Bursetynsky, P.E., McGraw Hill Book Company, 1986.

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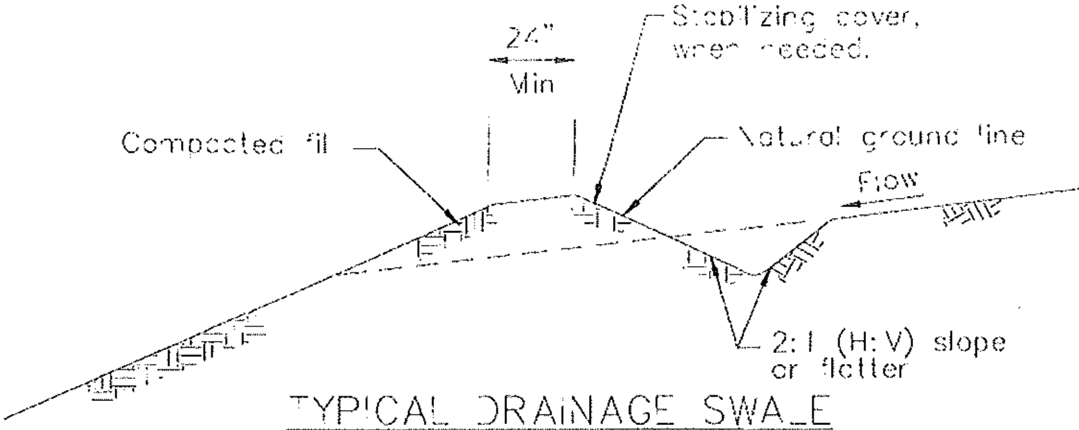
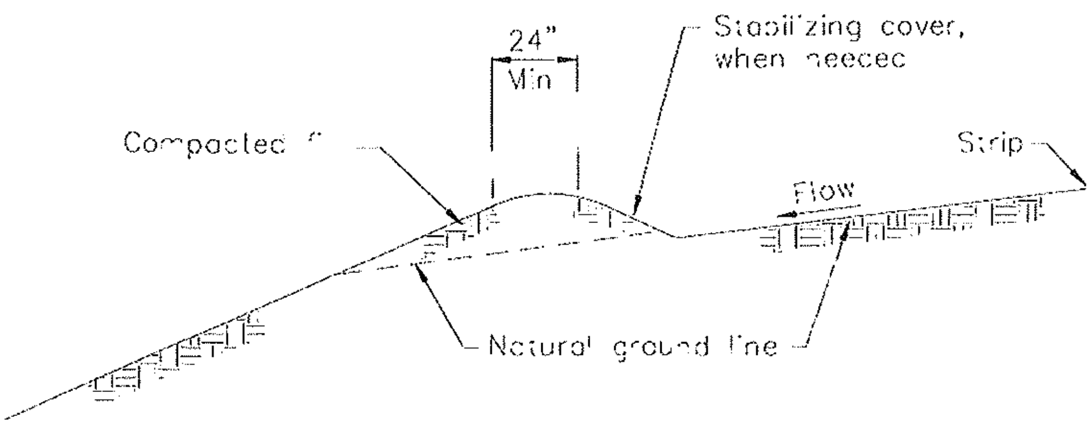


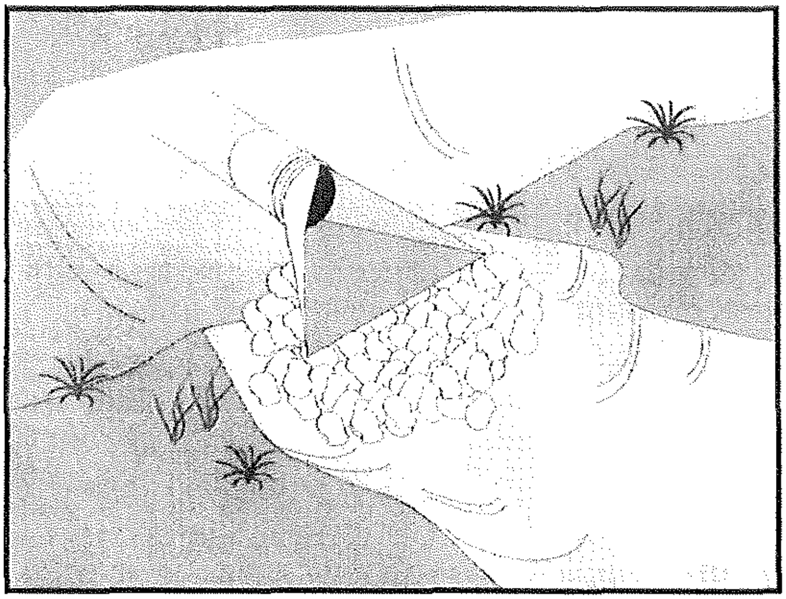
TYPICAL DRAINAGE SWALE
NOT TO SCALE

NOTES:

1. Stabilize inlet, outlets and slopes.
2. Properly compact the subgrade.



TYPICAL EARTH DIKE
NOT TO SCALE



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Outlet protection is a physical device composed of rock, grouted riprap, or concrete rubble, which is placed at the outlet of a pipe or channel to prevent scour of the soil caused by concentrated, high velocity flows.

Suitable Applications

Whenever discharge velocities and energies at the outlets of culverts, conduits, or channels are sufficient to erode the next downstream reach. This includes temporary diversion structures to divert runon during construction.

- These devices may be used at the following locations:
  - Outlets of pipes, drains, culverts, slope drains, diversion ditches, swales, conduits, or channels.
  - Outlets located at the bottom of mild to steep slopes.
  - Discharge outlets that carry continuous flows of water.
  - Outlets subject to short, intense flows of water, such as flash floods.
  - Points where lined conveyances discharge to unlined conveyances

Limitations

- Large storms or high flows can wash away the rock outlet protection and leave the area susceptible to erosion.

- Sediment captured by the rock outlet protection may be difficult to remove without removing the rock.
- Outlet protection may negatively impact the channel habitat.
- Grouted riprap may break up in areas of freeze and thaw.
- If there is not adequate drainage, and water builds up behind grouted riprap, it may cause the grouted riprap to break up due to the resulting hydrostatic pressure.
- Sediment accumulation, scour depressions, and/or persistent non-stormwater discharges can result in areas of standing water suitable for mosquito production in velocity dissipation devices.

Implementation

General

Outlet protection is needed where discharge velocities and energies at the outlets of culverts, conduits or channels are sufficient to erode the immediate downstream reach. This practice protects the outlet from developing small eroded pools (plange pools), and protects against gully erosion resulting from scouring at a culvert mouth.

Design and Layout

As with most channel design projects, depth of flow, roughness, gradient, side slopes, discharge rate, and velocity should be considered in the outlet design. Compliance to local and state regulations should also be considered while working in environmentally sensitive streambeds. General recommendations for rock size and length of outlet protection mat are shown in the rock outlet protection figure in this BMP and should be considered minimums. The apron length and rock size gradation are determined using a combination of the discharge pipe diameter and estimate discharge rate: Select the longest apron length and largest rock size suggested by the pipe size and discharge rate. Where flows are conveyed in open channels such as ditches and swales, use the estimated discharge rate for selecting the apron length and rock size. Flows should be same as the culvert or channel design flow but never the less than the peak 5 year flow for temporary structures planned for one rainy season, or the 10 year peak flow for temporary structures planned for two or three rainy seasons.

- There are many types of energy dissipaters, with rock being the one that is represented in the attached figure.
- Best results are obtained when sound, durable, and angular rock is used.
- Install riprap, grouted riprap, or concrete apron at selected outlet. Riprap aprons are best suited for temporary use during construction. Grouted or wired tied rock riprap can minimize maintenance requirements.
- Rock outlet protection is usually less expensive and easier to install than concrete aprons or energy dissipaters. It also serves to trap sediment and reduce flow velocities.
- Carefully place riprap to avoid damaging the filter fabric.

- Stone 4 in. to 6 in. may be carefully dumped onto filter fabric from a height not to exceed 12 in.
- Stone 8 in. to 12 in. must be hand placed onto filter fabric, or the filter fabric may be covered with 4 in. of gravel and the 8 in. to 12 in. rock may be dumped from a height not to exceed 16 in.
- Stone greater than 12 in. shall only be dumped onto filter fabric protected with a layer of gravel with a thickness equal to one half the D_{50} rock size, and the dump height limited to twice the depth of the gravel protection layer thickness.

- For proper operation of apron: Align apron with receiving stream and keep straight throughout its length. If a curve is needed to fit site conditions, place it in upper section of apron.
- Outlets on slopes steeper than 10 percent should have additional protection.

Costs

Costs are low if material is readily available. If material is imported, costs will be higher. Average installed cost is $150 per device.

Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Inspect BMPs subjected to non-stormwater discharges daily while non-stormwater discharges occur. Minimize areas of standing water by removing sediment blockages and filling scour depressions.
- Inspect apron for displacement of the riprap and damage to the underlying fabric. Repair fabric and replace riprap that has washed away. If riprap continues to wash away, consider using larger material.
- Inspect for scour beneath the riprap and around the outlet. Repair damage to slopes or underlying filter fabric immediately.
- Temporary devices should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction.

References

County of Sacramento Improvement Standards, Sacramento County, May 1989.

Erosion and Sediment Control Handbook, S.J. Goldman, K. Jackson, T.A. Bursztynsky, P.E., McGraw Hill Book Company, 1986.

Handbook of Steel Drainage & Highway Construction, American Iron and Steel Institute, 1983.

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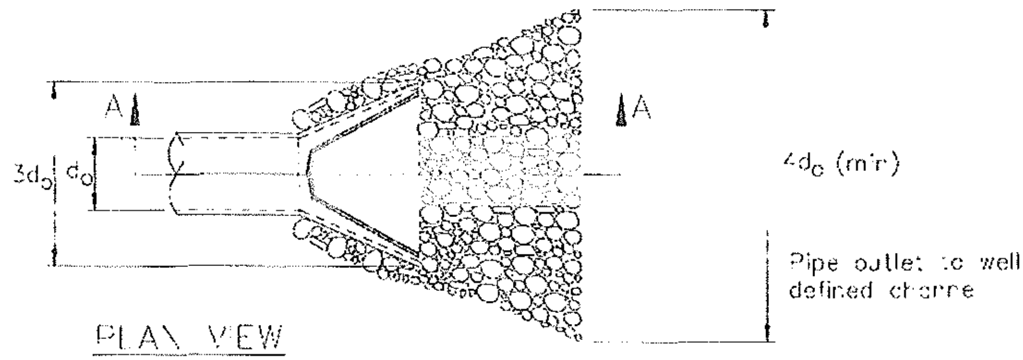
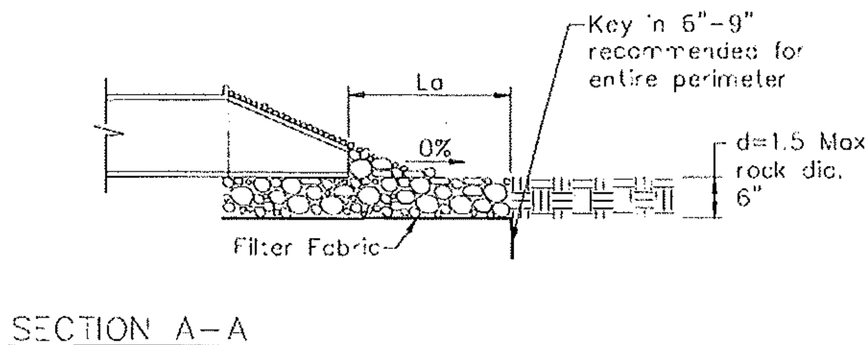
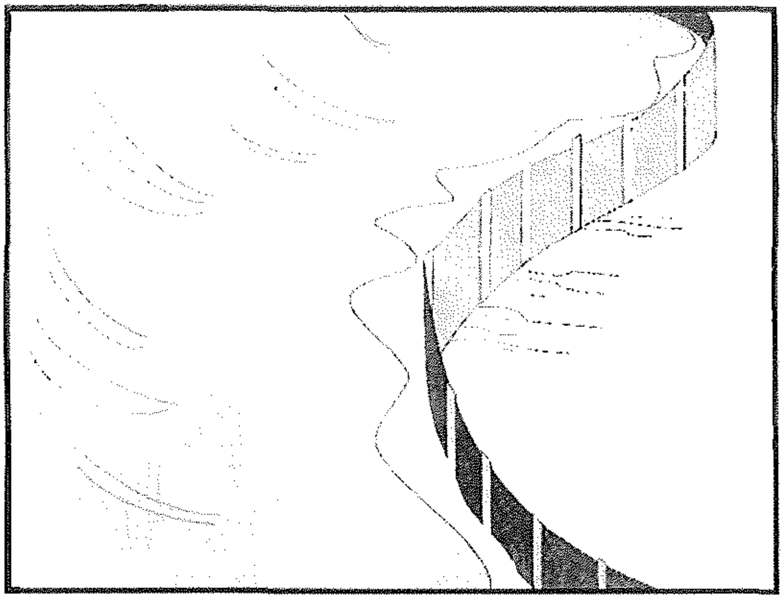




Pipe Diameter inches	Discharge ft³/s	Apron Length, La ft	Rip Rap D_{50} Diameter Min inches
12	5	10	4
	10	13	6
18	10	10	6
	20	16	8
	30	23	12
	40	26	16
24	30	16	8
	40	26	8
	50	26	12
	60	30	16

For larger or higher flows consult a Registered Civil Engineer
Source: USDA - SCS

Silt Fence SE-1



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Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-10 Storm Drain Inlet Protection

SE-14 Biofilter Bags

Description and Purpose

A silt fence is made of a woven geotextile that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains sediment-laden water, promoting sedimentation behind the fence.

Suitable Applications

Silt fences are suitable for perimeter control, placed below areas where sheet flows discharge from the site. They could also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion and around inlets within disturbed areas (SE-10). Silt fences are generally ineffective in locations where the flow is concentrated and are only applicable for sheet or overland flows. Silt fences are most effective when used in combination with erosion controls. Suitable applications include:

- Along the perimeter of a project.
- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels.
- Around temporary spoil areas and stockpiles.
- Around inlets.
- Below other small cleared areas.

Limitations

- Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.
- Do not use in locations where ponded water may cause a flooding hazard. Runoff typically ponds temporarily on the upstream side of silt fence.
- Do not use silt fence to divert water flows or place across any contour line. Fences not constructed on a level contour, or fences used to divert flow will concentrate flows resulting in additional erosion and possibly overtopping or failure of the silt fence.
- Improperly installed fences are subject to failure from undercutting, overtopping, or collapsing.
- Not effective unless trenched and keyed in.
- Not intended for use as mid-slope protection on slopes greater than 4:1 (H:V).
- Do not use on slopes subject to creeping, slumping, or landslides.

Implementation

General

A silt fence is a temporary sediment barrier consisting of woven geotextile stretched across and attached to supporting posts, trenched-in, and, depending upon the strength of fabric used, supported with plastic or wire mesh fence. Silt fences trap sediment by intercepting and detaining small amounts of sediment-laden runoff from disturbed areas in order to promote sedimentation behind the fence.

The following layout and installation guidance can improve performance and should be followed:

- Use principally in areas where sheet flow occurs.
- Install along a level contour, so water does not pond more than 1.5 ft at any point along the silt fence.
- The maximum length of slope draining to any point along the silt fence should be 200 ft or less.
- The maximum slope perpendicular to the fence line should be 1:1.
- Provide sufficient room for runoff to pond behind the fence and to allow sediment removal equipment to pass between the silt fence and toes of slopes or other obstructions. About 1200 ft^2 of ponding area should be provided for every acre draining to the fence.
- Turn the ends of the filter fence uphill to prevent stormwater from flowing around the fence.
- Leave an undisturbed or stabilized area immediately down slope from the fence where feasible.

- Silt fences should remain in place until the disturbed area is permanently stabilized, after which, the silt fence should be removed and properly disposed.

- Silt fence should be used in combination with erosion source controls up slope in order to provide the most effective sediment control.

- Be aware of local regulations regarding the type and installation requirements of silt fence, which may differ from those presented in this fact sheet.

Design and Layout

The fence should be supported by a plastic or wire mesh if the fabric selected does not have sufficient strength and bursting strength characteristics for the planned application (as recommended by the fabric manufacturer). Woven geotextile material should contain ultraviolet inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 °F to 120 °F.

- Layout in accordance with attached figures.

- For slopes steeper than 2:1 (H:V) and that contain a high number of rocks or large dirt clods that tend to dislodge, it may be necessary to install additional protection immediately adjacent to the bottom of the slope, prior to installing silt fence. Additional protection may be a chain link fence or a cable fence.

- For slopes adjacent to sensitive receiving waters or Environmentally Sensitive Areas (ESAs), silt fence should be used in conjunction with erosion control BMPs.

Standard vs. Heavy Duty Silt Fence

Standard Silt Fence

- Generally applicable in cases where the slope of area draining to the silt fence is 4:1 (H:V) or less.
- Used for shorter durations, typically 5 months or less
- Area draining to fence produces moderate sediment loads.

Heavy Duty Silt Fence

- Use is generally limited to 8 months or less.
- Area draining to fence produces moderate sediment loads.
- Heavy duty silt fence usually has 1 or more of the following characteristics, not possessed by standard silt fence.
  - Fence fabric has higher tensile strength.
  - Fabric is reinforced with wire backing or additional support.
  - Posts are spaced closer than pre-manufactured, standard silt fence products.
  - Posts are metal (steel or aluminum)

Materials

<u>Standard Silt Fence</u>

- Silt fence material should be woven geotextile with a minimum width of 36 in. and a minimum tensile strength of 100 lb force. The fabric should conform to the requirements in ASTM designation D4632 and should have an integral reinforcement layer. The reinforcement layer should be a polypropylene, or equivalent, net provided by the manufacturer. The permittivity of the fabric should be between 0.1 sec^{-1} and 0.15 sec^{-1} in conformance with the requirements in ASTM designation D4491.

- Wood stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.

- Staples used to fasten the fence fabric to the stakes should be not less than 1.75 in. long and should be fabricated from 15 gauge or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence should be 9 gauge or heavier wire. Galvanizing of the fastening wire will not be required.

Heavy-Duty Silt Fence

- Some silt fence has a wire backing to provide additional support, and there are products that may use prefabricated plastic holders for the silt fence and use metal posts or bar reinforcement instead of wood stakes. If bar reinforcement is used in lieu of wood stakes, use number four or greater bar. Provide end protection for any exposed bar reinforcement for health and safety purposes.

Installation Guidelines – Traditional Method

Silt fences are to be constructed on a level contour. Sufficient area should exist behind the fence for ponding to occur without flooding or overtopping the fence.

- A trench should be excavated approximately 6 in. wide and 6 in. deep along the line of the proposed silt fence (trenches should not be excavated wider or deeper than necessary for proper silt fence installation).

- Bottom of the silt fence should be keyed-in a minimum of 12 in.

- Posts should be spaced a maximum of 6 ft apart and driven securely into the ground a minimum of 18 in. or 12 in. below the bottom of the trench.

- When standard strength geotextile is used, a plastic or wire mesh support fence should be fastened securely to the upslope side of posts using heavy–duty wire staples at least 1 in. long. The mesh should extend into the trench.

- When extra-strength geotextile and closer post spacing are used, the mesh support fence may be eliminated.

- Woven geotextile should be purchased in a long roll, then cut to the length of the barrier. When joints are necessary, geotextile should be spliced together only at a support post, with a minimum 6 in. overlap and both ends securely fastened to the post.

- The trench should be backfilled with native material and compacted.

- Construct silt fences with a setback of at least 3 ft from the toe of a slope. Where, due to specific site conditions, a 3 ft setback is not available, the silt fence may be constructed at the toe of the slope, but should be constructed as far from the toe of the slope as practicable. Silt fences close to the toe of the slope will be less effective and more difficult to maintain.

- Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the barrier; in no case should the reach exceed 500 ft.

- Cross barriers should be a minimum of 1/3 and a maximum of ½ the height of the linear barrier.

- See typical installation details at the end of this fact sheet.

Installation Guidelines - Static Slicing Method

- Static Slicing is defined as insertion of a narrow blade pulled behind a tractor, similar to a plow blade, at least 10 inches into the soil while at the same time pulling silt geotextile fabric into the ground through the opening created by the blade to the depth of the blade. Once the gerotextile is installed, the soil is compacted using tractor tires.

- This method will not work with pre-fabricated, wire backed silt fence.

- Benefits:
    - Ease of installation (most often done with a 2 person crew). In addition, installation using static slicing has been found to be more efficient on slopes, in rocky soils, and in saturated soils.
    - Minimal soil disturbance.
    - Greater level of compaction along fence, leading to higher performance (i.e. greater sediment retention).
    - Uniform installation.
    - Less susceptible to undercutting/undermining.

Costs

- It should be noted that costs vary greatly across regions due to available supplies and labor costs.

- Average annual cost for installation using the traditional silt fence installation method (assumes 6 month useful life) is $7 per linear foot based on vendor research. Range of cost is $3.50 - $9.10 per linear foot.

- In tests, the slicing method required 0.33 man hours per 100 linear feet, while the trenched based systems required as much as 1.01 man hours per linear foot.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Repair undercut silt fences.

- Repair or replace split, torn, slumping, or weathered fabric. The lifespan of silt fence fabric is generally 5 to 8 months.
- Silt fences that are damaged and become unsuitable for the intended purpose should be removed from the site of work, disposed, and replaced with new silt fence barriers.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Silt fences should be left in place until the upstream area is permanently stabilized. Until then, the silt fence should be inspected and maintained regularly.
- Remove silt fence when upgradient areas are stabilized. Fill and compact post holes and anchor trench, remove sediment accumulation, grade fence alignment to blend with adjacent ground, and stabilize disturbed area.

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

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Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group-Working Paper, USEPA, April 1992.

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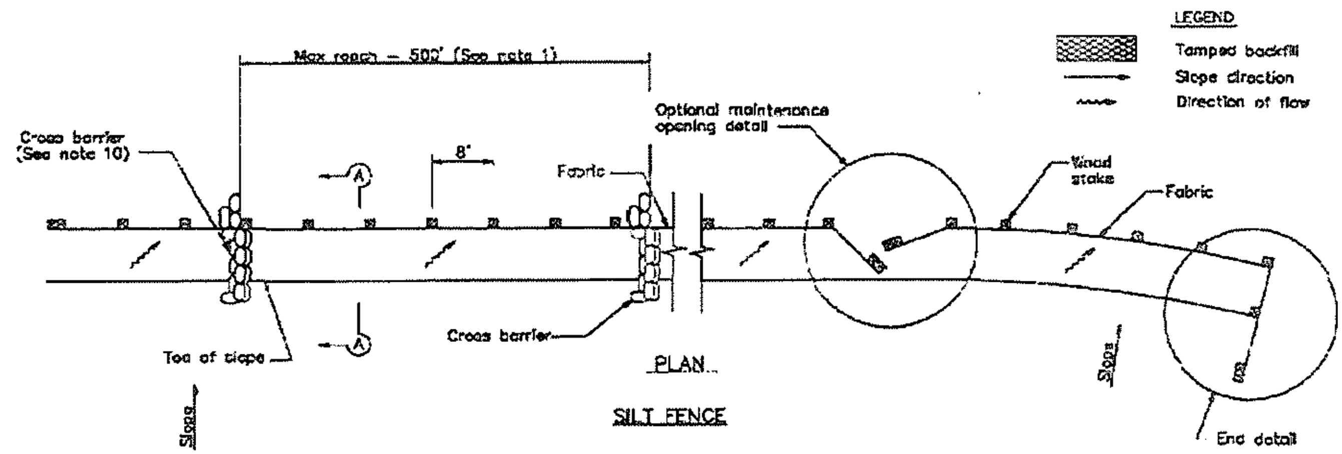
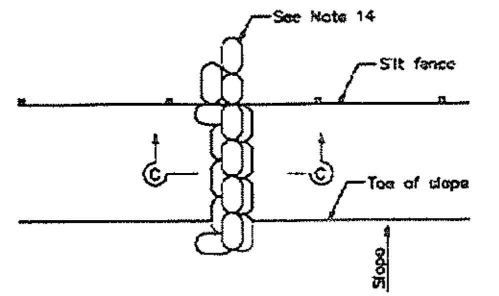
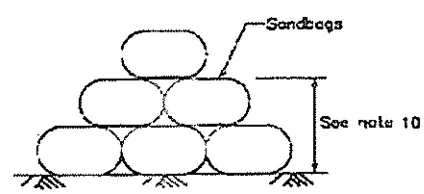


NOTES

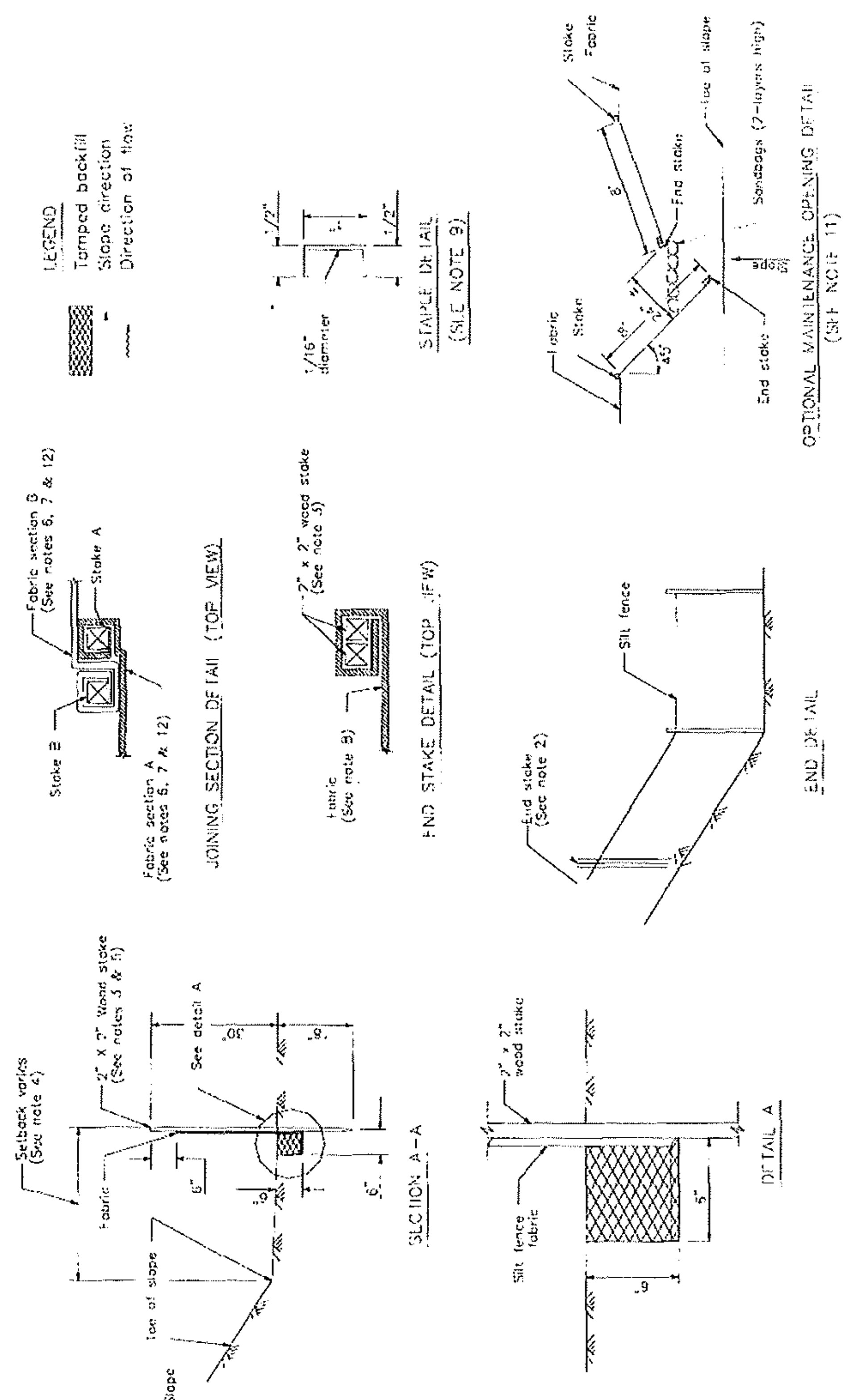
1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the linear barrier, in no case shall the reach length exceed 500'.
2. The last 8'-0" of fence shall be turned up slope.
3. Stake dimensions are nominal.
4. Dimension may vary to fit field condition.
5. Stakes shall be spaced at 8'-0" maximum and shall be positioned on downstream side of fence.
6. Stakes to overlap and fence fabric to fold around each stake one full turn. Secure fabric to stake with 4 staples.
7. Stakes shall be driven tightly together to prevent potential flow-through of sediment at joint. The tops of the stakes shall be secured with wire.
8. For end stake, fence fabric shall be folded around two stakes one full turn and secured with 4 staples.
9. Minimum 4 staples per stake. Dimensions shown are typical.
10. Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
11. Maintenance openings shall be constructed in a manner to ensure sediment remains behind silt fence.
12. Joining sections shall not be placed at sump locations.
13. Sandbag rows and layers shall be offset to eliminate gaps.
14. Add 3-4 bags to cross barrier on downgradient side of silt fence as needed to prevent bypass or undermining and as allowable based on site limits of disturbance.



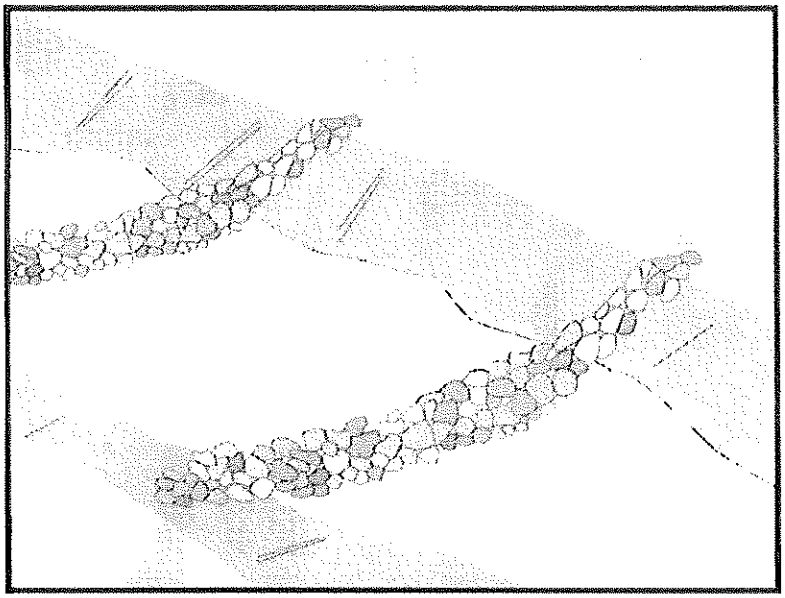
CROSS BARRIER DETAIL



SECTION C-C



LEGEND
Tamped backfill
Slope direction
Direction of flow
SECTION A-A
DETAIL A
JOINING SECTION DETAIL (TOP VIEW)
END STAKE DETAIL (TOP VIEW)
END DETAIL
STAPLE DETAIL
(SEE NOTE 9)
OPTIONAL MAINTENANCE OPENING DETAIL
(SEE NOTE 11)



Categories		
EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

Description and Purpose

A check dam is a small barrier constructed of rock, gravel bags, sandbags, fiber rolls, or other proprietary products, placed across a constructed swale or drainage ditch. Check dams reduce the effective slope of the channel, thereby reducing scour and channel erosion by reducing flow velocity and increasing residence time within the channel, allowing sediment to settle.

Suitable Applications

Check dams may be appropriate in the following situations:

- To promote sedimentation behind the dam.
- To prevent erosion by reducing the velocity of channel flow in small intermittent channels and temporary swales.
- In small open channels that drain 10 acres or less.
- In steep channels where stormwater runoff velocities exceed 5 ft/s.
- During the establishment of grass linings in drainage ditches or channels.
- In temporary ditches where the short length of service does not warrant establishment of erosion-resistant linings.
- To act as a grade control structure.

CASQA

Limitations

- Not to be used in live streams or in channels with extended base flows.
- Not appropriate in channels that drain areas greater than 10 acres.
- Not appropriate in channels that are already grass-lined unless erosion potential or sediment-laden flow is expected, as installation may damage vegetation.
- Require extensive maintenance following high velocity flows.
- Promotes sediment trapping which can be re-suspended during subsequent storms or removal of the check dam.
- Do not construct check dams with straw bales or silt fence.
- Water suitable for mosquito production may stand behind check dams, particularly if subjected to daily non-stormwater discharges.

Implementation

General

Check dams reduce the effective slope and create small pools in swales and ditches that drain 10 acres or less. Using check dams to reduce channel slope reduces the velocity of stormwater flows, thus reducing erosion of the swale or ditch and promoting sedimentation. Thus, check dams are dual-purpose and serve an important role as erosion controls as well as as sediment controls. Note that use of 1-2 isolated check dams for sedimentation will likely result in little net removal of sediment because of the small detention time and probable scour during longer storms. Using a series of check dams will generally increase their effectiveness. A sediment trap (SE-3) may be placed immediately upstream of the check dam to increase sediment removal efficiency.

Design and Layout

Check dams work by decreasing the effective slope in ditches and swales. An important consequence of the reduced slope is a reduction in capacity of the ditch or swale. This reduction in capacity should be considered when using this BMP, as reduced capacity can result in overtopping of the ditch or swale and resultant consequences. In some cases, such as a "permanent" ditch or swale being constructed early and used as a "temporary" conveyance for construction flows, the ditch or swale may have sufficient capacity such that the temporary reduction in capacity due to check dams is acceptable. When check dams reduce capacities beyond acceptable limits, either:

- Don't use check dams. Consider alternative BMPs, or.
- Increase the size of the ditch or swale to restore capacity.

Maximum slope and velocity reduction is achieved when the toe of the upstream dam is at the same elevation as the top of the downstream dam (see "Spacing Between Check Dams" detail at the end of this fact sheet). The center section of the dam should be lower than the edge sections (at least 6 inches), acting as a spillway, so that the check dam will direct flows to the center of the ditch or swale (see "Typical Rock Check Dam" detail at the end of this fact sheet). Bypass or side-cutting can occur if a sufficient spillway is not provided in the center of the dam.

Check dams are usually constructed of rock, gravel bags, sandbags, and fiber rolls. A number of products can also be used as check dams (e.g. HDPE check dams, temporary silt dikes (SE-12)), and some of these products can be removed and reused. Check dams can also be constructed of logs or lumber, and have the advantage of a longer lifespan when compared to gravel bags, sandbags, and fiber rolls. Check dams should not be constructed from straw bales or silt fences, since concentrated flows quickly wash out these materials.

Rock check dams are usually constructed of 8 to 12 in. rock. The rock is placed either by hand or mechanically, but never just dumped into the channel. The dam should completely span the ditch or swale to prevent washout. The rock used should be large enough to stay in place given the expected design flow through the channel. It is recommended that abutments be extended 18 in. into the channel bank. Rock can be graded such that smaller diameter rock (e.g. 2-4 in) is located on the upstream side of larger rock (holding the smaller rock in place); increasing residence time.

Log check dams are usually constructed of 4 to 6 in. diameter logs, installed vertically. The logs should be embedded into the soil at least 18 in. Logs can be bolted or wired to vertical support logs that have been driven or buried into the soil.

See fiber rolls, SE-5, for installation of fiber roll check dams.

Gravel bag and sand bag check dams are constructed by stacking bags across the ditch or swale, shaped as shown in the drawings at the end of this fact sheet (see "Gravel Bag Check Dam" detail at the end of this fact sheet).

Manufactured products, such as temporary silt dikes (SE-12), should be installed in accordance with the manufacturer's instructions. Installation typically requires anchoring or trenching of products, as well as regular maintenance to remove accumulated sediment and debris.

If grass is planted to stabilize the ditch or swale, the check dam should be removed when the grass has matured (unless the slope of the swales is greater than 4%).

The following guidance should be followed for the design and layout of check dams:

- Install the first check dam approximately 16 ft from the outfall device and at regular intervals based on slope gradient and soil type.
- Check dams should be placed at a distance and height to allow small pools to form between each check dam.
- For multiple check dam installation, backwater from a downstream check dam should reach the toes of the upstream check dam.
- A sediment trap provided immediately upstream of the check dam will help capture sediment. Due to the potential for this sediment to be resuspended in subsequent storms, the sediment trap should be cleaned following each storm event.

- High flows (typically a 2-year storm or larger) should safely flow over the check dam without an increase in upstream flooding or damage to the check dam.

- Where grass is used to line ditches, check dams should be removed when grass has matured sufficiently to protect the ditch or swale.

Materials

- Rock used for check dams should typically be 8-12 in rock and be sufficiently sized to stay in place given expected design flows in the channel. Smaller diameter rock (e.g. 2 to 4 in) can be placed on the upstream side of larger rock to increase residence time.

- Gravel bags used for check dams should conform to the requirements of SE-6, Gravel Bag Berms.

- Sandbags used for check dams should conform to SE-8, Sandbag Barrier.

- Fiber rolls used for check dams should conform to SE-5, Fiber Rolls.

- Temporary silt dikes used for check dams should conform to SE-12, Temporary Silt Dikes.

Installation

- Rock should be placed individually by hand or by mechanical methods (no dumping of rock) to achieve complete ditch or swale coverage.

- Tightly abut bags and stack according to detail shown in the figure at the end of this section (pyramid approach). Gravel bags and sandbags should not be stacked any higher than 3 ft.

- Upper rows or gravel and sand bags shall overlap joints in lower rows.

- Fiber rolls should be trenched in, backfilled, and firmly staked in place.

- Install along a level contour.

- HDPE check dams, temporary silt dikes, and other manufactured products should be used and installed per manufacturer specifications.

Costs

Cost consists of labor costs if materials are readily available (such as gravel on-site). If material must be imported, costs will increase. For other material and installation costs, see SE-5, SE-6, SE-8, SE-12, and SE-14.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Replace missing rock, bags, rolls, etc. Replace bags or rolls that have degraded or have become damaged.

- If the check dam is used as a sediment capture device, sediment that accumulates behind the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- If the check dam is used as a grade control structure, sediment removal is not required as long as the system continues to control the grade.
- Inspect areas behind check dams for pools of standing water, especially if subjected to daily non-stormwater discharges.
- Remove accumulated sediment prior to permanent seeding or soil stabilization.
- Remove check dam and accumulated sediment when check dams are no longer needed.

References

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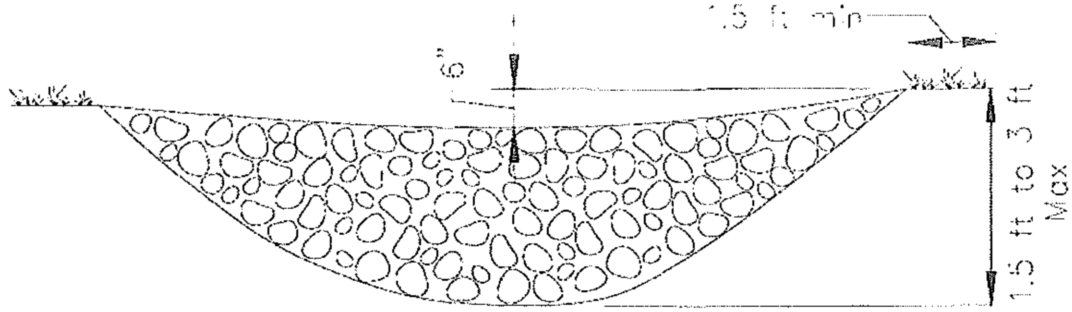
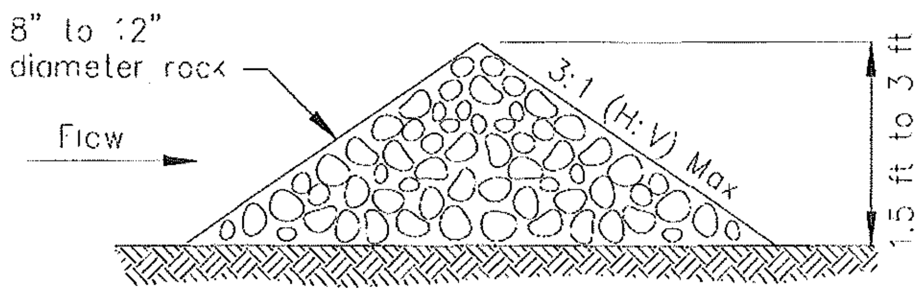
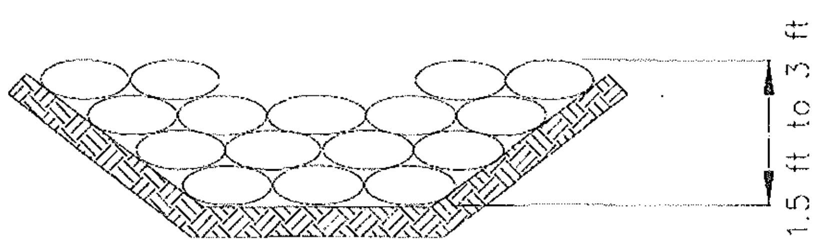


ELEVATION

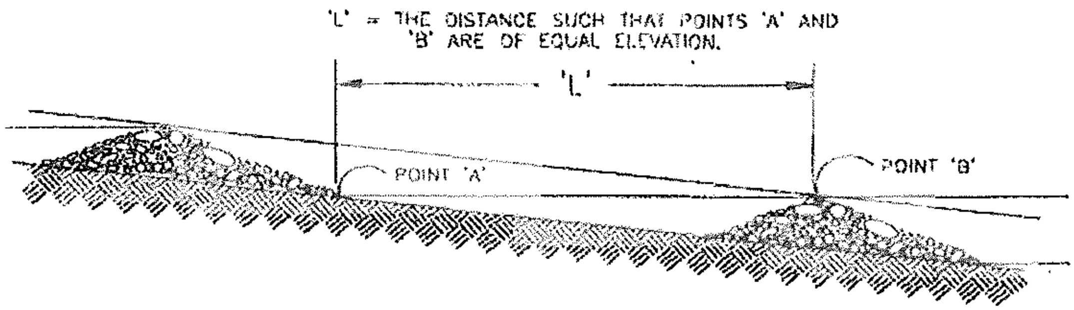


TYPICAL ROCK CHECK DAM SECTION

ROCK CHECK DAM
NOT TO SCALE

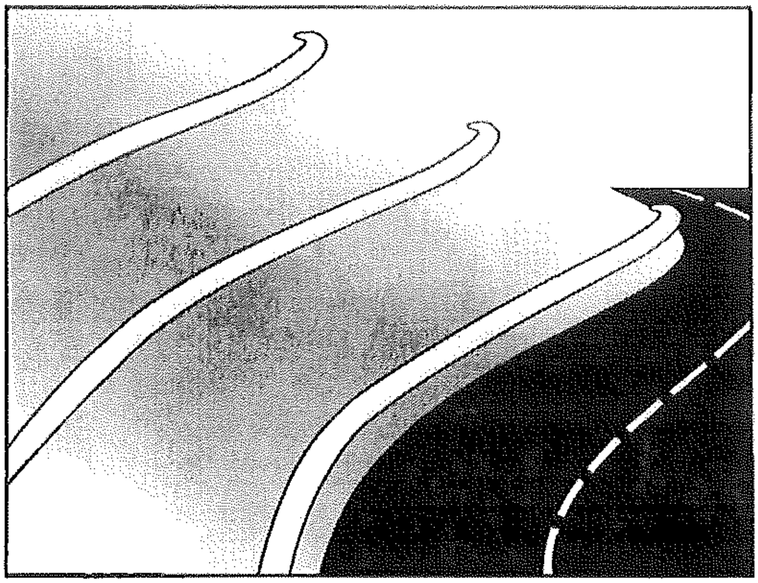


GRAVEL BAG CHECK DAM ELEVATION
NOT TO SCALE



SPACING BETWEEN CHECK DAMS

Fiber Rolls SE-5



Categories

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Legend:

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☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

Description and Purpose

A fiber roll consists of straw, coir, or other biodegradable materials bound into a tight tubular roll wrapped by netting, which can be photodegradable or natural. Additionally, gravel core fiber rolls are available, which contain an imbedded ballast material such as gravel or sand for additional weight when staking the rolls are not feasible (such as use as inlet protection). When fiber rolls are placed at the toe and on the face of slopes along the contours, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.

Suitable Applications

Fiber rolls may be suitable:

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- At the end of a downward slope where it transitions to a steeper slope.
- Along the perimeter of a project.
- As check dams in unlined ditches with minimal grade.
- Down-slope of exposed soil areas.
- At operational storm drains as a form of inlet protection.

- Around temporary stockpiles.

Limitations

- Fiber rolls are not effective unless trenched in and staked.
- Not intended for use in high flow situations.
- Difficult to move once saturated.
- If not properly staked and trenched in, fiber rolls could be transported by high flows.
- Fiber rolls have a very limited sediment capture zone.
- Fiber rolls should not be used on slopes subject to creep, slumping, or landslide.
- Rolls typically function for 12-24 months depending upon local conditions.

Implementation

Fiber Roll Materials

- Fiber rolls should be prefabricated.
- Fiber rolls may come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll. Fiber rolls impregnated with PAM provide additional sediment removal capabilities and should be used in areas with fine, clayey or silty soils to provide additional sediment removal capabilities. Monitoring may be required for these installations.
- Fiber rolls are made from weed free rice straw, flax, or a similar agricultural material bound into a tight tubular roll by netting.
- Typical fiber rolls vary in diameter from 9 in. to 20 in. Larger diameter rolls are available as well.

Installation

- Locate fiber rolls on level contours spaced as follows:
  - Slope inclination of 4:1 (H:V) or flatter: Fiber rolls should be placed at a maximum interval of 20 ft.
  - Slope inclination between 4:1 and 2:1 (H:V): Fiber Rolls should be placed at a maximum interval of 15 ft. (a closer spacing is more effective).
  - Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).
- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth should be ¼ to 1/3 of the thickness of the roll, and the width should equal the roll diameter, in order to provide area to backfill the trench.

- It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.

- Start building trenches and installing rolls from the bottom of the slope and work up.

- It is recommended that pilot holes be driven through the fiber roll. Use a straight bar to drive holes through the roll and into the soil for the wooden stakes.

- Turn the ends of the fiber roll up slope to prevent runoff from going around the roll.

- Stake fiber rolls into the trench.

  - Drive stakes at the end of each fiber roll and spaced 4 ft maximum on center.

  - Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.

- If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.

- See typical fiber roll installation details at the end of this fact sheet.

Removal

- Fiber rolls can be left in place or removed depending on the type of fiber roll and application (temporary vs. permanent installation). Typically, fiber rolls encased with plastic netting are used for a temporary application because the netting does not biodegrade. Fiber rolls used in a permanent application are typically encased with a biodegradeable material and are left in place. Removal of a fiber roll used in a permanent application can result in greater disturbance.

- Temporary installations should only be removed when up gradient areas are stabilized per General Permit requirements, and/or pollutant sources no longer present a hazard. But, they should also be removed before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.

Costs

Material costs for regular fiber rolls range from $20 - $30 per 25 ft roll.

Material costs for PAM impregnated fiber rolls range between 7.00-$9.00 per linear foot, based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Repair or replace split, torn, unraveling, or slumping fiber rolls.

- If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-third the designated sediment storage depth.

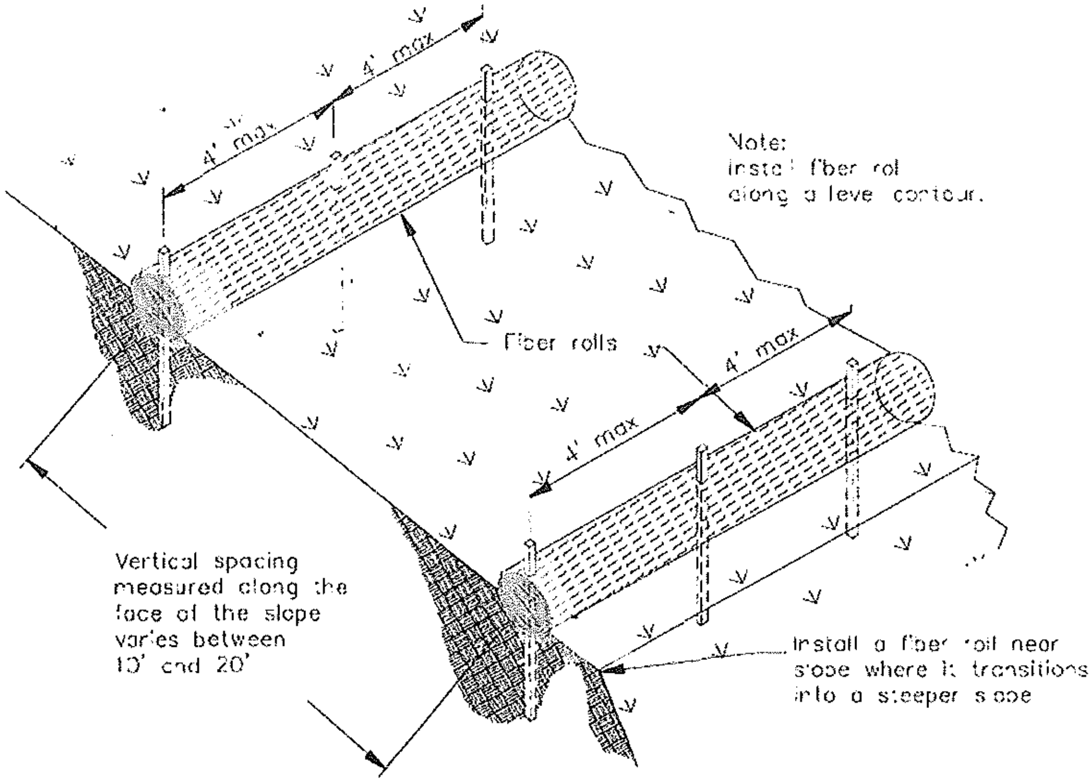
- If fiber rolls are used for erosion control, such as in a check dam, sediment removal should not be required as long as the system continues to control the grade. Sediment control BMPs will likely be required in conjunction with this type of application.

- Repair any rills or gullies promptly.

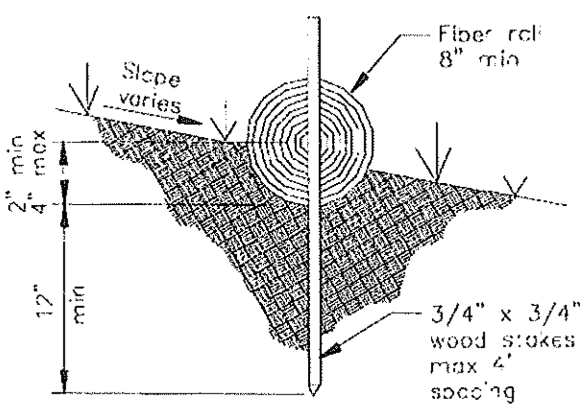
References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

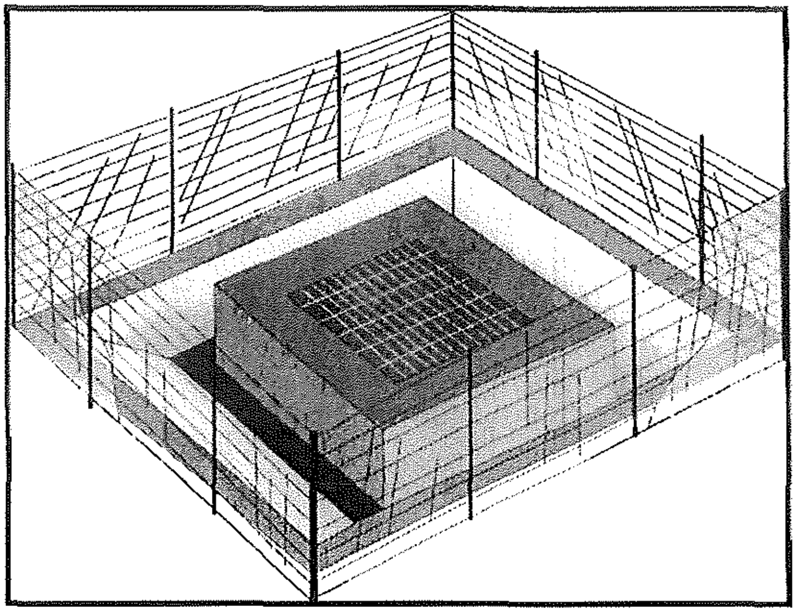
Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



TYPICAL FIBER ROLL INSTALLATION
N.T.S.



ENTRENCHMENT DETAIL
N.T.S.



Categories

EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☒
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

Description and Purpose

Storm drain inlet protection consists of a sediment filter or an impounding area in, around or upstream of a storm drain, drop inlet, or curb inlet. Storm drain inlet protection measures temporarily pond runoff before it enters the storm drain, allowing sediment to settle. Some filter configurations also remove sediment by filtering, but usually the ponding action results in the greatest sediment reduction. Temporary geotextile storm drain inserts attach underneath storm drain grates to capture and filter storm water.

Suitable Applications

Every storm drain inlet receiving runoff from unstabilized or otherwise active work areas should be protected. Inlet protection should be used in conjunction with other erosion and sediment controls to prevent sediment-laden stormwater and non-stormwater discharges from entering the storm drain system.

Limitations

- Drainage area should not exceed 1 acre.
- In general straw bales should not be used as inlet protection.
- Requires an adequate area for water to pond without encroaching into portions of the roadway subject to traffic.

- Sediment removal may be inadequate to prevent sediment discharges in high flow conditions or if runoff is heavily sediment laden. If high flow conditions are expected, use other onsite sediment trapping techniques in conjunction with inlet protection.

- Frequent maintenance is required.

- Limit drainage area to 1 acre maximum. For drainage areas larger than 1 acre, runoff should be routed to a sediment-trapping device designed for larger flows. See BMPs SE-2, Sediment Basin, and SE-3, Sediment Traps.

- Excavated drop inlet sediment traps are appropriate where relatively heavy flows are expected, and overflow capability is needed.

Implementation

General

Inlet control measures presented in this handbook should not be used for inlets draining more than one acre. Runoff from larger disturbed areas should be first routed through SE-2, Sediment Basin or SE-3, Sediment Trap and/or used in conjunction with other drainage control, erosion control, and sediment control BMPs to protect the site. Different types of inlet protection are appropriate for different applications depending on site conditions and the type of inlet. Alternative methods are available in addition to the methods described/shown herein such as prefabricated inlet insert devices, or gutter protection devices.

Design and Layout

Identify existing and planned storm drain inlets that have the potential to receive sediment-laden surface runoff. Determine if storm drain inlet protection is needed and which method to use.

- The key to successful and safe use of storm drain inlet protection devices is to know where runoff that is directed toward the inlet to be protected will pond or be diverted as a result of installing the protection device.

    - Determine the acceptable location and extent of ponding in the vicinity of the drain inlet. The acceptable location and extent of ponding will influence the type and design of the storm drain inlet protection device.

    - Determine the extent of potential runoff diversion caused by the storm drain inlet protection device. Runoff ponded by inlet protection devices may flow around the device and towards the next downstream inlet. In some cases, this is acceptable; in other cases, serious erosion or downstream property damage can be caused by these diversions. The possibility of runoff diversions will influence whether or not storm drain inlet protection is suitable; and, if suitable, the type and design of the device.

- The location and extent of ponding, and the extent of diversion, can usually be controlled through appropriate placement of the inlet protection device. In some cases, moving the inlet protection device a short distance upstream of the actual inlet can provide more efficient sediment control, limit ponding to desired areas, and prevent or control diversions.

- Six types of inlet protection are presented below. However, it is recognized that other effective methods and proprietary devices exist and may be selected.

  - Silt Fence: Appropriate for drainage basins with less than a 5% slope, sheet flows, and flows under 0.5 cfs.

  - Excavated Drop Inlet Sediment Trap: An excavated area around the inlet to trap sediment (SE-3).

  - Gravel bag barrier: Used to create a small sediment trap upstream of inlets on sloped, paved streets. Appropriate for sheet flow or when concentrated flow may exceed 0.5 cfs, and where overtopping is required to prevent flooding.

  - Block and Gravel Filter: Appropriate for flows greater than 0.5 cfs.

  - Temporary Geotextile Storm drain Inserts: Different products provide different features. Refer to manufacturer details for targeted pollutants and additional features.

  - Biofilter Bag Barrier: Used to create a small retention area upstream of inlets and can be located on pavement or soil. Biofilter bags slowly filter runoff allowing sediment to settle out. Appropriate for flows under 0.5 cfs.

- Select the appropriate type of inlet protection and design as referred to or as described in this fact sheet.

- Provide area around the inlet for water to pond without flooding structures and property.

- Grates and spaces around all inlets should be sealed to prevent seepage of sediment-laden water.

- Excavate sediment sumps (where needed) 1 to 2 ft with 2:1 side slopes around the inlet.

Installation

- ***DI Protection Type 1 - Silt Fence*** - Similar to constructing a silt fence; see BMP SE-1, Silt Fence. Do not place fabric underneath the inlet grate since the collected sediment may fall into the drain inlet when the fabric is removed or replaced and water flow through the grate will be blocked resulting in flooding. See typical Type 1 installation details at the end of this fact sheet.

  1. Excavate a trench approximately 6 in. wide and 6 in. deep along the line of the silt fence inlet protection device.

  2. Place 2 in. by 2 in. wooden stakes around the perimeter of the inlet a maximum of 3 ft apart and drive them at least 18 in. into the ground or 12 in. below the bottom of the trench. The stakes should be at least 48 in.

  3. Lay fabric along bottom of trench, up side of trench, and then up stakes. See SE-1, Silt Fence, for details. The maximum silt fence height around the inlet is 24 in.

  4. Staple the filter fabric (for materials and specifications, see SE-1, Silt Fence) to wooden stakes. Use heavy-duty wire staples at least 1 in. in length.

5. Backfill the trench with gravel or compacted earth all the way around.

- ***DI Protection Type 2 - Excavated Drop Inlet Sediment Trap*** - Install filter fabric fence in accordance with DI Protection Type 1. Size excavated trap to provide a minimum storage capacity calculated at the rate 67 yd^3/acre of drainage area. See typical Type 2 installation details at the end of this fact sheet.

- ***DI Protection Type 3 - Gravel bag*** - Flow from a severe storm should not overtop the curb. In areas of high clay and silts, use filter fabric and gravel as additional filter media. Construct gravel bags in accordance with SE-6, Gravel Bag Berm. Gravel bags should be used due to their high permeability. See typical Type 3 installation details at the end of this fact sheet.

  1. Construct on gently sloping street.
  2. Leave room upstream of barrier for water to pond and sediment to settle.
  3. Place several layers of gravel bags – overlapping the bags and packing them tightly together.
  4. Leave gap of one bag on the top row to serve as a spillway. Flow from a severe storm (e.g., 10 year storm) should not overtop the curb.

- ***DI Protection Type 4 – Block and Gravel Filter*** - Block and gravel filters are suitable for curb inlets commonly used in residential, commercial, and industrial construction. See typical Type 4 installation details at the end of this fact sheet.

  1. Place hardware cloth or comparable wire mesh with 0.5 in. openings over the drop inlet so that the wire extends a minimum of 1 ft beyond each side of the inlet structure. If more than one strip is necessary, overlap the strips. Place woven geotextile over the wire mesh.
  2. Place concrete blocks lengthwise on their sides in a single row around the perimeter of the inlet, so that the open ends face outward, not upward. The ends of adjacent blocks should abut. The height of the barrier can be varied, depending on design needs, by stacking combinations of blocks that are 4 in., 8 in., and 12 in. wide. The row of blocks should be at least 12 in. but no greater than 24 in. high.
  3. Place wire mesh over the outside vertical face (open end) of the concrete blocks to prevent stone from being washed through the blocks. Use hardware cloth or comparable wire mesh with 0.5 in. opening.
  4. Pile washed stone against the wire mesh to the top of the blocks. Use 0.75 to 3 in.

- ***DI Protection Type 5 – Temporary Geotextile Insert (proprietary)*** – Many types of temporary inserts are available. Most inserts fit underneath the grate of a drop inlet or inside of a curb inlet and are fastened to the outside of the grate or curb. These inserts are removable and many can be cleaned and reused. Installation of these inserts differs between manufacturers. Please refer to manufacturer instruction for installation of proprietary devices.

- ***DI Protection Type 6 - Biofilter bags*** – Biofilter bags may be used as a substitute for gravel bags in low-flow situations. Biofilter bags should conform to specifications detailed in SE-14, Biofilter bags.

  1. Construct in a gently sloping area.
  2. Biofilter bags should be placed around inlets to intercept runoff flows.
  3. All bag joints should overlap by 6 in.
  4. Leave room upstream for water to pond and for sediment to settle out.
  5. Stake bags to the ground as described in the following detail. Stakes may be omitted if bags are placed on a paved surface.

Costs

- Average annual cost for installation and maintenance of DI Type 1-4 and 6 (one year useful life) is $200 per inlet.

- Temporary geotextile inserts are proprietary and cost varies by region. These inserts can often be reused and may have greater than 1 year of use if maintained and kept undamaged. Average cost per insert ranges from $50-75 plus installation, but costs can exceed $100. This cost does not include maintenance.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Silt Fences. If the fabric becomes clogged, torn, or degrades, it should be replaced. Make sure the stakes are securely driven in the ground and are in good shape (i.e., not bent, cracked, or splintered, and are reasonably perpendicular to the ground). Replace damaged stakes. At a minimum, remove the sediment behind the fabric fence when accumulation reaches one-third the height of the fence or barrier height.

- Gravel Filters. If the gravel becomes clogged with sediment, it should be carefully removed from the inlet and either cleaned or replaced. Since cleaning gravel at a construction site may be difficult, consider using the sediment-laden stone as fill material and put fresh stone around the inlet. Inspect bags for holes, gashes, and snags, and replace bags as needed. Check gravel bags for proper arrangement and displacement.

- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.

- Inspect and maintain temporary geotextile insert devices according to manufacturer's specifications.

- Remove storm drain inlet protection once the drainage area is stabilized.

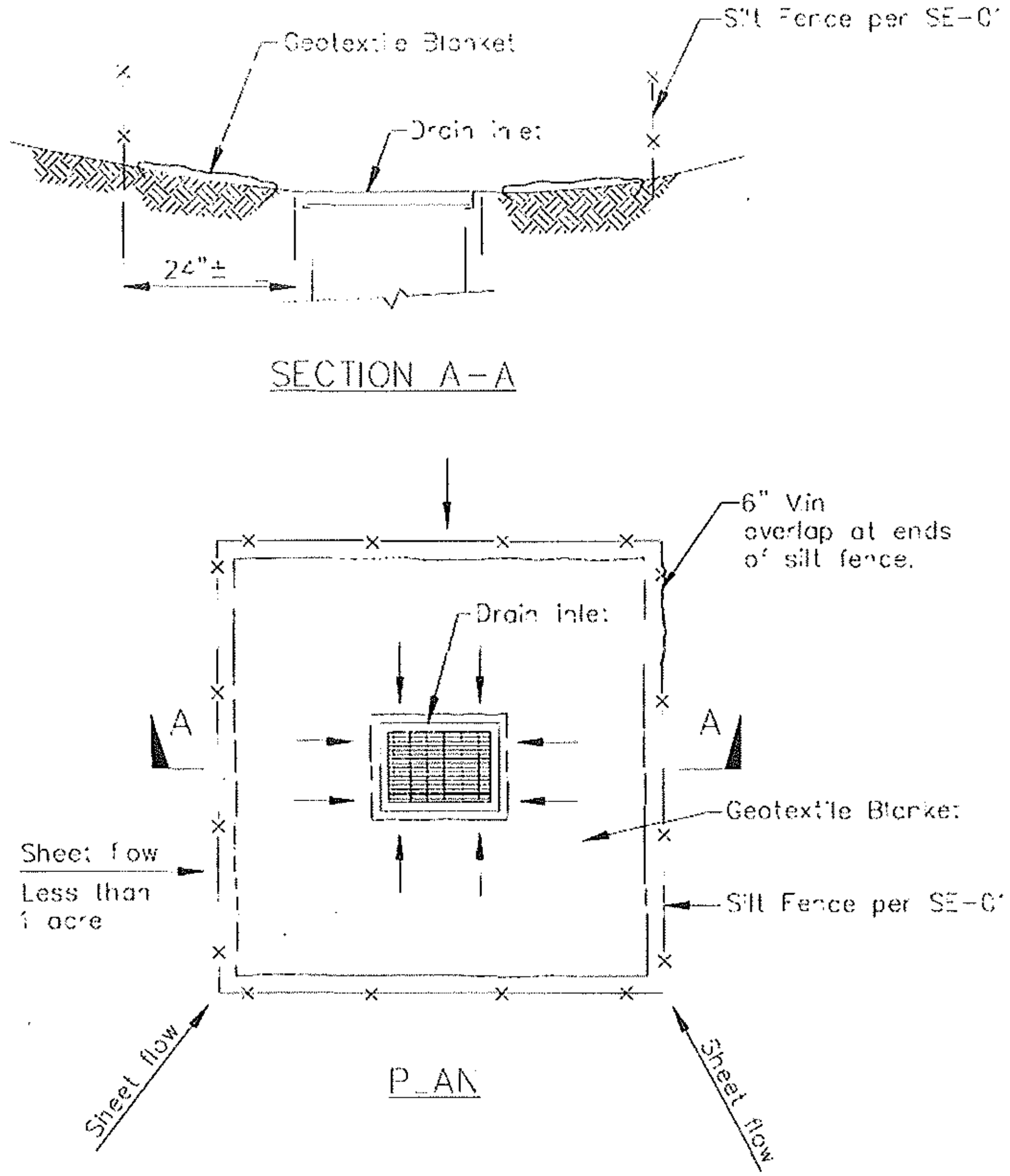
- Clean and regrade area around the inlet and clean the inside of the storm drain inlet, as it should be free of sediment and debris at the time of final inspection.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

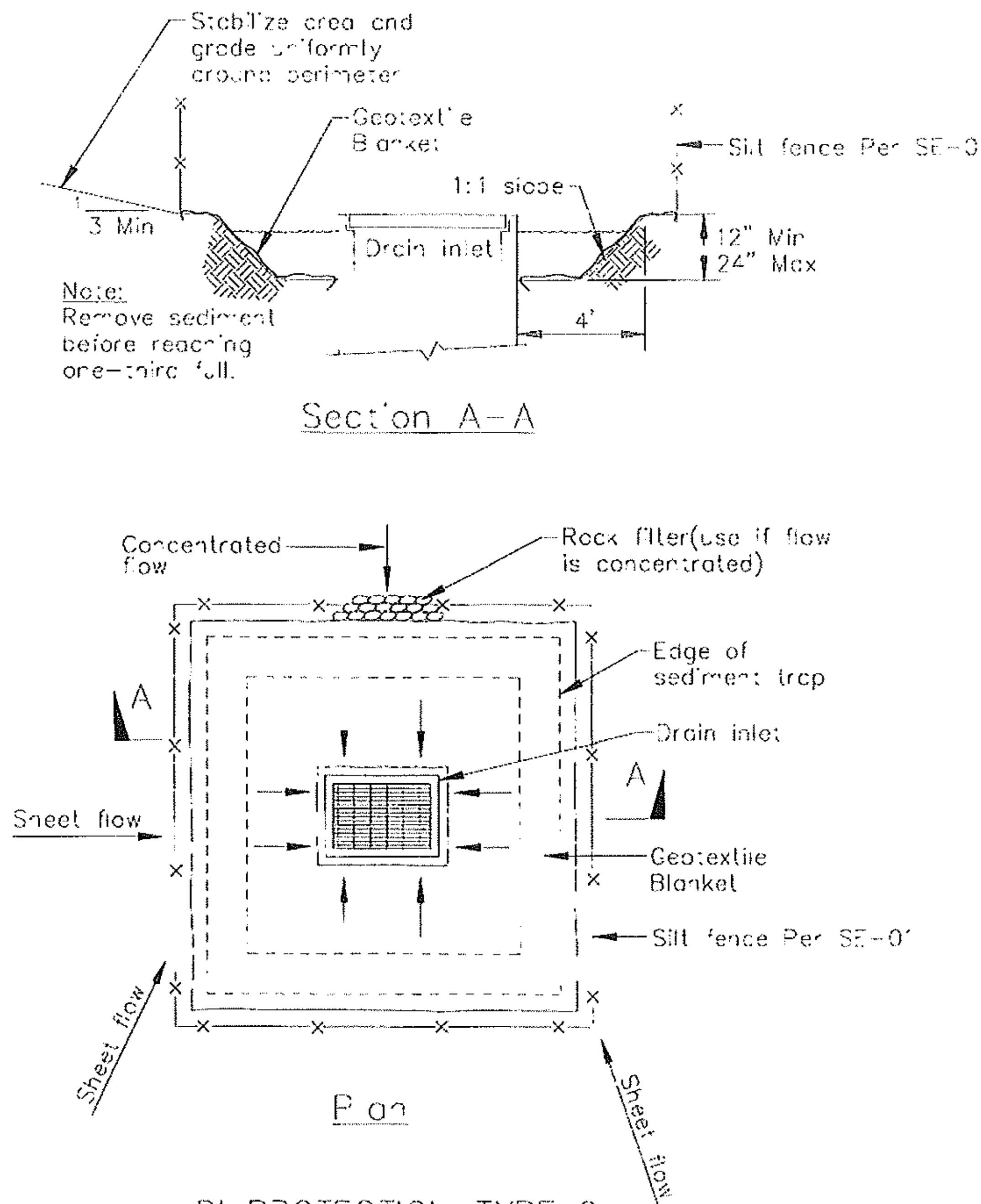
Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



DI PROTECTION TYPE 1
NOT TO SCALE

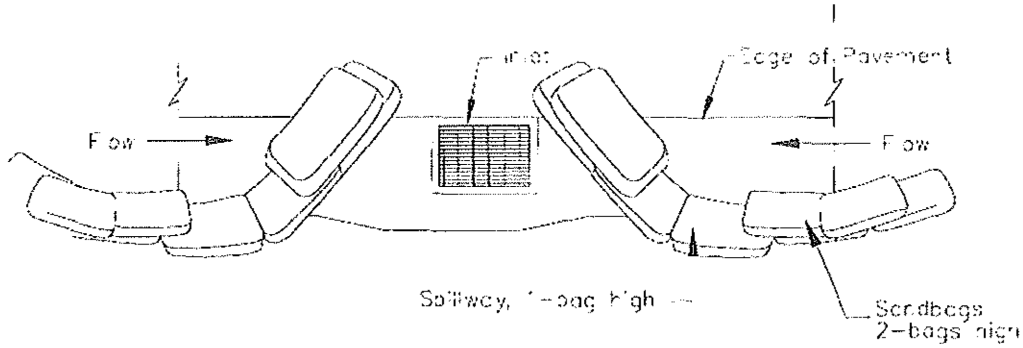
NOTES:

1. For use in areas where grading has been completed and final soil stabilization and seeding are pending.
2. Not applicable in paved areas.
3. Not applicable with concentrated flows.

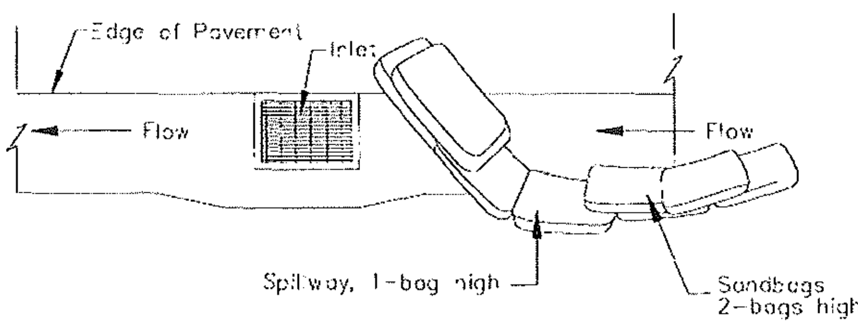


DI PROTECTION TYPE 2
NOT TO SCALE

Notes
1. For use in cleared and grubbed and in graded areas.
2. Shape basin so that longest inflow area faces longest length of trap.
3. For concentrated flows, shape basin in 2:1 ratio with length oriented towards direction of flow.



TYPICAL PROTECTION FOR INLET ON SUMP

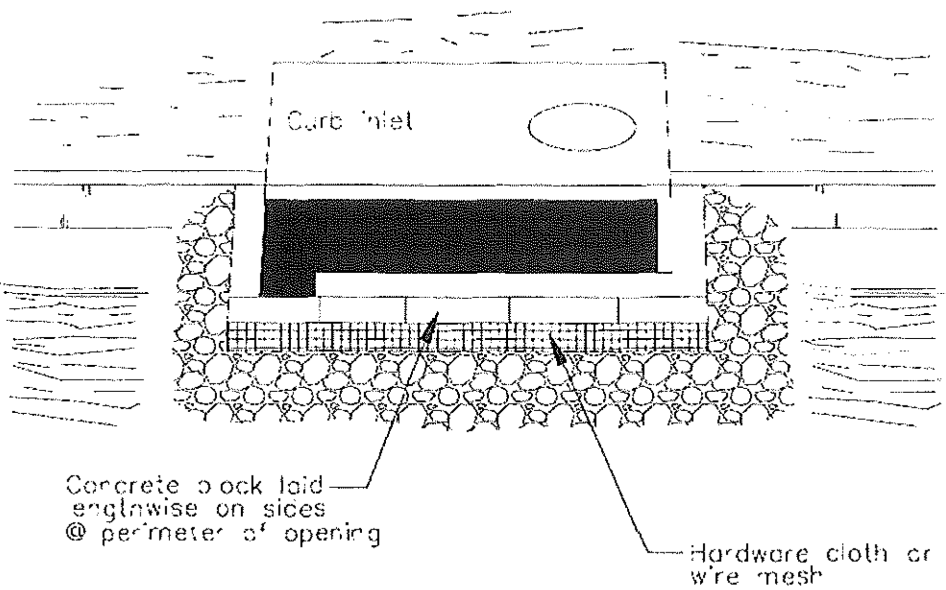


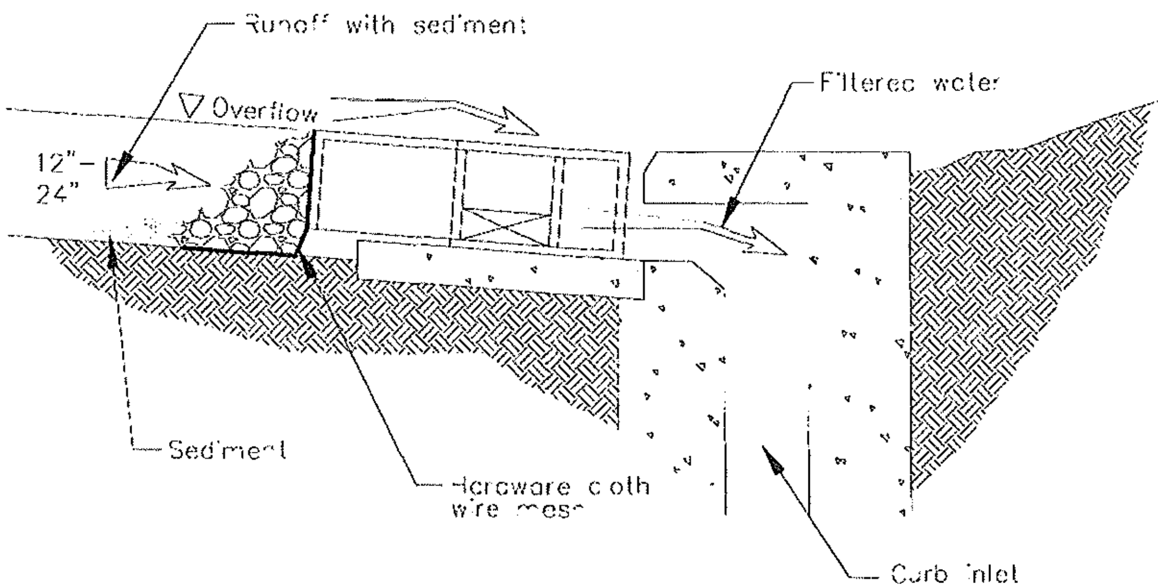
TYPICAL PROTECTION FOR INLET ON GRADE

NOTES:

1. Intended for short-term use.
2. Use to inhibit non-storm water flow.
3. Allow for proper maintenance and cleanup.
4. Bags must be removed after adjacent operation is completed
5. Not applicable in areas with high silts and clays without filter fabric.

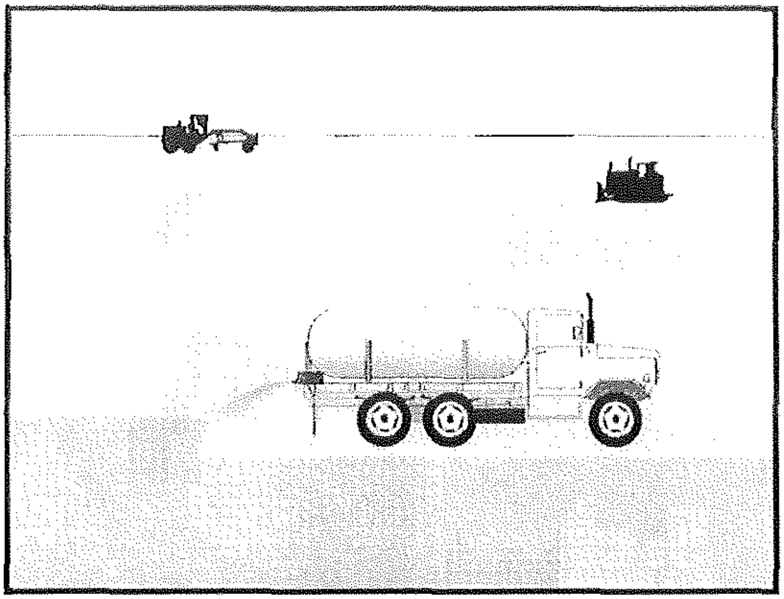
DI PROTECTION TYPE 3
NOT TO SCALE





DI PROTECTION – TYPE 4
NOT TO SCALE

Wind Erosion Control — WE-1



Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	☑
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-5 Soil Binders

Description and Purpose

Wind erosion or dust control consists of applying water or other chemical dust suppressants as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

California's Mediterranean climate, with a short "wet" season and a typically long, hot "dry" season, allows the soils to thoroughly dry out. During the dry season, construction activities are at their peak, and disturbed and exposed areas are increasingly subject to wind erosion, sediment tracking and dust generated by construction equipment. Site conditions and climate can make dust control more of an erosion problem than water based erosion. Additionally, many local agencies, including Air Quality Management Districts, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. Wind erosion control is required to be implemented at all construction sites greater than 1 acre by the General Permit.

Suitable Applications

Most BMPs that provide protection against water-based erosion will also protect against wind-based erosion and dust control requirements required by other agencies will generally meet wind erosion control requirements for water quality protection. Wind erosion control BMPs are suitable during the following construction activities:

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- Construction vehicle traffic on unpaved roads
- Drilling and blasting activities
- Soils and debris storage piles
- Batch drop from front-end loaders
- Areas with unstabilized soil
- Final grading/site stabilization

Limitations

- Watering prevents dust only for a short period (generally less than a few hours) and should be applied daily (or more often) to be effective.
- Over watering may cause erosion and track-out.
- Oil or oil-treated subgrade should not be used for dust control because the oil may migrate into drainageways and/or seep into the soil.
- Chemical dust suppression agents may have potential environmental impacts. Selected chemical dust control agents should be environmentally benign.
- Effectiveness of controls depends on soil, temperature, humidity, wind velocity and traffic.
- Chemical dust suppression agents should not be used within 100 feet of wetlands or water bodies.
- Chemically treated subgrades may make the soil water repellant, interfering with long-term infiltration and the vegetation/re-vegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents and should be handled properly.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.
- If the soil surface has minimal natural moisture, the affected area may need to be pre-wetted so that chemical dust control agents can uniformly penetrate the soil surface.

Implementation

Dust Control Practices

Dust control BMPs generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. The following table presents dust control practices that can be applied to varying site conditions that could potentially cause dust. For heavily traveled and disturbed areas, wet suppression (watering), chemical dust suppression, gravel asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers can be employed as dust control applications. Permanent or temporary vegetation and mulching can be employed for areas of occasional or no construction traffic. Preventive measures include minimizing surface areas to be disturbed, limiting onsite vehicle traffic to 15 mph or less, and controlling the number and activity of vehicles on a site at any given time.

Chemical dust suppressants include: mulch and fiber based dust palliatives (e.g. paper mulch with gypsum binder), salts and brines (e.g. calcium chloride, magnesium chloride), non-petroleum based organics (e.g. vegetable oil, lignosulfonate), petroleum based organics (e.g. asphalt emulsion, dust oils, petroleum resins), synthetic polymers (e.g. polyvinyl acetate, vinyls, acrylic), clay additives (e.g. bentonite, montimorillonite) and electrochemical products (e.g. enzymes, ionic products).

Site Condition	Dust Control Practices							
	Permanent Vegetation	Mulching	Wet Suppression (Watering)	Chemical Dust Suppression	Gravel or Asphalt	Temporary Gravel Construction Entrances/Equipment Wash Down	Synthetic Covers	Minimize Extent of Disturbed Area
Disturbed Areas not Subject to Traffic	X	X	X	X	X			X
Disturbed Areas Subject to Traffic			X	X	X	X		X
Material Stockpiles		X	X	X			X	X
Demolition			X			X	X	
Clearing/ Excavation			X	X				X
Truck Traffic on Unpaved Roads			X	X	X	X	X	
Tracking					X	X		

Additional preventive measures include:

- Schedule construction activities to minimize exposed area (see EC-1, Scheduling).
- Quickly treat exposed soils using water, mulching, chemical dust suppressants, or stone/gravel layering.
- Identify and stabilize key access points prior to commencement of construction.
- Minimize the impact of dust by anticipating the direction of prevailing winds.
- Restrict construction traffic to stabilized roadways within the project site, as practicable.
- Water should be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution.
- All distribution equipment should be equipped with a positive means of shutoff.
- Unless water is applied by means of pipelines, at least one mobile unit should be available at all times to apply water or dust palliative to the project.
- If reclaimed waste water is used, the sources and discharge must meet California Department of Health Services water reclamation criteria and the Regional Water Quality

Control Board (RWQCB) requirements. Non-potable water should not be conveyed in tanks or drain pipes that will be used to convey potable water and there should be no connection between potable and non-potable supplies. Non-potable tanks, pipes, and other conveyances should be marked, "NON-POTABLE WATER - DO NOT DRINK."

- Pave or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.
- Provide covers for haul trucks transporting materials that contribute to dust.
- Provide for rapid clean up of sediments deposited on paved roads. Furnish stabilized construction road entrances and wheel wash areas.
- Stabilize inactive areas of construction sites using temporary vegetation or chemical stabilization methods.

For chemical stabilization, there are many products available for chemically stabilizing gravel roadways and stockpiles. If chemical stabilization is used, the chemicals should not create any adverse effects on stormwater, plant life, or groundwater and should meet all applicable regulatory requirements.

Costs

Installation costs for water and chemical dust suppression vary based on the method used and the length of effectiveness. Annual costs may be high since some of these measures are effective for only a few hours to a few days.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check areas protected to ensure coverage.
- Most water-based dust control measures require frequent application, often daily or even multiple times per day. Obtain vendor or independent information on longevity of chemical dust suppressants.

References

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

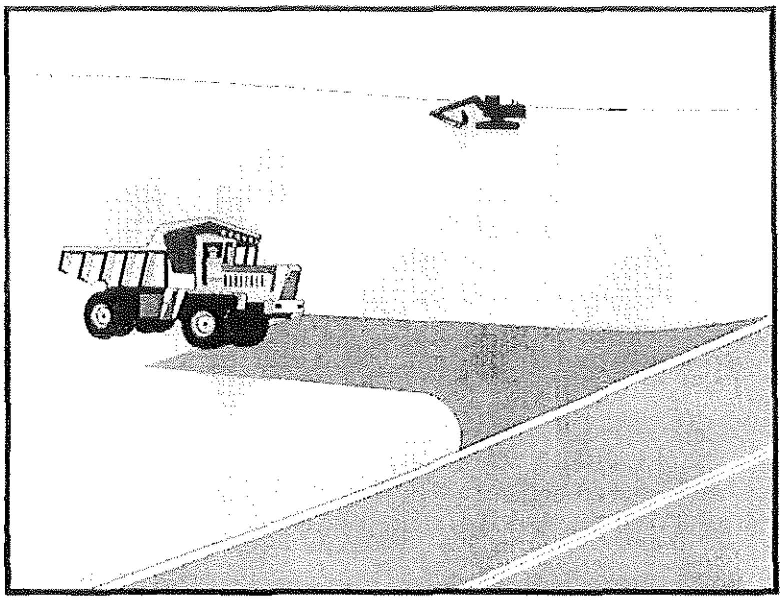
California Air Pollution Control Laws, California Air Resources Board, updated annually.

Construction Manual, Chapter 4, Section 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative", California Department of Transportation (Caltrans), July 2001.

Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide, California Air Resources Board, April 1991.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stabilized Construction Entrance/Exit TC-1



Categories

EC	Erosion Control	☒
SE	Sediment Control	☒
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WE	Wind Erosion Control	
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WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

CASQA

CALIFORNIA STORMWATER

Description and Purpose

A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

Suitable Applications

Use at construction sites:

- Where dirt or mud can be tracked onto public roads.
- Adjacent to water bodies.
- Where poor soils are encountered.
- Where dust is a problem during dry weather conditions.

Limitations

- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct and when a wash rack is included, a sediment trap of some kind must also be provided to collect wash water

runoff.

Implementation

General

A stabilized construction entrance is a pad of aggregate underlain with filter cloth located at any point where traffic will be entering or leaving a construction site to or from a public right of way, street, alley, sidewalk, or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights of way or streets. Reducing tracking of sediments and other pollutants onto paved roads helps prevent deposition of sediments into local storm drains and production of airborne dust.

Where traffic will be entering or leaving the construction site, a stabilized construction entrance should be used. NPDES permits require that appropriate measures be implemented to prevent tracking of sediments onto paved roadways, where a significant source of sediments is derived from mud and dirt carried out from unpaved roads and construction sites.

Stabilized construction entrances are moderately effective in removing sediment from equipment leaving a construction site. The entrance should be built on level ground. Advantages of the Stabilized Construction Entrance/Exit is that it does remove some sediment from equipment and serves to channel construction traffic in and out of the site at specified locations. Efficiency is greatly increased when a washing rack is included as part of a stabilized construction entrance/exit.

Design and Layout

- Construct on level ground where possible.
- Select 3 to 6 in. diameter stones.
- Use minimum depth of stones of 12 in. or as recommended by soils engineer.
- Construct length of 50 ft minimum, and 30 ft minimum width.
- Rumble racks constructed of steel panels with ridges and installed in the stabilized entrance/exit will help remove additional sediment and to keep adjacent streets clean.
- Provide ample turning radii as part of the entrance.
- Limit the points of entrance/exit to the construction site.
- Limit speed of vehicles to control dust.
- Properly grade each construction entrance/exit to prevent runoff from leaving the construction site.
- Route runoff from stabilized entrances/exits through a sediment trapping device before discharge.
- Design stabilized entrance/exit to support heaviest vehicles and equipment that will use it.

- Select construction access stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions. Do not use asphalt concrete (AC) grindings for stabilized construction access/roadway.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth, or place aggregate to a depth recommended by a geotechnical engineer. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.
- Designate combination or single purpose entrances and exits to the construction site.
- Require that all employees, subcontractors, and suppliers utilize the stabilized construction access.
- Implement SE-7, Street Sweeping and Vacuuming, as needed.
- All exit locations intended to be used for more than a two-week period should have stabilized construction entrance/exit BMPs.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMPs are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect local roads adjacent to the site daily. Sweep or vacuum to remove visible accumulated sediment.
- Remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment.
- Keep all temporary roadway ditches clear.
- Check for damage and repair as needed.
- Replace gravel material when surface voids are visible.
- Remove all sediment deposited on paved roadways within 24 hours.
- Remove gravel and filter fabric at completion of construction

Costs

Average annual cost for installation and maintenance may vary from $1,200 to $4,800 each, averaging $2,400 per entrance. Costs will increase with addition of washing rack, and sediment trap. With wash rack, costs range from $1,200 - $6,000 each, averaging $3,600 per entrance.

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, USEPA Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April 1992.

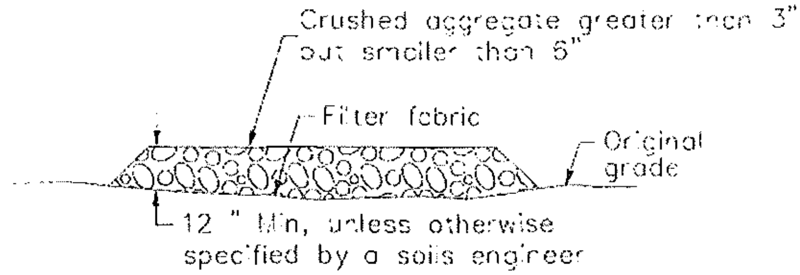
Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

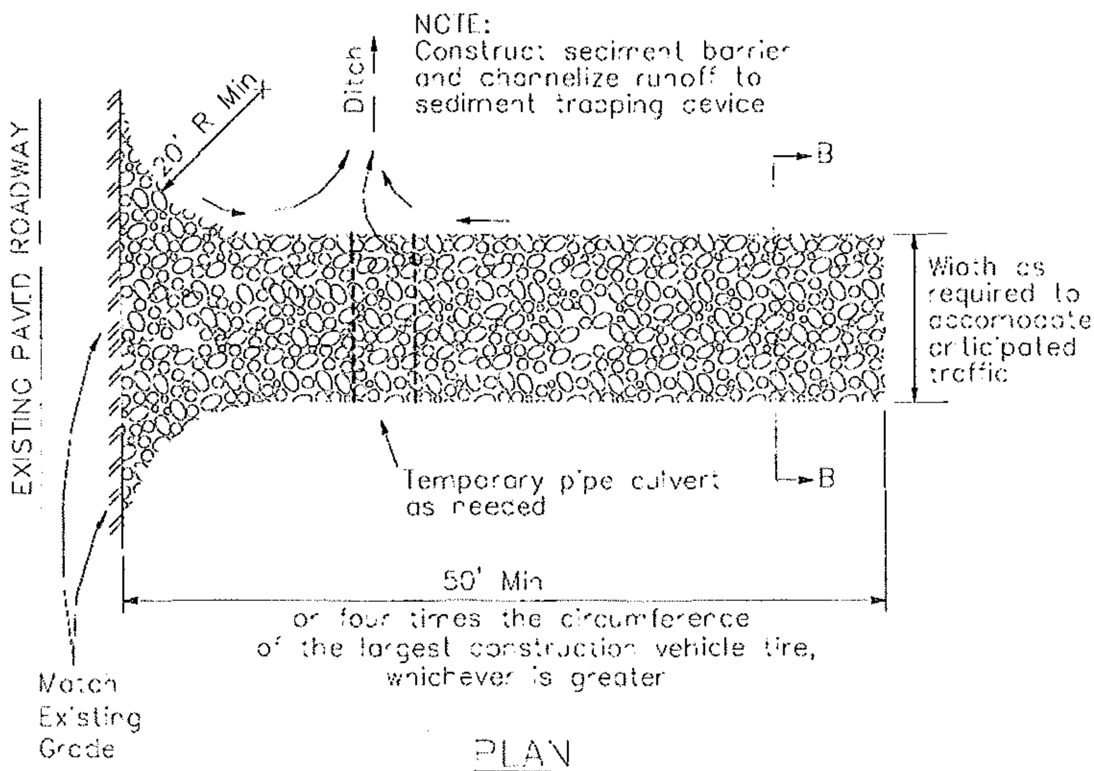
Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

Guidance Specifying Management Measures for Nonpoint Pollution in Coastal Waters, EPA 840-B-9-002, USEPA, Office of Water, Washington, DC, 1993.

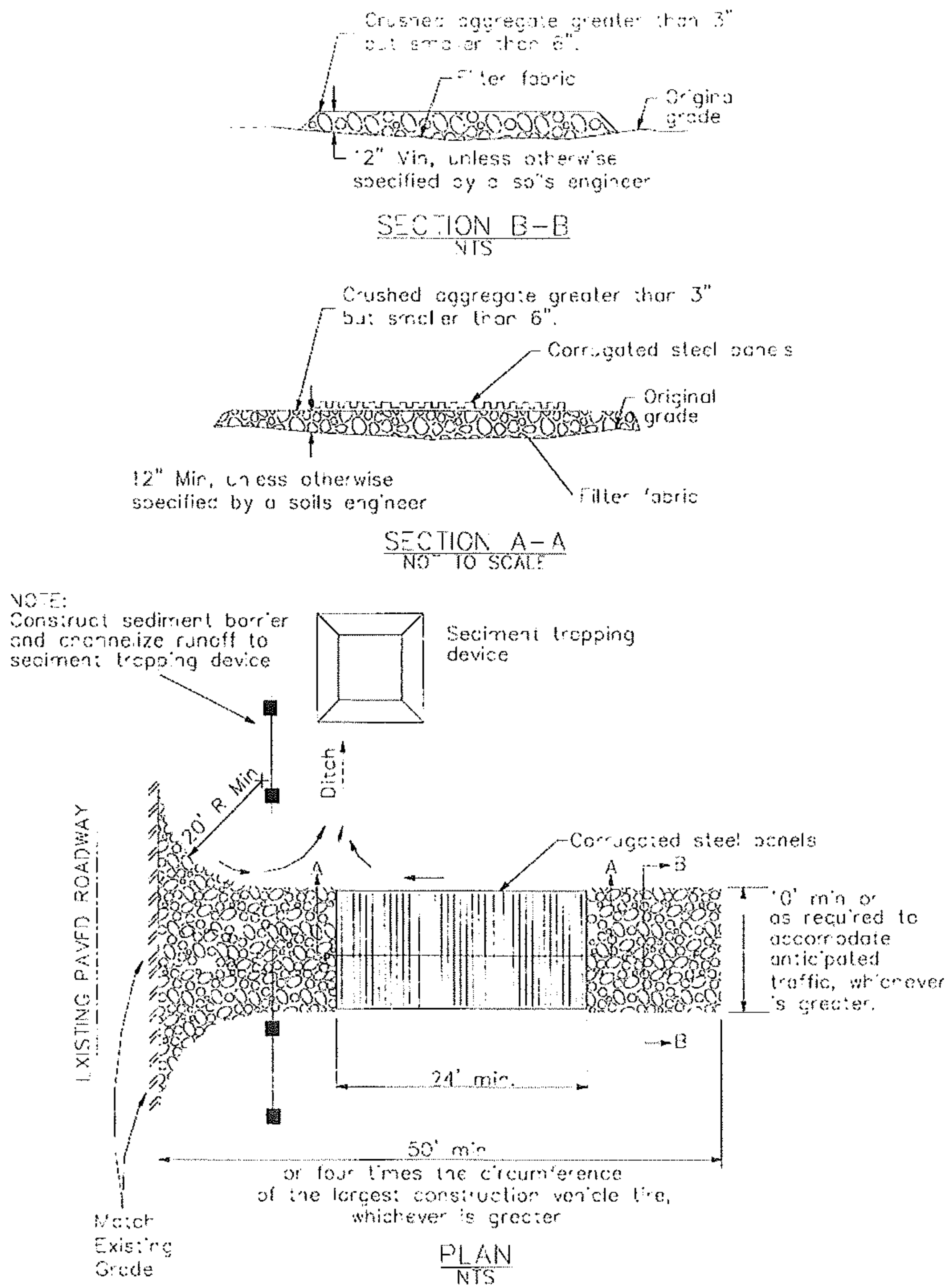
Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.



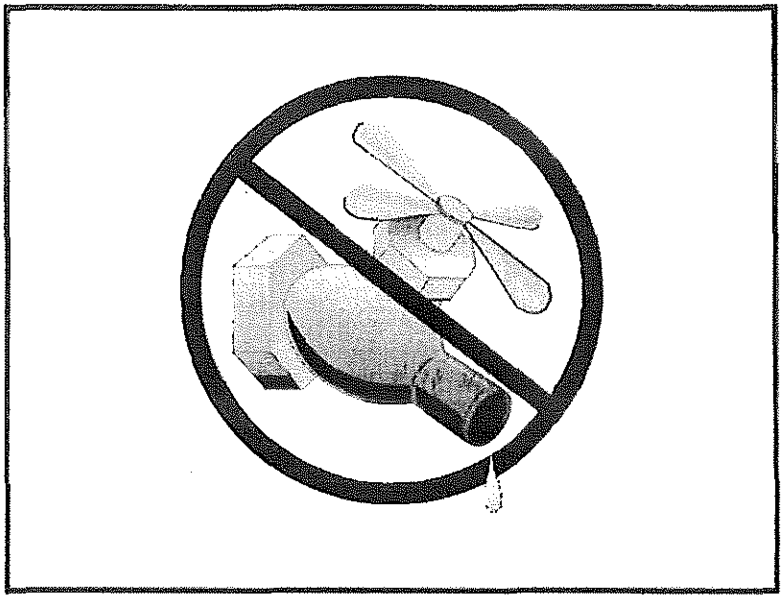
SECTION B-B
NTS



PLAN
NTS


Crushed aggregate greater than 3" but smaller than 6".
Filter fabric
Original grade
12" Min, unless otherwise specified by a soils engineer
SECTION B-B
NTS
Crushed aggregate greater than 3" but smaller than 6".
Corrugated steel panels
Original grade
12" Min, unless otherwise specified by a soils engineer
Filter fabric
SECTION A-A
NOT TO SCALE
NOTE:
Construct sediment barrier and channelize runoff to sediment trapping device
Sediment trapping device
Ditch
20' R Min
EXISTING PAVED ROADWAY
Corrugated steel panels
A
A
B
B
10' min or as required to accomodate anticipated traffic, whichever is greater.
24' min.
50' min or four times the circumference of the largest construction vehicle tire, whichever is greater
Match Existing Grade
PLAN
NTS

Water Conservation Practices NS-1



Categories

EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

Suitable Applications

Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

Limitations

- None identified.

Implementation

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.
- Direct construction water runoff to areas where it can soak

into the ground or be collected and reused.

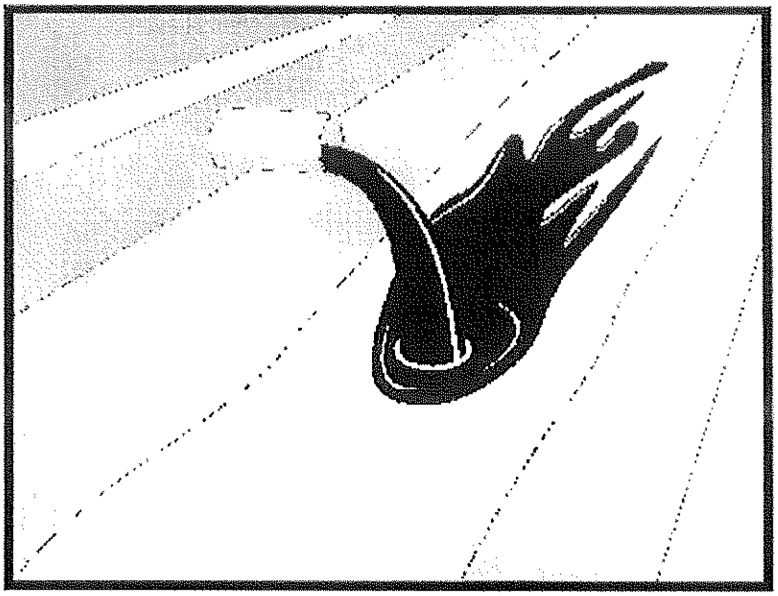
- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.
- Lock water tank valves to prevent unauthorized use.

Costs
The cost is small to none compared to the benefits of conserving water.

Inspection and Maintenance
- Inspect and verify that activity based BMPs are in place prior to the commencement of authorized non-stormwater discharges.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges are occuring.
- Repair water equipment as needed to prevent unintended discharges.
  - Water trucks
  - Water reservoirs (water buffalos)
  - Irrigation systems
  - Hydrant connections

References
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Illicit Connection/Discharge NS-6



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Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered or illegally dumped material is found on the construction site.

Limitations

Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the contractor. If pre-existing hazardous materials or wastes are known to exist onsite, they should be identified in the SWPPP and handled as set forth in the SWPPP.

Implementation

Planning

- Review the SWPPP. Pre-existing areas of contamination should be identified and documented in the SWPPP.
- Inspect site before beginning the job for evidence of illicit connections, illegal dumping or discharges. Document any pre-existing conditions and notify the owner.
- Inspect site regularly during project execution for evidence

of illicit connections, illegal dumping or discharges.

- Observe site perimeter for evidence for potential of illicitly discharged or illegally dumped material, which may enter the job site.

Identification of Illicit Connections and Illegal Dumping or Discharges

- **General** – unlabeled and unidentifiable material should be treated as hazardous.
- **Solids** - Look for debris, or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- **Liquids** - signs of illegal liquid dumping or discharge can include:
  - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Abnormal water flow during the dry weather season
- **Urban Areas** - Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
  - Abnormal water flow during the dry weather season
  - Unusual flows in sub drain systems used for dewatering
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Excessive sediment deposits, particularly adjacent to or near active offsite construction projects
- **Rural Areas** - Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit discharge can include:
  - Abnormal water flow during the non-irrigation season
  - Non-standard junction structures
  - Broken concrete or other disturbances at or near junction structures

Reporting

Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery. For illicit connections or discharges to the storm drain system, notify the local stormwater management agency. For illegal dumping, notify the local law enforcement agency.

Cleanup and Removal

The responsibility for cleanup and removal of illicit or illegal dumping or discharges will vary by location. Contact the local stormwater management agency for further information.

Costs

Costs to look for and report illicit connections and illegal discharges and dumping are low. The best way to avoid costs associated with illicit connections and illegal discharges and dumping is to keep the project perimeters secure to prevent access to the site, to observe the site for vehicles that should not be there, and to document any waste or hazardous materials that exist onsite before taking possession of the site.

Inspection and Maintenance

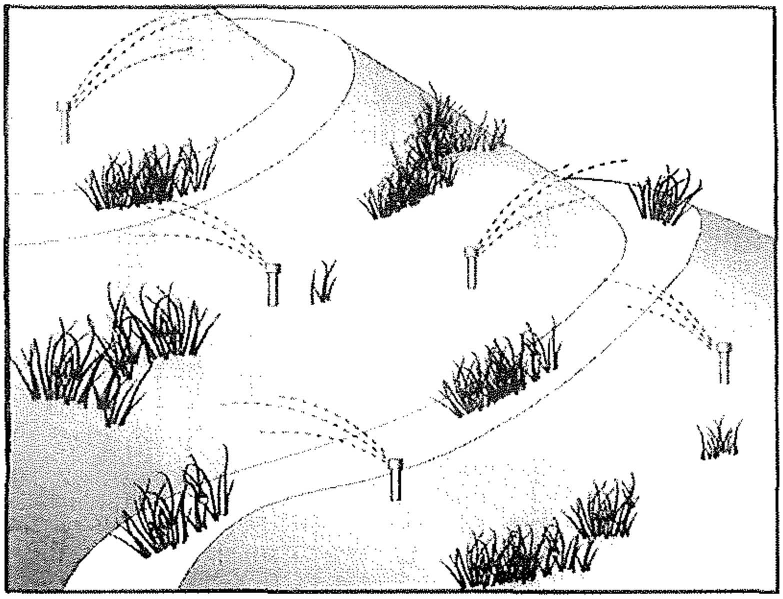
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect the site regularly to check for any illegal dumping or discharge.
- Prohibit employees and subcontractors from disposing of non-job related debris or materials at the construction site.
- Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Potable Water/Irrigation consists of practices and procedures to manage the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, lawn or garden watering, planned and unplanned discharges from potable water sources, water line flushing, and hydrant flushing.

Suitable Applications

Implement this BMP whenever potable water or irrigation water discharges occur at or enter a construction site.

Limitations

None identified.

Implementation

- Direct water from offsite sources around or through a construction site, where feasible, in a way that minimizes contact with the construction site.
- Discharges from water line flushing should be reused for landscaping purposes where feasible.
- Shut off the water source to broken lines, sprinklers, or valves as soon as possible to prevent excess water flow.
- Protect downstream stormwater drainage systems and watercourses from water pumped or bailed from trenches excavated to repair water lines.
- Inspect irrigated areas within the construction limits for

excess watering. Adjust watering times and schedules to ensure that the appropriate amount of water is being used and to minimize runoff. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.

Costs

Cost to manage potable water and irrigation are low and generally considered to be a normal part of related activities.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Repair broken water lines as soon as possible.
- Inspect irrigated areas regularly for signs of erosion and/or discharge.

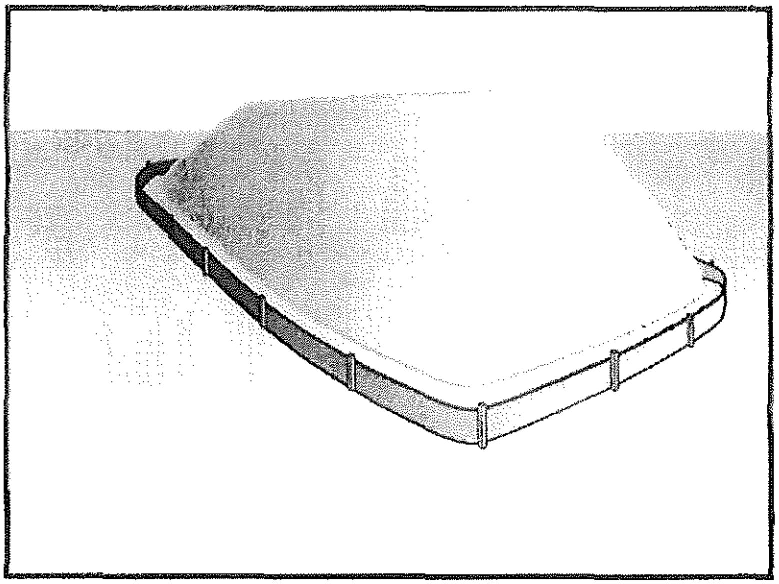
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Stockpile Management WM-3



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called "cold mix" asphalt), and pressure treated wood.

Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of Plastic materials and photodegradable plastics should be avoided.

Implementation

Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

- On larger sites, a minimum of 50 ft separation from concentrated flows of stormwater, drainage courses, and inlets is recommended.

- All stockpiles are required to be protected immediately if they are not scheduled to be used within 14 days.

- Protect all stockpiles from stormwater runon using temporary perimeter sediment barriers such as compost berms (SE-13), temporary silt dikes (SE-12), fiber rolls (SE-5), silt fences (SE-1), sandbags (SE-8), gravel bags (SE-6), or biofilter bags (SE-14). Refer to the individual fact sheet for each of these controls for installation information.

- Implement wind erosion control practices as appropriate on all stockpiled material. For specific information, see WE-1, Wind Erosion Control.

- Manage stockpiles of contaminated soil in accordance with WM-7, Contaminated Soil Management.

- Place bagged materials on pallets and under cover.

- Ensure that stockpile coverings are installed securely to protect from wind and rain.

- Some plastic covers withstand weather and sunlight better than others. Select cover materials or methods based on anticipated duration of use.

Protection of Non-Active Stockpiles

Non-active stockpiles of the identified materials should be protected further as follows:

Soil stockpiles

- Soil stockpiles should be covered or protected with soil stabilization measures and a temporary perimeter sediment barrier at all times.

- Temporary vegetation should be considered for topsoil piles that will be stockpiled for extended periods.

Stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate sub base

- Stockpiles should be covered and protected with a temporary perimeter sediment barrier at all times.

Stockpiles of "cold mix"

- Cold mix stockpiles should be placed on and covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Stockpiles of fly ash, stucco, hydrated lime

- Stockpiles of materials that may raise the pH of runoff (i.e., basic materials) should be covered with plastic and surrounded by a berm.

Stockpiles/Storage of wood (Pressure treated with chromated copper arsenate or ammoniacal copper zinc arsenate

- Treated wood should be covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Protection of Active Stockpiles

Active stockpiles of the identified materials should be protected as follows:

- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.

- Stockpiles of "cold mix" and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to the onset of precipitation.

- The downstream perimeter of an active stockpile should be protected with a linear sediment barrier or berm and runoff should be diverted around or away from the stockpile on the upstream perimeter.

Costs

For cost information associated with stockpile protection refer to the individual erosion or sediment control BMP fact sheet considered for implementation (For example, refer to SE-1 Silt Fence for installation of silt fence around the perimeter of a stockpile.)

Inspection and Maintenance

- Stockpiles must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- It may be necessary to inspect stockpiles covered with plastic sheeting more frequently during certain conditions (for example, high winds or extreme heat).

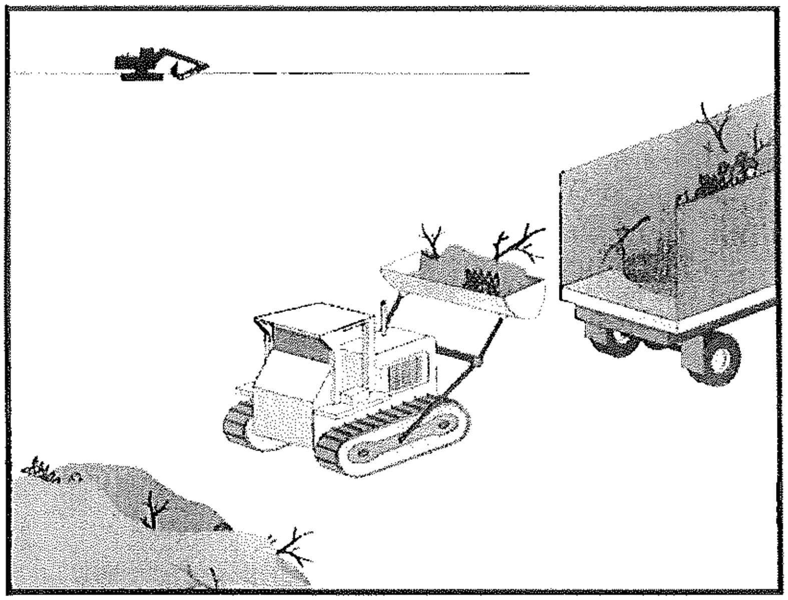
- Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.

- Sediment shall be removed when it reaches one-third of the barrier height.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Solid Waste Management **WM-5**



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for construction sites where the following wastes are generated or stored:

- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction
- Packaging materials including wood, paper, and plastic
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces and masonry products
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes
- Construction wastes including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials
- Highway planting wastes, including vegetative material,

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CALIFORNIA STORMWATER

plant containers, and packaging materials

Limitations

Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season or in desert areas with low rainfall.

Implementation

The following steps will help keep a clean site and reduce stormwater pollution:

- Select designated waste collection areas onsite.
- Inform trash-hauling contractors that you will accept only watertight dumpsters for onsite use. Inspect dumpsters for leaks and repair any dumpster that is not watertight.
- Locate containers in a covered area or in a secondary containment.
- Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it is windy.
- Plan for additional containers and more frequent pickup during the demolition phase of construction.
- Collect site trash daily, especially during rainy and windy conditions.
- Remove this solid waste promptly since erosion and sediment control devices tend to collect litter.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor.
- Arrange for regular waste collection before containers overflow.
- Clean up immediately if a container does spill.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.

Education

- Have the contractor's superintendent or representative oversee and enforce proper solid waste management procedures and practices.
- Instruct employees and subcontractors on identification of solid waste and hazardous waste.
- Educate employees and subcontractors on solid waste storage and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).

- Require that employees and subcontractors follow solid waste handling and storage procedures.
- Prohibit littering by employees, subcontractors, and visitors.
- Minimize production of solid waste materials wherever possible.

Collection, Storage, and Disposal

- Littering on the project site should be prohibited.
- To prevent clogging of the storm drainage system, litter and debris removal from drainage grates, trash racks, and ditch lines should be a priority.
- Trash receptacles should be provided in the contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
- Litter from work areas within the construction limits of the project site should be collected and placed in watertight dumpsters at least weekly, regardless of whether the litter was generated by the contractor, the public, or others. Collected litter and debris should not be placed in or next to drain inlets, stormwater drainage systems, or watercourses.
- Dumpsters of sufficient size and number should be provided to contain the solid waste generated by the project.
- Full dumpsters should be removed from the project site and the contents should be disposed of by the trash hauling contractor.
- Construction debris and waste should be removed from the site biweekly or more frequently as needed.
- Construction material visible to the public should be stored or stacked in an orderly manner.
- Stormwater runon should be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces.
- Solid waste storage areas should be located at least 50 ft from drainage facilities and watercourses and should not be located in areas prone to flooding or ponding.
- Except during fair weather, construction and highway planting waste not stored in watertight dumpsters should be securely covered from wind and rain by covering the waste with tarps or plastic.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- For disposal of hazardous waste, see WM-6, Hazardous Waste Management. Have hazardous waste hauled to an appropriate disposal and/or recycling facility.

- Salvage or recycle useful vegetation debris, packaging and surplus building materials when practical. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas. Wood pallets, cardboard boxes, and construction scraps can also be recycled.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.

- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur

- Inspect construction waste area regularly.

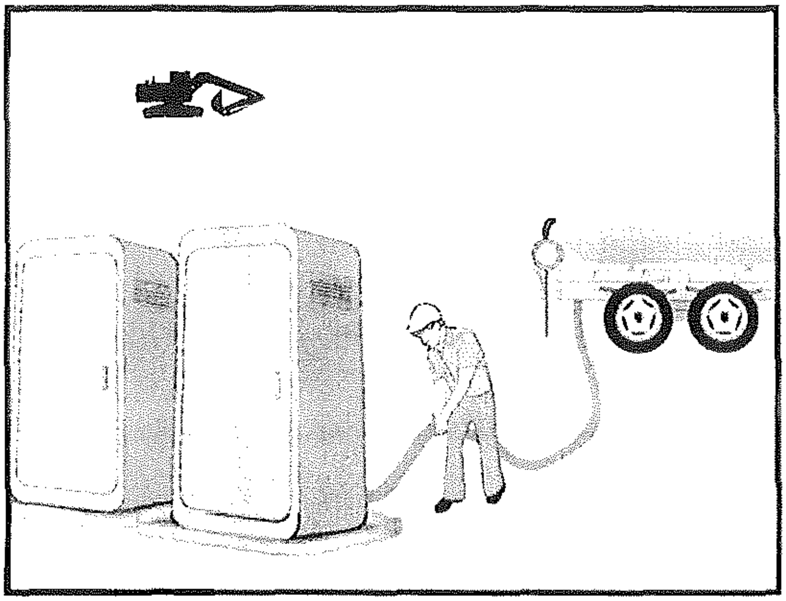
- Arrange for regular waste collection.

References

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



Categories

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TC	Tracking Control	
WE	Wind Erosion Control	
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WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	☑
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

Suitable Applications

Sanitary septic waste management practices are suitable for use at all construction sites that use temporary or portable sanitary and septic waste systems.

Limitations

None identified.

Implementation

Sanitary or septic wastes should be treated or disposed of in accordance with state and local requirements. In many cases, one contract with a local facility supplier will be all that it takes to make sure sanitary wastes are properly disposed.

Storage and Disposal Procedures

- Temporary sanitary facilities should be located away from drainage facilities, watercourses, and from traffic circulation. If site conditions allow, place portable facilities a minimum of 50 feet from drainage conveyances and traffic areas. When subjected to high winds or risk of high winds, temporary sanitary facilities should be secured to prevent overturning.

- Temporary sanitary facilities must be equipped with containment to prevent discharge of pollutants to the stormwater drainage system of the receiving water.
- Consider safety as well as environmental implications before placing temporary sanitary facilities.
- Wastewater should not be discharged or buried within the project site.
- Sanitary and septic systems that discharge directly into sanitary sewer systems, where permissible, should comply with the local health agency, city, county, and sewer district requirements.
- Only reputable, licensed sanitary and septic waste haulers should be used.
- Sanitary facilities should be located in a convenient location.
- Temporary septic systems should treat wastes to appropriate levels before discharging.
- If using an onsite disposal system (OSDS), such as a septic system, local health agency requirements must be followed.
- Temporary sanitary facilities that discharge to the sanitary sewer system should be properly connected to avoid illicit discharges.
- Sanitary and septic facilities should be maintained in good working order by a licensed service.
- Regular waste collection by a licensed hauler should be arranged before facilities overflow.
- If a spill does occur from a temporary sanitary facility, follow federal, state and local regulations for containment and clean-up.

Education

- Educate employees, subcontractors, and suppliers on sanitary and septic waste storage and disposal procedures.
- Educate employees, subcontractors, and suppliers of potential dangers to humans and the environment from sanitary and septic wastes.
- Instruct employees, subcontractors, and suppliers in identification of sanitary and septic waste.
- Hold regular meetings to discuss and reinforce the use of sanitary facilities (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Arrange for regular waste collection.

- If high winds are expected, portable sanitary facilities must be secured with spikes or weighed down to prevent over turning.

- If spills or leaks from sanitary or septic facilities occur that are not contained and discharge from the site, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

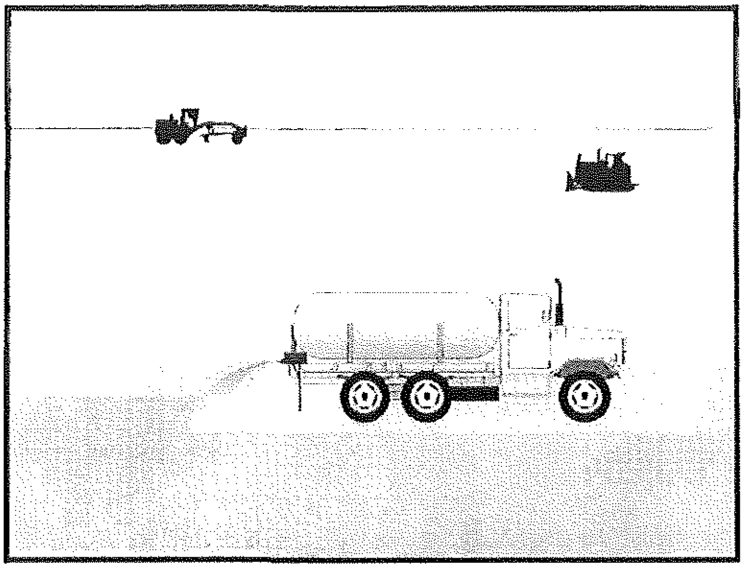
References

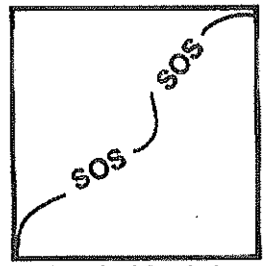
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Soil Binders

SS-5





Standard Symbol

BMP Objectives

- ● Soil Stabilization
- ○ Sediment Control
- ○ Tracking Control
- ● Wind Erosion Control
- ○ Non-Storm Water Management
- ○ Materials and Waste Management

Definition and Purpose

Soil binders consist of applying and maintaining a soil stabilizer to exposed soil surfaces. Soil binders are materials applied to the soil surface to temporarily prevent water-induced erosion of exposed soils on construction sites. Soil binders also provide temporary dust, wind, and soil stabilization (erosion control) benefits. This is one of five temporary soil stabilization alternatives to consider.

Appropriate Applications

Soil binders are typically applied to disturbed areas requiring short-term temporary protection. Because soil binders can often be incorporated into the work, they may be a good choice for areas where grading activities will soon resume. Application on stockpiles to prevent water and wind erosion.

Limitations

- Soil binders are temporary in nature and may need reapplication.
- Soil binders require a minimum curing time until fully effective, as prescribed by the manufacturer, which may be 24 hours or longer. Soil binders may need reapplication after a storm event.
- Soil binders will generally experience spot failures during heavy rainfall events. If runoff penetrates the soil at the top of a slope treated with a soil binder, it is likely that the runoff will undercut the stabilized soil layer and discharge at a point further down slope.
- Soil binders do not hold up to pedestrian or vehicular traffic across treated areas.
- Soil binders may not penetrate soil surfaces made up primarily of silt and clay, particularly when compacted.
- Storm water quality runoff sampling is required for many soil binders. Soil binders that do not require sampling are identified in the Caltrans SWPPP/WPCP Preparation Manual, Pollutant Table, Attachment S.

- Some soil binders may not perform well with low relative humidity. Under rainy conditions, some agents may become slippery or leach out of the soil.
- May not cure if low temperatures occur within 24 hours of application.

Standards and Specifications

General Considerations

- Site-specific soil types will dictate appropriate soil binders to be used.
- A soil binder must be environmentally benign (non-toxic to plant and animal life), easy to apply, easy to maintain, economical, and shall not stain paved or painted surfaces, refer to Standard Specifications Section 20-2.11.
- Some soil binders are compatible with existing vegetation.
- Performance of soil binders depends on temperature, humidity, and traffic across treated areas.
- Avoid over-spray onto the traveled way, sidewalks, lined drainage channels, and existing vegetation.

Soil Binders Applications

After selecting an appropriate soil binder, the untreated soil surface must be prepared before applying the soil binder. The untreated soil surface must contain sufficient moisture to assist the agent in achieving uniform distribution. In general, the following steps shall be followed:

- Follow manufacturer's recommendations for application rates, pre-wetting of application area, and cleaning of equipment after use.
- Prior to application, roughen embankment and fill areas by rolling with a crimping or punching type roller or by track walking. Track walking shall only be used where rolling is impractical.
- Consider the drying time for the selected soil binder and apply with sufficient time before anticipated rainfall. Soil binders shall not be applied during or immediately before rainfall.
- Avoid over-spray onto the traveled way, sidewalks, lined drainage channels, sound walls, and existing vegetation.
- Soil binders shall not be applied to frozen soil, areas with standing water, under freezing or rainy conditions, or when the air temperature is below 4oC (40oF) during the curing period.
- More than one treatment is often necessary, although the second treatment may be diluted or have a lower application rate.
- Generally, soil binders require a minimum curing time of 24 hours before they are fully effective. Refer to manufacturer's instructions for specific cure times.

- For liquid agents:
  - Crown or slope ground to avoid ponding.
  - Uniformly pre-wet ground at 0.14 to 1.4 L/m^2 (0.03 to 0.3 gal/yd^2) or according to manufacturer's recommendations.
  - Apply solution under pressure. Overlap solution 150 to 300 mm (6 to 12 in).
  - Allow treated area to cure for the time recommended by the manufacturer; typically, at least 24 hours.
  - In low humidities, reactivate chemicals by re-wetting with water at 0.5 to 0.9 L/m^2 (0.1 to 0.2 gal/yd^2).

Selecting a Soil Binder

Properties of common soil binders used for erosion control are provided in Table 1 and Appendix B. Use Table 1 to select an appropriate soil binder.

Factors to consider when selecting a soil binder include the following:

- Suitability to situation - Consider where the soil binder will be applied; determine if it needs a high resistance to leaching or abrasion, and whether it needs to be compatible with any existing vegetation. Determine the length of time soil stabilization will be needed, and if the soil binder will be placed in an area where it will degrade rapidly. In general, slope steepness is not a discriminating factor for the listed soil binders.
- Soil types and surface materials - Fines and moisture content are key properties of surface materials. Consider a soil binder's ability to penetrate, likelihood of leaching, and ability to form a surface crust on the surface materials.
- Frequency of application - The frequency of application can be affected by subgrade conditions, surface type, climate, and maintenance schedule. Frequent applications could lead to high costs. Application frequency may be minimized if the soil binder has good penetration, low evaporation, and good longevity. Consider also that frequent application will require frequent equipment clean-up.

After considering the above factors, the soil binders in Table 1 will be generally appropriate as follows:

Plant-Material Based (Short Lived)

-*Guar:* Guar is a non-toxic, biodegradable, natural galactomannan-based hydrocolloid treated with dispersent agents for easy field mixing. It shall be diluted at the rate of 1.2 to 1.8 kg per 1,000 liters (1 to 5 lb per 100 gallons) of water, depending on application machine capacity. Recommended minimum application rates are as follows:

Application Rates for Guar Soil Stabilizer

Slope (V:H):	Flat	1:4	1:3	1:2	1:1
Kg/Ha:	45	50	56	67	78
lb/ac	40	45	50	60	70

-*Psyllium:* Psyllium is composed of the finely ground muciloid coating of plantago seeds that is applied as a dry powder or in a wet slurry to the surface of the soil. It dries to form a firm but rewettable membrane that binds soil particles together but permits germination and growth of seed. Psyllium requires 12 to 18 hours drying time. Psyllium shall be applied at a rate of 90 to 225 kg/ha (80 to 200 lb/ac), with enough water in solution to allow for a uniform slurry flow.

-*Starch:* Starch is non-ionic, cold-water soluble (pre-gelatinized) granular cornstarch. The material is mixed with water and applied at the rate of 170 kg/ha (150 lb/ac). Approximate drying time is 9 to 12 hours.

Plant-Material Based (Long Lived)

-*Pitch and Rosin Emulsion:* Generally, a non-ionic pitch and rosin emulsion has a minimum solids content of 48%. The rosin shall be a minimum of 26% of the total solids content. The soil stabilizer shall be non-corrosive, water-dilutable emulsion that upon application cures to a water insoluble binding and cementing agent. For soil erosion control applications, the emulsion is diluted and shall be applied as follows:

For clayey soil: 5 parts water to 1 part emulsion

For sandy soil: 10 parts water to 1 part emulsion

Application can be by water truck or hydraulic seeder with the emulsion/product mixture applied at the rate specified by the manufacturer. Approximate drying time is 19 to 24 hours.

Polymeric Emulsion Blends

-Acrylic Copolymers and Polymers: Polymeric soil stabilizers shall consist of a liquid or solid polymer or copolymer with an acrylic base that contains a minimum of 55% solids. The polymeric compound shall be handled and mixed in a manner that will not cause foaming or shall contain an anti-foaming agent. The polymeric emulsion shall not exceed its shelf life or expiration date; manufacturers shall provide the expiration date. Polymeric soil stabilizer shall be readily miscible in water, non-injurious to seed or animal life, non-flammable, shall provide surface soil stabilization for various soil types without totally inhibiting water infiltration, and shall not re-emulsify when cured. The applied compound shall air cure within a maximum of 36 to 48 hours. Liquid copolymer shall be diluted at a rate of 10 parts water to 1 part polymer and applied to soil at a rate of 11,000 liters/hectare (1,175 gal/ac).

-Liquid Polymers of Methacrylates and Acrylates: This material consists of a tackifier/sealer that is a liquid polymer of methacrylates and acrylates. It is an aqueous 100% acrylic emulsion blend of 40% solids by volume that is free from styrene, acetate, vinyl, ethoxylated surfactants or silicates. For soil stabilization applications, it is diluted with water in accordance with manufacturer's recommendations, and applied with a hydraulic seeder at the rate of 190 L/ha (20 gal/ac). Drying time is 12 to 18 hours after application.

-Copolymers of Sodium Acrylates and Acrylamides: These materials are non-toxic, dry powders that are copolymers of sodium acrylate and acrylamide. They are mixed with water and applied to the soil surface for erosion control at rates that are determined by slope gradient:

Slope Gradient (V:H)	kg/ha (lb/ac)
Flat to 1:5	3.4 – 5.6 (3-5)
1:5 to 1:3	5.6 – 11.2 (5-10)
1:2 to 1:1	11.2 – 22.4 (10-20)

-Poly-Acrylamide and Copolymer of Acrylamide: Linear copolymer polyacrylamide is packaged as a dry-flowable solid. When used as a stand-alone stabilizer, it is diluted at a rate of 1.5 kg/1,000 liters (1 lb/100 gal) of water and applied at the rate of 5.6 kg/ha (5 lb/ac).

-Hydro-Colloid Polymers: Hydro-Colloid Polymers are various combinations of dry-flowable poly-acrylamides, copolymers and hydro-colloid polymers that are mixed with water and applied to the soil surface at rates of 60 to 70 kg/ha (53 to 62 lb/ac). Drying times are 0 to 4 hours.

Cementitious-Based Binders

-Gypsum: This is a formulated gypsum-based product that readily mixes with water and mulch to form a thin protective crust on the soil surface. It is composed of high purity gypsum that is ground, calcined and processed into calcium sulfate hemihydrate with a minimum purity of 86%. It is mixed in a hydraulic seeder and applied at rates 4,500 to 13,500 kg/ha (4,000 to 12,000 lb/ac). Drying time is 4 to 8 hours.

Maintenance and Inspection

- Reapplying the selected soil binder may be needed for proper maintenance. High traffic areas shall be inspected daily, and lower traffic areas shall be inspected weekly.
- After any rainfall event, the Contractor is responsible for maintaining all slopes to prevent erosion.
- Maintain an unbroken, temporary stabilized area while DSAs are nonactive. Repair any damaged stabilized area and re-apply soil binder to exposed areas.

Table 1 Properties of Soil Binders for Erosion Control				
Chemicals	**Plant Material Based (Short Lived)**	**Plant Material Based (Long Lived)**	**Polymeric Emulsion Blends**	**Cementitious-Based Binders**
Relative Cost	Low	Low	Low	Low
Resistance to Leaching	High	High	Low to Moderate	Moderate
Resistance to Abrasion	Moderate	Low	Moderate to High	Moderate to High
Longevity	Short to Medium	Medium	Medium to Long	Medium
Minimum Curing Time before Rain	9 to 18 hours	19 to 24 hours	0 to 24 hours	4 to 8 hours
Compatibility with Existing Vegetation	Good	Poor	Poor	Poor
Mode of Degradation	Biodegradable	Biodegradable	Photodegradable/ Chemically Degradable	Photodegradable/ Chemically Degradable
Labor Intensive	No	No	No	No
Specialized Application Equipment	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher
Liquid/Powder	Powder	Liquid	Liquid/Powder	Powder
Surface Crusting	Yes, but dissolves on rewetting	Yes	Yes, but dissolves on rewetting	Yes
Clean-Up	Water	Water	Water	Water
Erosion Control Application Rate	Varies (1)	Varies (1)	Varies (1)	4,500 to 13,500 kg/ha

(1) Dependant on product, soil type, and slope inclination

APPENDIX J

Mestre Greve Associates GHG Analysis

M E M O R A N D U M

Mestre Greve Associates
Division of Landrum & Brown

Date : April 20, 2011

To : Makana Nova, City of Newport Beach

From : Tanya Moon
Mestre Greve Associates, Division of Landrum & Brown

Subject: Greenhouse Gas Assessment for Grading Activities on 10 Big Canyon Drive Report # 515901GHG

Dear Ms. Nova,

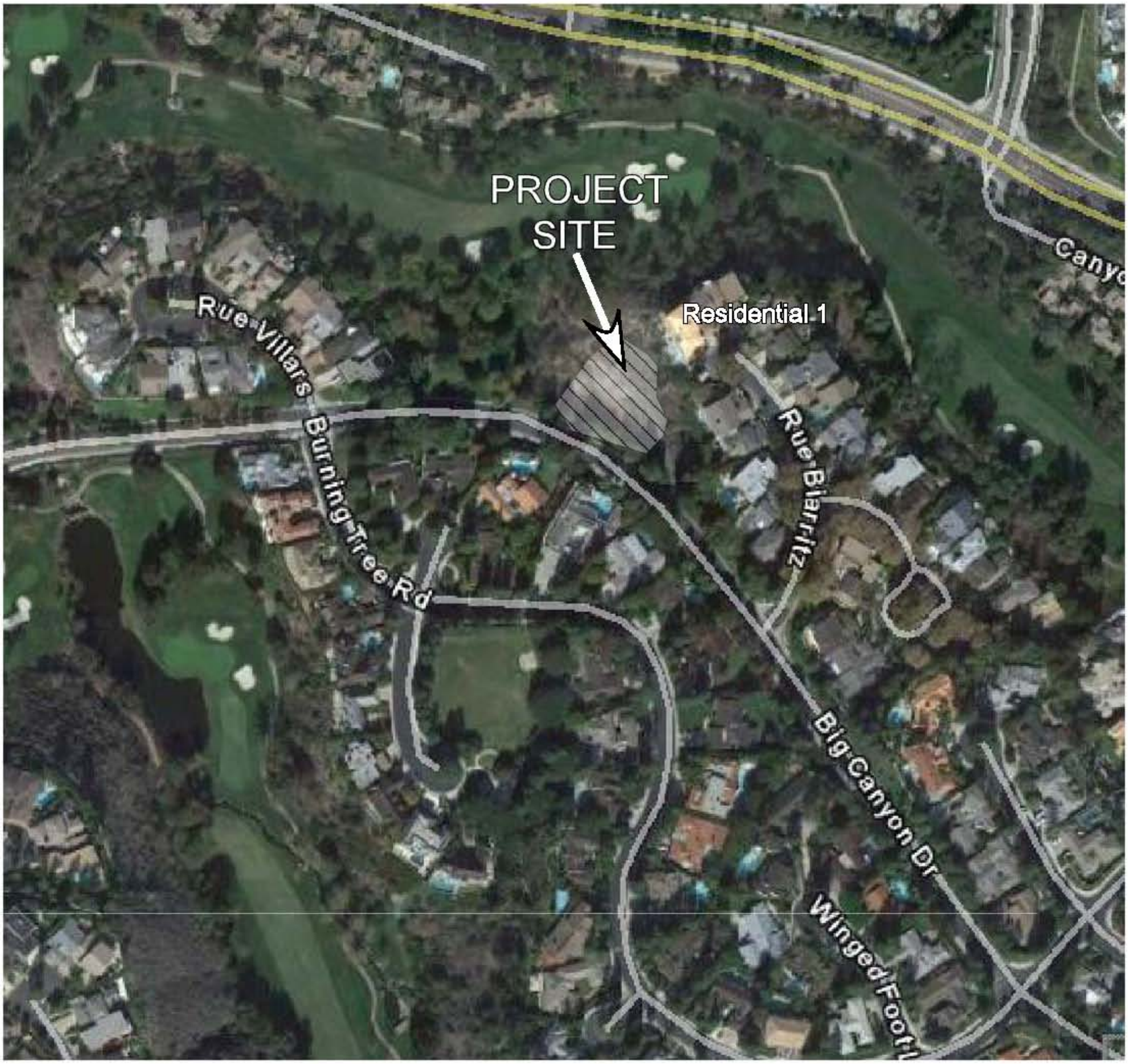
This memo presents the results of the greenhouse gas emission assessment for 10 Big Canyon Drive in the City of Newport Beach. The air quality and noise assessments have been conducted for the grading of this single residential lot. We understand that the project site is 1.9 acres. The project includes the removal of 19,000 cubic yards of unusable soil from the site. Approximately 12,000 cubic yards of this soil will be exported to the northern portion of the subject property to the northwest, and across the Big Canyon Golf Course. The remaining 7,000 cubic yards will be exported to the spoils site located at the east end of the golf course, adjacent to MacArthur Boulevard. Additionally, 45,000 cubic yards of soil will be imported from the Orange County Sanitation District. The vicinity map is shown in Exhibit 1.

Some background and regulatory information are also presented, for information purposes.

Greenhouse Gases and Climate Change

Impact of Climate Change. The Earth's climate has always been in the process of changing, due to many different natural factors. These factors have included changes in the Earth's orbit, volcanic eruptions, and varying amounts of energy released from the sun. Differences such as these have caused fluctuations in the temperature of the climate, ranging from ice ages to long periods of warmth. However, since the late 18th century, humans have had an increasing impact of the rate of climate change, beginning with the Industrial Revolution.

Many human activities have augmented the amount of "greenhouse gases" ("GHGs") being released into our atmosphere, specifically the burning of fossil fuels, such as coal and oil, and deforestation. The gases increase the efficiency of the greenhouse effect, which is the process of trapping and recycling energy (in the form of heat) that the Earth emits naturally, resulting in higher temperatures worldwide. The Intergovernmental Panel on Climate Change stated in



N.T.S.

Mestre Greve Associates

Exhibit 1
Vicinity Map

February 2007 that warming is unequivocal, expressing very high confidence (expressed as a nine out of ten chance of being correct) that the net effect of human activities since 1750 has been one of warming. According to the National Oceanic and Atmospheric Administration (NOAA) and National Aeronautics and Space Administration (NASA) data, the average surface temperature of the Earth has increased by about 1.2 to 1.4 ºF since 1900. The warmest global average temperatures in human record have all occurred within the past 15 years, with the warmest two years being 1998 and 2005. [EPA, 2007, epa.gov/climatechange/basicinfo.html].

This process of heating is often referred to as 'global warming,' although the National Academy of Sciences prefers the terms 'climate change' as an umbrella phrase which includes global warming as well as other environmental changes, in addition to the increasing temperatures. Some of these effects include changes to rainfall, wind, and current weather patterns, as well as snow and ice cover, and sea level.

Depending on which GHG emissions scenario is used, climate models predict that the Earth's average temperature could rise anywhere between 2.5 to 10.4 ºF from 1990 to the end of this century. The degree of change is influenced by the assumed amount of GHG emissions, and how quickly atmospheric GHG levels are stabilized. At this point, however, the climate change models are not capable of predicting local impacts, but rather, can only predict global trends. [EPA, 2007, epa.gov/climatechange/basicinfo.html].

Global GHG emissions are measured in million metric tons of carbon dioxide equivalent ("MMT CO_2EQ") units. A metric ton is approximately 2,205 lbs. Some GHGs emitted into the atmosphere are naturally occurring, while others are caused solely by human activities. The principal GHGs that enter the atmosphere because of human activities are:

- **Carbon dioxide (CO_2)** enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), agriculture, irrigation, and deforestation, as well as the manufacturing of cement.

- **Methane (CH_4)** is emitted through the production and transportation of coal, natural gas, and oil, as well as from livestock. Other agricultural activities influence methane emissions as well as the decay of waste in landfills.

- **Nitrous oxide (N_2O)** is released most often during the burning of fuel at high temperatures. This greenhouse gas is caused mostly by motor vehicles, which also include non-road vehicles, such as those used for agriculture.

- **Fluorinated Gases** are emitted primarily from industrial sources, which often include hydrofluorocarbons (HRC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6). Though they are often released in smaller quantities, they are referred to as High Global Warming Potential Gases because of their ability to cause global warming. Fluorinated gases are often used as substitutes for ozone depleting substances.

These gases have different potentials for trapping heat in the atmosphere, called global warming potential ("GWP"). For example, one pound of methane has 21 times more heat capturing potential than one pound of carbon dioxide. When dealing with an array of emissions, the gases are converted to carbon dioxide equivalents for comparison purposes. The GWPs for common greenhouse gases are shown in Table 1.

Table 1
Global Warming Potentials (GWP)

Gas	Global Warming Potential
Carbon Dioxide	1
Methane	21
Nitrous Oxide	310
HFC-23	11,700
HFC-134a	1,300
HFC-152a	140
PFC: Tetrafluoromethane (CF_4)	6,500
PFC: Hexafluoroethane (C_2F_6)	9,200
Sulfur Hexafluoride (SF_6)	23,900

Source: EPA 2006. Non CO2 Gases Economic Analysis and inventory. (http://www.epa.gov/nonco2/econ-inv/table.html), December 2006

Consumption of fossil fuels in the transportation sector was the single largest source of California's GHG emissions in 2004, accounting for 40.7 percent of total GHG emissions in the state (California Energy Commission 2006a). This category was followed by the electric power sector (including both in-state and out-of-state sources) (22.2 percent) and the industrial sector (20.5 percent) (California Energy Commission 2006a). A byproduct of fossil fuel combustion is CO_2. Processes that absorb and accumulate CO_2, often called CO_2 "sinks," include absorption by vegetation and dissolution into the ocean. Methane, a highly potent GHG, results from off-gassing associated with agricultural practices and municipal solid waste landfills.

Impact of Climate Change on California and Human Health The long term environmental impacts of global warming may include sea level rise that could cause devastating erosion and flooding of coastal cities and villages, as well as more intense hurricanes and typhoons worldwide. In the United States, Chicago is projected to experience 25 percent more frequent heat waves and Los Angeles a four-to-eight-fold increase in heat wave days by the end of the century (IPCC, 2007: Climate Change 2007: Impacts, Adaptation and Vulnerability, Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge).

Locally, global warming could cause changing weather patterns with increased storm and drought severity in California. Changes to local and regional ecosystems include the potential loss of species and a significant reduction in winter snow pack (e.g., estimates include a 30 to 90% reduction in snow pack in the Sierra Nevada mountain range). Current data suggest that in the next 25 years, in every season of the year, California could experience unprecedented heat, longer and more extreme heat waves, greater intensity and frequency of heat waves, and longer dry periods. The California Climate Change Center (2006) predicted that California could witness the following events:

- Temperature rises between 3 and 10.5 °F
- 6 to 20 inches or more increase in sea level
- 2 to 4 times as many heat-wave days in major urban centers
- 2 to 6 times as many heat-related deaths in major urban centers
- 1 to 1.5 times more critically dry years
- 10 to 55% increase in the risk of wildfires

An increase in the frequency of extreme events may result in more event-related deaths, injuries, infectious diseases, and stress-related disorders. Particular segments of the population such as those with heart problems, asthma, the elderly, the very young and the homeless can be especially vulnerable to extreme heat. Also, climate change may increase the risk of some infectious diseases; particularly those diseases that appear in warm areas and are spread by mosquitoes and other insects. These "vector-borne" diseases include malaria, dengue fever, yellow fever, and encephalitis. Also, algal blooms could occur more frequently as temperatures warm — particularly in areas with polluted waters — in which case diseases (such as cholera) that tend to accompany algal blooms could become more frequent.

Adaptation Impact. Adaptation refers to potential climate change impacts on the project. Global warming is already having a profound impact on water resources. Climate change already altered the weather patterns and water supply in California leading to increased water shortages (i.e., a dwindling snowpack, bigger flood flows, rising sea levels, longer and harsher droughts). Water supplies are also at risk from rising sea levels. Risks may include degradation of California’s estuaries, wetlands, and groundwater aquifers which would threaten the quality and reliability of the major California fresh water supply (Climate Change Adaptation Strategies for California’s Water, State of California Department of Water Resources, October 2008).

Higher temperatures will also likely increase electricity demand due to higher air conditioning use. Even if the population remained unchanged, toward the end of the century annual electricity demand could increase by as much as 20 percent if temperatures rise into the higher warming range. (Implementing aggressive efficiency measures could lower this estimate).

Higher temperatures may require that the project consume more electricity for cooling. Additionally, more water may be needed for the landscaping. However, sea level rise will not impact the project because it is so far and high relative to the ocean.

Adaptation includes the responses to the changing climate and policies to minimize the predicted impacts (e.g., building better coastal defenses to sea level rise). Adaptation is not included in this report. It should be note that adaptation is not mitigation. Mitigation includes intervention or policies to reduce GHG emissions or to enhance the sinks of GHGs.

Regulatory Framework

Federal Plans, Policies, Regulations, and Laws. The federal government began studying the phenomenon of global warming as early as 1978 with the National Climate Protection Act, 92 Stat. 601, which required the President to establish a program to "assist the Nation and the world to understand and respond to natural and man-induced climate processes and their implications." The 1987 Global Climate Protection Act, Title XI of Pub. L. 100-204, directed the U.S. EPA to propose a "coordinated national policy on global climate change," and ordered the Secretary of State to work "through the channels of multilateral diplomacy" to coordinate efforts to address global warming. Further, in 1992, the United States ratified a nonbinding agreement among 154 nations to reduce atmospheric GHGs.

More recently, in *Massachusetts v. EPA* (April 2, 2007), the United State Supreme Court held that GHGs fall within the Clean Air Act's definition of an "air pollutant," and directed the EPA to consider whether GHGs are causing climate change. If so, the EPA must regulate GHG emissions from automobiles under the Clean Air Act.

While EPA has not finalized a regulation, it did issue a proposed rule on April 17, 2009. The rule declared that GHGs endanger human health and is the first step to regulation through the federal Clean Air Act. If it becomes final, the EPA would define air pollution to include the six key GHGs – CO2, CH4, N2O, HFCs, PFCs, and SF6.

In addition, Congress has increased the corporate average fuel economy (CAFE) of the U.S. automotive fleet. In December 2007, President Bush signed a bill raising the minimum average miles per gallon for cars, sport utility vehicles, and light trucks to 35 miles per gallon by 2020. This increase in CAFE standard will create a substantial reduction in GHG emissions from automobiles, which is the largest single emitting GHG sector in California.

As of this writing, however, there are no adopted federal plans, policies, regulations or laws setting a mandatory limit on GHG emissions. Further, the EPA has not finalized its evaluation in the wake of *Massachusetts v. EPA.*

California State Plans, Policies, Regulations, and Laws. In the past year, California has distinguished itself as a national leader in efforts to address global climate change by enacting several major pieces of legislation, engaging in multi-national and multi-state collaborative efforts, and preparing a wealth of information on the impacts associated with global climate change.

In November 2008, the Governor issued Executive Order S-13-08 directing state agencies to plan for sea level rise and other climate change impacts. There are four key actions in the Executive Order: (1) initiation of a climate change adaptation strategy that will assess the state's expected climate change impacts where the state is most vulnerable, with recommendations by early 2009; (2) an expert panel on sea level rise will inform state planning and development efforts; (3) interim guidance to state agencies on planning for sea level rise in coastal and floodplain areas for new projects; and (4) initiation of a report on critical existing and planned infrastructure projects vulnerable to sea level rise. (http://gov.ca.gov/executive-order/11036/)

Pursuant to AB 32, the California Air Resources Board ("CARB") has adopted a number of relevant policies and directives. In December 2008, the Scoping Plan was adopted. The Plan is a central requirement of the statute. In addition, it has adopted a number of protocols for industry and government sectors, including one for local government (http://www.arb.ca.gov/cc/protocols/localgov/localgov.htm). (See also, the Local Government Toolkit (http://www.coolcalifornia.org/local-government).

In response to SB 97, the Office of Planning and Research ("OPR") issued a Technical Advisory on CEQA and Climate Change in June 2008. The Advisory provides an outline of what should be included in a GHG analysis under CEQA (http://www.opr.ca.gov/ceqa/pdfs/june08-ceqa.pdf). In January 2009, OPR issued draft amendments to the CEQA Guidelines that address GHGs. Among the amendments are the following:

- Determining the Significance of Impacts from Greenhouse Gas Emissions (Guidelines § 15064.4) ;
- Thresholds of Significance (Guidelines ¤ 15064.7(c));
- Discussion of Cumulative Impacts (Guidelines ¤ 15130(a)(1)(B) and Guidelines § 15130(f));
- Tiering and Streamlining the Analysis of Greenhouse Gas Emissions (Guidelines § 15183.5);

Assembly Bill 32, the California Global Warming Solutions Act of 2006 (Health and Safety Code § 38500 et seq.). In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Global Warming Solutions Act of 2006. In general, AB 32 directs the California Air Resources Board ("CARB") to do the following:

- On or before June 30, 2007, CARB shall publish a list of discrete early action measures for reducing GHG emissions that can be implemented by January 1, 2010;

- By January 1, 2008, establish the statewide GHG emissions cap for 2020, based on CARB's calculation of statewide GHG emissions in 1990 (an approximately 25 percent reduction in existing statewide GHG emissions);

- Also by January 1, 2008, adopt mandatory reporting rules for GHG emissions sources that "contribute the most to statewide emissions" (Health & Safety Code § 38530);

- By January 1, 2009, adopt a scoping plan that indicates how GHG emission reductions will be achieved from significant GHG sources through regulations, market mechanisms, and other strategies;

- On or before January 1, 2010, adopt regulations to implement the early action GHG emission reduction measures;

- On or before January 1, 2011, adopt quantifiable, verifiable, and enforceable emission reduction measures by regulation that will achieve the statewide GHG emissions limit by 2020; and

- On January 1, 2012, CARB's GHG emissions regulations become operative.

- On January 1, 2020, achieve 1990 levels of GHG emissions.

In a December 2006 report, CARB estimated that California emitted between 425 and 468 million metric tons of CO_2 in 1990. In December 2007, CARB finalized 1990 emissions at 427 million metric tons of CO_2. In the August 2007 draft report, CARB estimated California emitted approximately 480 million metric tons of CO_2 in 2004. Based on the U.S. Census Bureau California 2007 population of 36,553,215, this would result in about 13 metric tons of CO_2 per capita.

AB 32 takes into account the relative contribution of each source or source category to protect adverse impacts on small businesses and others by requiring CARB to recommend a *de minimis* (minimal importance) threshold of GHG emissions below which emissions reduction requirements would not apply. AB 32 also allows the Governor to adjust the deadlines mentioned above for individual regulations or the entire state to the earliest feasible date in the event of extraordinary circumstances, catastrophic events, or threat of significant economic harm.

CARB "Early Action Measures" (June 30, 2007). On June 21, 2007, CARB approved its early action measures to address climate change, as required by AB 32. The three measures include: (1) a low carbon fuel standard, which will reduce the carbon-intensity in California fuels, thereby reducing total CO_2 emissions; (2) reduction of refrigerant losses from motor vehicle air conditioning system maintenance through the restriction of "do-it-yourself" automotive refrigerants; and (3) increased CH_4 (methane) capture from landfills through the required implementation of state-of-the-art capture technologies.

CARB Mandatory Reporting Regulations (December 2008). Under AB 32, CARB propounded regulations to govern mandatory greenhouse gas emissions reporting for certain sectors of the economy, most dealing with approximately 94 percent of the industrial and commercial stationary sources of emissions. Regulated entities include electricity generating facilities, electricity retail providers, oil refineries, hydrogen plants, cement plants, cogeneration facilities, and industrial sources that emit over 25,000 metric tons of CO2 from stationary source combustion.

Senate Bill 97 (2007). By July 1, 2009, the Governor's Office of Planning and Research (OPR) is directed to prepare, develop, and transmit to the Resources Agency guidelines for the feasible mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions, as required by the California Environmental Quality Act. The Resources Agency is required to certify and adopt these guidelines by January 1, 2010. OPR is required to periodically update these guidelines as CARB implements AB 32. In addition, SB 97 states that the failure to include a discussion of greenhouse gas emissions in any CEQA document for a project funded under the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006, or projects funded under the Disaster Preparedness and Flood Prevention Bond Act of 2006 shall not be a cause of action under CEQA. This last provision will be repealed on January 1, 2010.

Executive Order S-01-07 (2007). Executive Order S-01-07 calls for a reduction in the carbon intensity of California's transportation fuels by at least 10 percent by 2020. As noted above, the low-carbon fuel standard ("LCFS") was adopted by CARB as one of its three "early action measures" on June 21, 2007.

Senate Bill 1368 (2006) (Public Utilities Code §§ 8340-41). SB 1368 required the California Public Utilities Commission ("PUC") to establish a "GHG emission performance standard" by February 1, 2007, for all electricity providers under its jurisdiction, including the state's three largest privately-owned utilities. Pub. Res. Code § 8341(d)(1). These utilities provide approximately 30 percent of the state's electric power. After the PUC acted, the CEC adopted a performance standard "consistent with" the PUC performance standard and applied it to local publicly-owned utilities on May 23, 2007 (over one month ahead of its June 30, 2007 deadline). Cal. Pub. Res. Code § 8341(e)(1). However, the California Office of Administrative Law ("OAL") found four alleged flaws in the CEC's rulemaking. The CEC overcame these alleged flaws and adopted reformulating regulations in August 2007.

Senate Bill 107 (2006). Senate Bill 107 ("SB 107") requires investor-owned utilities such as Pacific Gas and Electric, Southern California Edison and San Diego Gas and Electric, to generate 20 percent of their electricity from renewable sources by 2010. Previously, state law required that this target be achieved by 2017.

Senate Bill 375 (September 2008). In September 2008, SB 375 was signed by Governor Schwarzenegger. SB 375 is a comprehensive global warming bill that helps to achieve the goals of AB32. To help establish these targets, the CARB assigned a Regional Targets Advisory Committee to recommend factors to be considered and methodologies for setting greenhouse gas emission reduction targets. SR 375 also provides incentive – relief from certain CEQA requirements for development projects that are consistent with regional plans that achieve the targets. SB 375 requires CARB to develop, in collaboration with the Metropolitan Planning Organization (MPO), passenger vehicle greenhouse gas emissions reduction targets for 2020 and 2035 by September 30, 2010. The MPO is required to include and adopt, in their regional transportation plan, a sustainable community strategy that will meet the region's target provided by CARB.

Western Regional Climate Action Initiative (Arizona, California, New Mexico, Oregon, Utah, Washington)(2007). Acknowledging that the western states already experience a hotter, drier climate, the Governors of the foregoing states have committed to three time-sensitive actions: (1) by August 26, 2007, to set a regional goal to reduce emissions from the states collectively, consistent with state-by state goals; (2) by August 26, 2008, to develop "a design for a regional market-based multi-sector mechanism, such as a load-based cap and trade program, to achieve the regional GHG reduction goal;" and (3) to participate in a multi-state GHG registry "to enable tracking, management, and crediting for entities that reduce GHG emissions, consistent with state GHG reporting mechanisms and requirements."

Executive Order S-3-05 (June 1, 2005). Executive Order S-3-05 calls for a reduction in GHG emissions to 2000 levels by 2010; 1990 levels by 2020; and for an 80 percent reduction in GHG emissions below 1990 levels by 2050. It also directs the California Environmental Protection Agency ("CalEPA") to prepare biennial science reports on the potential impact of continued global warming on certain sectors of the California economy.

California's Renewable Energy Portfolio Standard Program (2005). In 2002, California established its Renewable Energy Portfolio Standard Program, which originally included a goal of increasing the percentage of renewable energy in the state's electricity mix to 20 percent by 2017. The state's most recent 2005 Energy Action Plan raises the renewable energy goal from 20 percent by 2017, to 33 percent by 2020.

Title 24, Part 6, California Code of Regulations (2005). In 2005, California adopted new energy efficiency standards for residential and nonresidential buildings in order to reduce California's energy consumption. This program has been partially responsible for keeping California's per capita energy use approximately flat over the past 30 years.

Assembly Bill 1493 (2002) (Health and Safety Code § 43018.5). Assembly Bill 1493 ("AB 1493") required CARB to develop and adopt the nation's first GHG emission standards for automobiles. Not only have litigants challenged their legality in federal court, but also USEPA denied California's request for a Clean Air Act waiver to implement its regulations. As of this writing, California and other states that seek to adopt California's greenhouse gas emissions standards for automobiles are challenging USEPA's denial in federal court.

Climate Action Registry (2001). California Senate Bills 1771 and 527 created the structure of the California Climate Action Registry ("Registry"), and former Governor Gray Davis signed the final version of the Registry's enabling legislation into law on October 13, 2001. These bills establish the Registry as a non-profit entity to help companies and organizations establish GHG emissions baselines against which future GHG emission reduction requirements could be applied. Using any year from 1990 forward as a base year, participants can record their annual GHG emissions with the Registry. In return for this voluntary action, the State of California promises to offer its "best efforts" to ensure that participants receive consideration for their early action if they are subject to any future state, federal, or international emissions regulatory scheme.

South Coast Air Quality Management District Plans, Policies, Regulations and Laws. The South Coast Air Quality Management District ("SCAQMD") adopted a "Policy on Global Warming and Stratospheric Ozone Depletion" in April 1990. The policy commits the SCAQMD to consider global impacts in rulemaking and in drafting revisions to the Air Quality Management Plan. In March 1992, the SCAQMD Governing Board reaffirmed this policy and adopted amendments to the policy to include the following directives:

- Phase out the use and corresponding emissions of chlorofluorocarbons (CFCs), methyl chloroform (1,1,1-trichloroethane or TCA), carbon tetrachloride, and halons by December 1995;

- Phase out the large quantity use and corresponding emissions of hydrochlorofluorocarbons (HCFCs) by the year 2000;

- Develop recycling regulations for HCFCs (e.g., SCAQMD Rules 1411 and 1415);

- Develop an emissions inventory and control strategy for methyl bromide; and,

- Support the adoption of a California GHG emission reduction goal.

The legislative and regulatory activity detailed above is expected to require significant development and implementation of energy efficient technologies and shifting of energy production to renewable sources.

City of Newport Beach Plans, Policies, Regulations, and Laws.
The City of Newport Beach does not have any plans, policies, regulations, significance thresholds or laws addressing climate change at this time.

Significance Thresholds

California Air Resource Board Significance Thresholds: The CARB is the lead agency for implementing AB32. In October 2008, CARB published a Proposed Scoping Plan, in coordination with the Climate Action Team (CAT), to establish a comprehensive set of actions designed to reduce overall greenhouse gas emissions in California. The measures in the Scoping Plan approved by the Board will be developed over the next two years and be in place by 2020. California is the fifteenth largest emitter of GHGs on the planet, representing about 2 percent of the worldwide emissions. According to climate scientists, California and the rest of the developed world will have to cut emissions by 80 percent from today's levels to stabilize the amount of CO_2 in the atmosphere and prevent the most severe effects of global climate change. This long range goal is reflected in California Executive Order S-3-05 that requires an 80 percent reduction of greenhouse gases from 1990 levels by 2050. Reducing GHG emissions to 1990 levels means cutting approximately 30 percent from business-as-usual emissions levels projected for 2020, or about 15 percent from today's levels. On a per-capita basis, that means reducing our annual emissions of 14 tons of CO_2 equivalent for every man, woman and child in California down to about 10 tons per person by 2020.

Significant progress can be made toward the 2020 goal with existing technologies and improving the efficiency of energy use. Other solutions involve improving our state's infrastructure, transitioning to cleaner and more secure sources of energy, and adopting 21st century land use planning and development practices. Key elements of California's recommendations for reducing its greenhouse gas emissions to 1990 levels by 2020 include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standard;

- Achieving a statewide renewable energy mix of 33 percent;

- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;

- Establishing targets for transportation-related greenhouse gas emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;

- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and

- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long term commitment to AB 32 implementation.

To meet the 1990 target established by AB 32, CARB recommends a de minimis (minimal importance) emission threshold of 0.1 MMT annual (100,000 MT per year) CO_2EQ per transportation source category. Source categories whose total aggregated emissions are below this level are not proposed for emission reduction requirements in the Scoping Plan but may contribute toward the target via other means. As each regulation to implement the Scoping Plan is developed, CARB and other agencies will consider more specific de minimis levels below which the regulatory requirements would not apply. These levels will consider the cost to comply, especially for small businesses, and other factors. Until approved thresholds and guidelines are adopted at the local and regional level, the proposed de minimis threshold of 100,000 MT CO_2EQ per year for transportation sources will be utilized for transportation sources.

In addition to the Proposed Scoping Plan, CARB released the Preliminary Draft Staff Proposal (Staff Proposal) on October 24, 2008 with the objective of developing interim significant thresholds for commercial and residential projects. CARB has already proposed a threshold of 7,000 annual MT for industrial operational sources. However, the Staff Proposal has not yet developed thresholds applicable for residential and commercial sources. Therefore, criteria for determining threshold levels for residential and commercial sources have yet to be defined. Under CARB's Staff Proposal, recommended approaches for setting interim significant thresholds for GHG under the CEQA are underway. CARB staff proposes to define certain performance standards (e.g., for energy efficiency) by referencing or compiling lists from existing local, state or national standards. For some sub-sources of GHG emissions (e.g., construction, transportation, waste), CARB staff has not identified reference standards.

The Staff Proposal's Potential Performance Standards and Measures were released in December 2008. Inside the Staff Proposal, CARB's Potential Performance Standard and Measures included some construction measures. These guideline measures are:

- Provide alternative transportation mode options or incentives for workers to and from worksite on days that construction requires 200 or more workers; and
- Recycle and/or salvage at least 75% of non-hazardous construction and demolition debris by weight (residential) or by weight in volume (commercial); and
- Use recycled materials for at least 20% of construction materials based on cost for building materials, based on volume for roadway, parking lot, sidewalk and curb material. Recycled materials may include salvaged, reused, and recycled content materials.

CARB's Staff Proposal has identified California Energy Commission's (CEC) Tier II Energy Efficiency goals as an appropriate performance standard for energy use. Under State Law, the CEC is required to establish eligibility criteria, conditions for incentives, and rating standards. Thus, the CEC established energy efficiency standards for homes and commercial structures, and requires new buildings to exceed current building standards by meeting Tier Energy Efficiency goals. Currently, CEC's proposed guidelines for the solar energy incentive program recommend a Tier II goal for residential and commercial projects of a 30% reduction in building combined space heating, cooling, and water heating energy compared to the 2008 Title 24 standards.

Existing green building rating systems like LEED, GreenPoint Rated, the California Green Building Code, and others, contain examples of measures that are likely to result in substantial GHG emission reductions from residential and commercial projects. Performance standards that already exist and have been proven to be effective, at the local, state, national or international level, are preferable. For residential and commercial projects, staff has proposed that the GHG emissions of some projects that meet GHG performance standards might under some circumstances still be considered cumulatively considerable and therefore significant. However, criteria threshold for residential and commercial has yet to be developed.

SCAQMD's Significance Thresholds: In December 5, 2008, the South Coast Air Quality Management District (SCAQMD) adopted GHG significance threshold for Stationary Sources, Rules and Plans where the SCAQMD is lead agency. The threshold utilizes a tiered approach, with a screening significance threshold of 10,000 MTCO2EQ, if the project was not part of a general plan's GHG reduction plan. The SCAQMD has also developed draft thresholds for commercial and residential projects, where it is not the lead. The draft recommends a 3,000 MTCO2EQ per year screening threshold. The SCAQMD's working group has not set a date for finalizing the recommendations. <u>Although the 3,000 MTCO2EQ is a preliminary recommendation, it will be used for this analysis as the significance threshold.</u>

Short term Construction Emissions

Temporary impacts will result from construction activities. The primary source of GHG emissions generated by construction activities is from use of diesel-powered construction equipment and other combustion sources (i.e., generators, worker vehicles, materials delivery, etc.). The GHG air pollutants emitted by construction equipment would primarily be carbon dioxide.[1]

Typical emission rates for construction equipment were obtained from URBEMISv9.2.4 (Urban Emissions Model Version 9.2.4) which was released By CARB in 2008. URBEMIS is a computer program that can be used to estimate emissions including operation (vehicle and area) sources, as well as construction projects associated with land development projects in California.

While the URBEMISv9.2.4 model does not include other GHG emissions generated by the proposed project (such as CH4, N_2O, and Fluorinated Gases), CO_2 emissions comprise approximately 99.6 percent of GHG emissions from burning diesel fuel. Consequently, non-CO_2 GHG emissions represent a very small percentage (approximately 0.4 percent) of the total short-term construction GHG emissions and would not represent a significant source of GHG emissions generated by the proposed project during construction, even when combined with CO_2 emissions. Therefore, non-CO_2 construction GHG emissions have not been quantified in this analysis.

The proposed project site is approximately 1.9 acres. The primary source of air quality emissions would primarily from the grading, import and export of soil. The grading associated with the project includes import and export of significant quantities of dirt. According to the City of Newport Beach, approximately 12,000 cubic yards will be moved to the adjacent surrounding areas, while approximately 7,000 cubic yards of hauled dirt will be exported to the east side of the Golf Course near MacArthur Boulevard approximately 3 miles away, and approximately 45,000 cubic yards of soil will be imported from the Orange County Sanitary District in City of Fountain Valley. Due to the limit of access on the project site, haul trucks of 10 cubic yard haul capacity will be utilized, resulting in approximately 87 haul trucks per day.

According to the SCAQMD's CEQA Handbook (Greenhouse Gas CEQA Significance Threshold Stakeholder Working Group #5, August 27, 2008), construction emissions are amortized over the life of the project, defined by SCAQMD as 30 years. Thus, the project's annualized construction emission will be compared to the applicable GHG significance threshold. Table 2 presents the results of the URBEMIS2007 model showing the annual CO_2 construction emissions projected. Worksheets showing the specific data utilized in the calculation are presented in the appendix.

[1] When one gallon of diesel fuel is burned it produces 22.384 pounds of CO_2, 0.000534 pounds of CH_4, and 0.0001928 pounds N_2O. Based on the global warming potential of 21 for CH_4 and 310 for N_2O relative to CO_2, the total pounds of CO_2-equivalent (CO_2EQ) emissions from diesel fuel is 22.455 CO_2EQ/gallon, which is 99.6 percent of the total emissions. Bay Area Air Quality Management District (BAAQS), *Source Inventory of Bay Area Greenhouse Gas Emissions*, November 2006.

Table 2
Construction CO_2 Emissions

Activity	MT CO_2
Mass Grading	0
Haul Trucks (including worker trips)	561
Amortized 30 years (CO2MT/Year)	**19**

MT = metric tons.

The construction amortized emissions are projected to below the SCAQMD screening threshold of 3,000 MTCO2EQ/year. Consequently, no significant cumulative impacts are anticipated.

References

California Energy Commission, “Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004,” December 2006.

Edmund G. Brown, Jr., Attorney General, State of California, “Comments on Draft Environmental Impact Report for Coyote Canyon Specific Plan,” June 19, 2007.

Michael Hendrix et. al., “Alternative Approaches to Analyze Greenhouse Gas Emissions and Global Climate Change in CEQA Documents,” Association of Environmental Professionals, Revised Draft April 27, 2007.

State of California, “Climate Change Portal,” http://www.climatechange.ca.gov/index.html.

United Nations Statistics Division, “Environment Indicators: Greenhouse Gas Emissions,” http://unstats.un.org/unsd/ENVIRONMENT/air_greenhouse_emissions.htm.

United Nations Framework Convention on Climate Change, “National Greenhouse Gas Inventory Data for the Period 1990–2006 and Status of Reporting,” November 17, 2008.

United Nations Framework Convention on Climate Change, “ Sixth compilation and synthesis of initial national communications from Parties not included in Annex I to the Convention”, October 25, 2005.

U.S. Environmental Protection Agency, “The U.S. Inventory of Greenhouse Gas Emissions and Sinks: Fast Facts,” April 2007.

U.S. Environmental Protection Agency, “Climate Change,” http://epa.gov/climatechange/index.html.

U.S. Environmental Protection Agency, “AP 42, Fifth Edition Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources,” http://www.epa.gov/ttn/chief/ap42/.

U.S. Environmental Protection Agency, “Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2005,” April 15, 2007.

Lancaster Landfill Draft Environmental Impact Report, Section 4.5.4.

California Air Resource Board, “ Climate Change Proposed Scoping Plan”, October 2008.

California Air Resource Board, “Staff Proposal-Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the CEQA”, December 2008.

California Air Resource Board, “Preliminary Draft Staff Proposal- Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the CEQA”, October 24,2008.

SCAQMD, Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans, December 5, 2008

State of California Department of Water Resources (DWR), Climate Change Adaptation Strategies for California’s Water, October 2008

APPENDIX

(Urbemis Modeling)

4/19/2011 06:36:06 PM

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\My Dropbox\L&B WORK_2\BigCanyon AQ_NZ NB2\big canyon nb 022811 mitg 50'.urb924

Project Name: Big Canyon Lot

Project Location: Orange County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	CO_2
2011 TOTALS (tons/year unmitigated)	639.24
2011 TOTALS (tons/year mitigated)	639.24
Percent Reduction	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	CO_2
2011	639.24
Mass Grading 02/01/2011-10/07/2011	618.69
Mass Grading Dust	0.00
Mass Grading Off Road Diesel	383.79
Mass Grading On Road Diesel	218.19
Mass Grading Worker Trips	16.70
Building 06/01/2011-06/30/2011	20.55
Building Off Road Diesel	20.55
Building Vendor Trips	0.00
Building Worker Trips	0.00
Coating 08/02/2011-08/15/2011	0.00
Architectural Coating	0.00
Coating Worker Trips	0.00

Phase Assumptions

Phase: Mass Grading 2/1/2011 - 10/7/2011 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 1.9

Maximum Daily Acreage Disturbed: 1

Fugitive Dust Level of Detail: Low

Onsite Cut/Fill: 380 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day

On Road Truck Travel (VMT): 575.2

Off-Road Equipment:

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

2 Other Material Handling Equipment (191 hp) operating at a 0.59 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Building Construction 6/1/2011 - 6/30/2011 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Architectural Coating 8/2/2011 - 8/15/2011 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

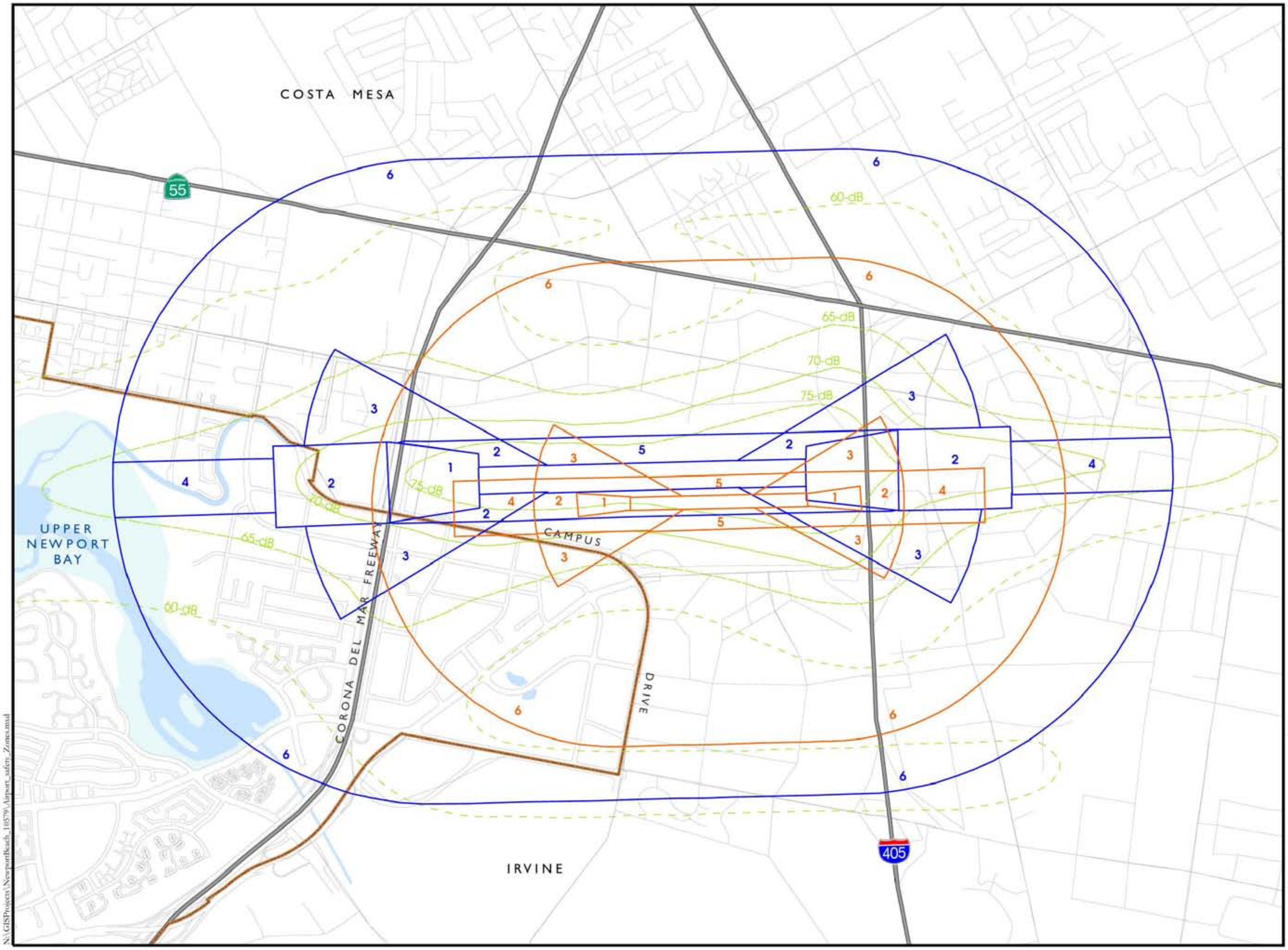
Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

APPENDIX K

Figure S5: Runway Protection Zone

CITY of NEWPORT BEACH
GENERAL PLAN
Figure S5

JWA CLEAR ZONE/RUNWAY PROTECTION ZONES AND ACCIDENT POTENTIAL ZONES



Legend

Safety Compatibility Zones for Runway 1L and 19R (a medium general aviation runway as described in the California Airport Land Use Planning handbook, January 2002)

Safety Compatibility Zones for Runway 1R and 19L (a short general aviation runway as described in the California Airport Land Use Planning handbook, January 2002)

AELUP Noise Contours

Water Body

CityBoundary

Highway

Right of Way

Safety Compatibility Zones

1. Runway Protection Zone
2. Inner Approach/Departure Zone
3. Inner Turning Zone
4. Outer Approach/Departure Zone
5. Sideline Zone
6. Traffic Pattern Zone

0 0.25 0.5 Miles

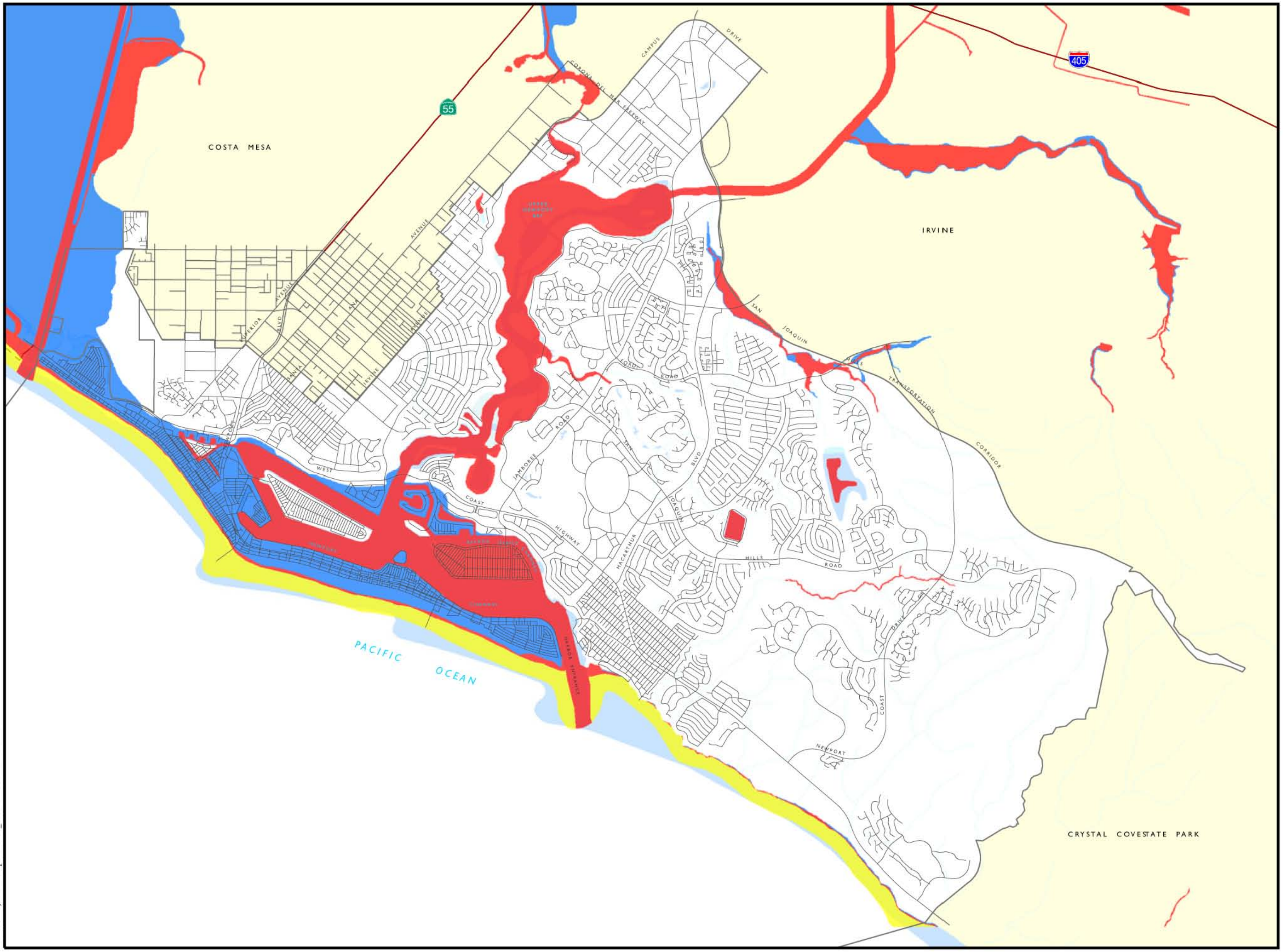
Source: Airport Land Use Commission for Orange County, 2006
PROJECT NUMBER: 10579-01
Date: 6/20/06

EIP

N:\GISProjects\NewportBeach_10579\Airport_safety_Zones.mxd

APPENDIX L

Figure S3: Flood Hazards



CITY of NEWPORT BEACH
GENERAL PLAN

Figure S3
FLOOD HAZARDS

Legend

- Special Flood Hazard Areas Inundated by 100-year flood
- Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood
- Zone VE, Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

0 0.25 0.5 1 Miles

Source: City of Newport Beach, 2006
PROJECT NUMBER: 10579-01
Date: 03/17/06

EIP

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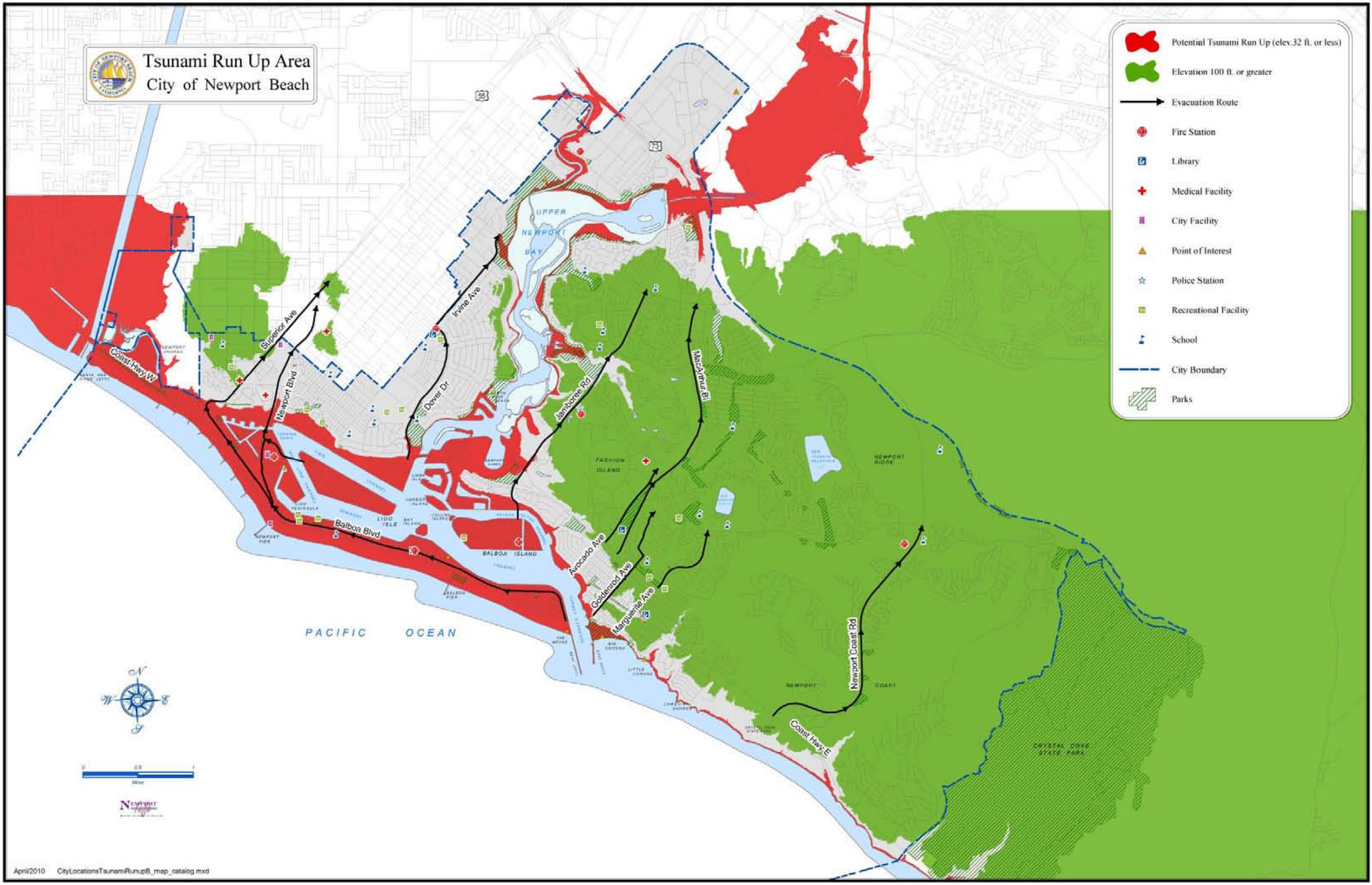
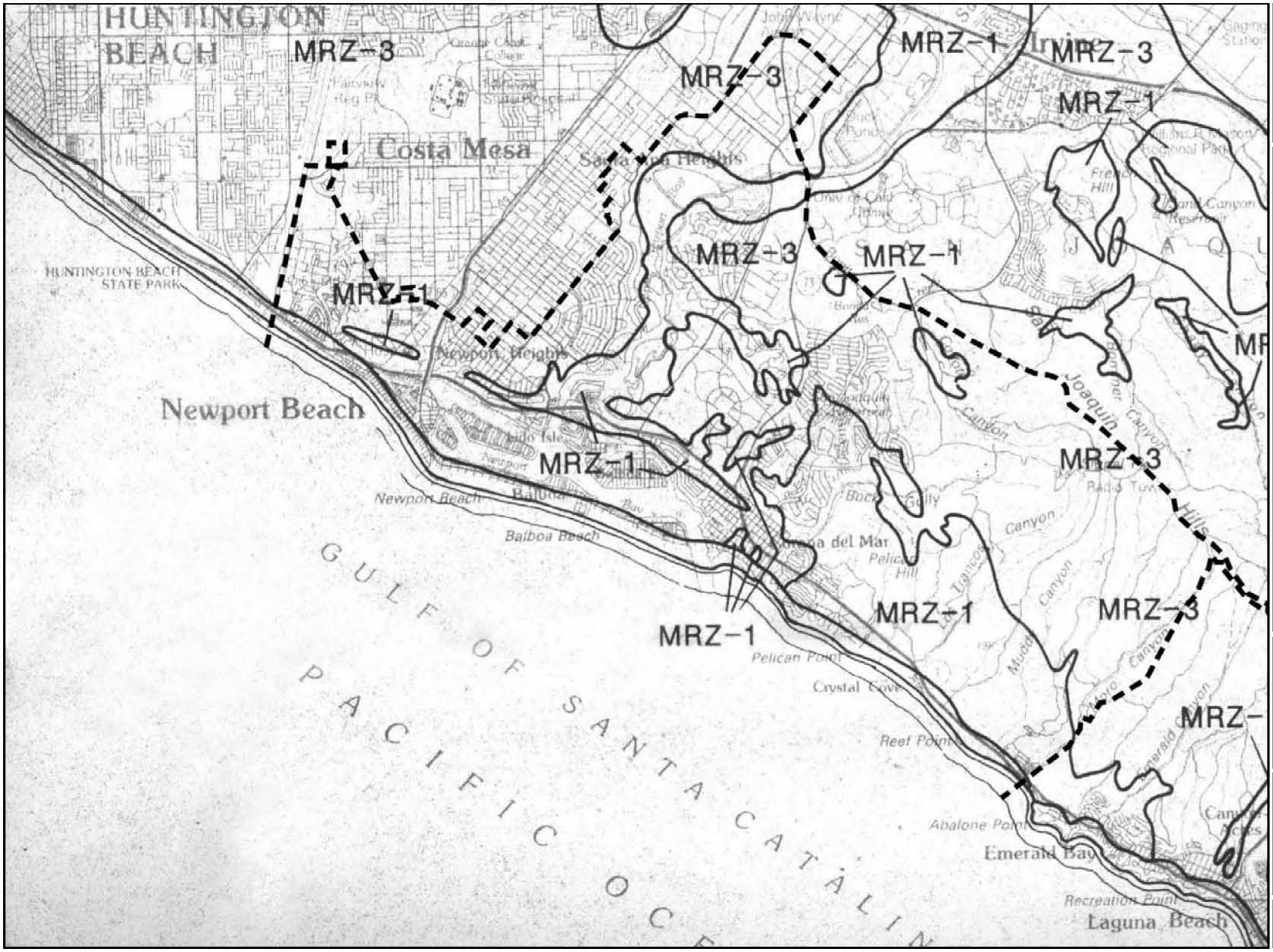
APPENDIX M

Tsunami Run-Up Areas Map


Tsunami Run Up Area
City of Newport Beach
Potential Tsunami Run Up (elev.32 ft. or less)
Elevation 100 ft. or greater
Evacuation Route
Fire Station
Library
Medical Facility
City Facility
Point of Interest
Police Station
Recreational Facility
School
City Boundary
Parks
UPPER
NEWPORT
BAY
Coast Hwy W
Superior Ave
Newport Blvd
Irvine Ave
Dover Dr
Jamboree Rd
MacArthur Bl
Balboa Blvd
Avocado Ave
Goldenrod Ave
Marguerite Ave
Newport Coast Rd
Coast Hwy E
FASHION
ISLAND
LIDO
ISLE
BALBOA ISLAND
NEWPORT
RIDGE
NEWPORT
COAST
CRYSTAL COVE
STATE PARK
PACIFIC OCEAN
Miles
April/2010 CityLocationsTsunamiRunupB_map_catalog.mxd

APPENDIX N

Figure 4.5-4 Mineral Resource Zones



CITY of NEWPORT BEACH
GENERAL PLAN UPDATE EIR

Figure 4.5-4
MINERAL RESOURCE ZONES

Legend

City Boundary (approximate)

Mineral Resource Zones

MRZ-1	Area with No Significant Mineral Deposits
MRZ-2	Area with Significant Mineral Deposits
MRZ-3	Areas Containing Mineral Deposits of Undetermined Significance
MRZ-4	Areas with Inadequate Information

0 0.5 1

Not to Scale

Source: Department of Conservation Division of Mines and Geology, DMG Open-File Report 94-15, 1994.

Project No. 10579-03

EIP

APPENDIX O

Mestre Greve Associates Noise Analysis

M E M O R A N D U M

Mestre Greve Associates

A Division of Landrum and Brown Inc.

Date : May 18, 2011

To : Makana Nova, City of Newport Beach

From : Tanya Moon
Mestre Greve Associates, Division of Landrum-Brown Inc.

Subject: Noise and Air Quality Assessment for Grading Activities on the Single Big Canyon Lot. Report # 515901 (II).

Dear Ms. Nova,

This memo presents the noise and air quality emission assessment for the grading activities of a single lot in Big Canyon. A single custom home will be built on this lot. Standard grading equipment noise levels will be used to project the noise levels that will occur at nearby receptors. These levels will be compared to ambient noise levels and the criteria contained in the City's Noise Ordinance to determine potential impacts.

Noise and air quality will be analyzed based on grading activities of this single lot, and any mitigation measures necessary will be specified.

1.0 NOISE ANALYSIS

Community noise levels are measured in terms of the "A-weighted decibel," abbreviated dBA. DBA is the standard unit of measurement of the loudness of sound adjusted for the human ear. Several rating scales have been developed for measurement of community noise. Two of the predominate noise scales are the: Equivalent Noise Level (LEQ) and the Community Noise Equivalent Level (CNEL). LEQ can be measured for any time period, but is typically measured for 1 hour. It is the energy sum of all the events and background noise levels that occur during that time period. CNEL, or Community Noise Equivalent Level, scale represents a time weighted 24-hour average noise level based on the A-weighted decibel. The CNEL penalizes the evening time period (7 p.m. to 10 p.m.) noises by 5 dBA, and 10 dBA for the nighttime (10 p.m. to 7 a.m.) These time periods and penalties were selected to reflect people's increased sensitivity to noise during these time periods.

L(%) is another way of expressing the noise level exceeded for a percentage of time in a given measurement period. For example, 5 minutes is 25% of 20 minutes, thus L(25) is the noise level that is equal to or exceeded for five minutes in a twenty minute measurement period. It is the L(%) that is used for most Noise Ordinance standards. For example, the City of Culver uses an ordinance standard of 55 dBA for 30 minutes per hour or an L(50) level of 55 dBA. In other words, the Noise Ordinance states that no noise level should exceed 55 dBA for more that fifty percent of a given period. Additionally, Lmax represents the maximum instantaneous level, while Lmin represents the minimum level. These L% noise levels can be compared to noise ordinance criteria.

Noise Ordinance

The Newport Beach Noise Ordinance (Chapter 10.26 Community Noise Control) establishes exterior and interior noise standards for noise generated on private property affecting a neighbor. Table 1 presents the City of Newport Beach's Noise Ordinance standards. The noise ordinance is designed to control unnecessary, excessive and annoying sounds from sources such as parking lots and mechanical equipment at the residential property line. The noise ordinance requirements cannot be applied to mobile noise sources such as heavy trucks when traveling on public roadways. Federal and State laws preempt control of the mobile noise sources on public roads. However, the requirements can be applied to vehicles traveling on public property.

The City of Newport Beach exterior and interior noise criteria are given in terms of 15 minute Leq and Lmax noise levels. These noise levels are not to be exceeded at a property from noise generated at a neighbor property. Noise levels are to be measured with A-weighting and a slow time response. Greater noise levels are permitted during the day (7 a.m. to 10 p.m.) as compared to the nighttime period (10 p.m. to 7 a.m.).

Table 1
City Of Newport Beach Noise Ordinance Standards

Zone	Noise Metric	Noise Level Not To Be Exceeded 7 a.m. to 10 p.m. (daytime)	10 p.m. to 7 a.m. (nighttime)
EXTERIOR NOISE STANDARDS			
I Residential	Leq (15 min)	55 dBA	50 dBA
	Lmax	75 dBA	70 dBA
II Commercial	Leq (15 min)	65 dBA	60 dBA
	Lmax	85 dBA	80 dBA
III Mixed Use Residential*	Leq (15 min)	60 dBA	50 dBA
	Lmax	80 dBA	70 dBA
IV Industrial/Manufacturing	Leq (15 min)	70 dBA	70 dBA
	Lmax	90 dBA	90 dBA
INTERIOR NOISE STANDARDS			
I Residential	Leq (15 min)	45 dBA	40 dBA
	Lmax	65 dBA	60 dBA
III Mixed Use Residential*	Leq (15 min)	45 dBA	45 dBA
	Lmax	65 dBA	65 dBA

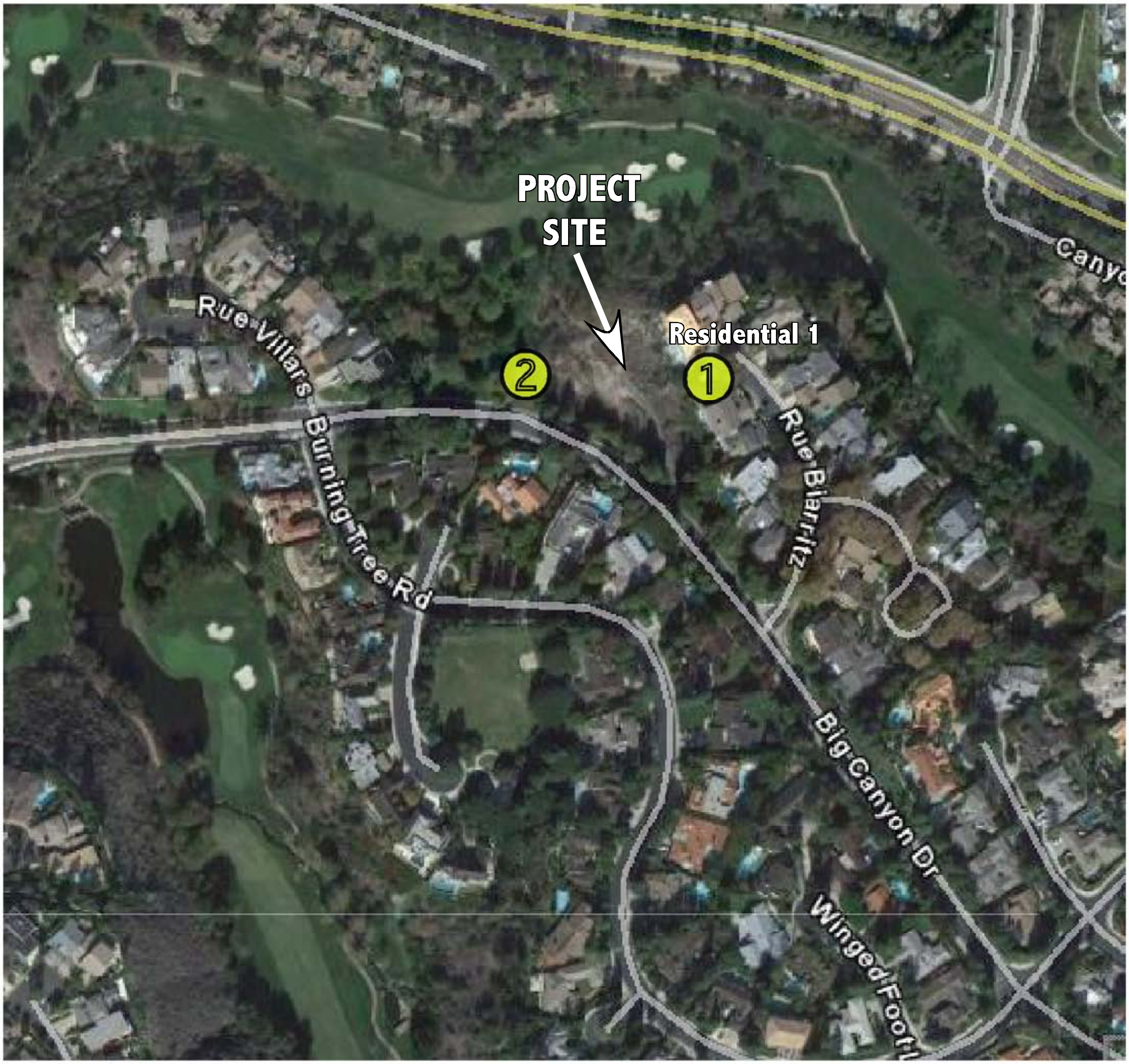
* Residential within 100' of a commercial property where noise is from said commercial property

Section 10.26.035.D of the Newport Beach Municipal Code exempts construction equipment from the provisions of the Noise Ordinance and requires them to comply with Section 10.28 of the Code. Section 10.28.040 of the Code restricts hours of construction to between the hours of 7:00 a.m. and 6:30 p.m. Monday through Friday and 8:00 a.m. and 6:00 p.m. on Saturday. Noise generating construction activities are not allowed on Sundays or Holidays. The project does not propose any construction activities outside of these hours, and therefore, will not result in a significant noise impact.

Existing Noise Measurements

Noise measurements in the vicinity of the project site are needed to establish the existing noise environment. Short-term noise measurements were conducted at two sites: Site 1 was at the nearest residences on Rue Biarritz at the end of the cul-de-sac, and Site 2 was on-site at the southwest property line adjacent to the golf course. The two measurement sites are illustrated in Exhibit 1.

The measurements were performed on Wednesday, July 21, 2010, between the hours of 10:30 a.m. and 12:00 p.m. The site locations are described in Table 2.



1 Noise measurement receptor

N

Exhibit 1
Noise Measurement Locations

Mestre Greve Associates

Table 2
Noise Measurement Locations

Site	Location
1	Single-family home on Rue Biarritz the cul-de-sac to the north
2	On-site at southwest property line near golf course and Big Canyon Road

Measurements at the sites were performed using a Brüel & Kjær Model 2236 automated digital noise data acquisition system and sound meter mounted on a tripod. A large windscreen covered the microphone during the measurements to dampen-out the effect of unwanted wind-generated noise. For each measurement site, two 10-minute periods of data were collected. Before and after the measurements were taken, a Brüel & Kjær calibrator with calibration traceable to the National Institute of Standards and Technology was used to calibrate the sound meter. Table 3 presents the results of the measurements.

Table 3
Existing Noise Measurement Results (dBA)

Site	Time	Leq	Lmax	Lmin	L1.7	L8.3	L25	L50	L90	L99
1	10:35 am	49.5	61.7	40.9	58.5	52.5	48.5	45.5	42.5	41.5
	10:47 am	50.3	64.3	40.2	58.5	54.5	49.0	45.5	42.0	41.0
2	11:02 am	49.4	61.4	36.6	57.0	55.0	48.0	44.0	40.0	38.0
	11:14 am	46.9	53.8	37.0	50.5	49.5	48.0	46.0	42.5	38.5

Site 1 is located at the adjacent residences on Rue Biarritz at the end of the cul-de-sac to the north over looking the project site. Traffic on Big Canyon Road and distant Jamboree Road was the main source at this location, while occasional vehicles in the cul-de-sac were secondary. Other sources contributing to the noise environment were air planes overhead, gardeners and yard maintenance trucks, people, and trash trucks. The Lmax was 64.3 dBA, and was caused by a vehicle in the cul-de-sac. The Leq at this site measured 50.3 dBA.

Site 2 is located on-site adjacent to the property line between the project site and the existing golf course. The noise monitor was located near Big Canyon Road. Big Canyon Road was approximately 3 to 5 feet higher than the noise monitor. Infrequent traffic on Big Canyon Road and steady but distant gardener’s trimming equipment on the golf course were the dominant sources at this location, while distant traffic on Jamboree Road and golf carts were secondary. Occasionally, airplane overhead and other urban noise also contributed to the ambient noise. The Lmax was 61.4 dBA, and was caused by a car pass-by on Big Canyon Road. The Leq at this site measured 49.4 dBA and was driven mainly by a gardener’s trimmimg equipment on the golf course.

Construction Noise

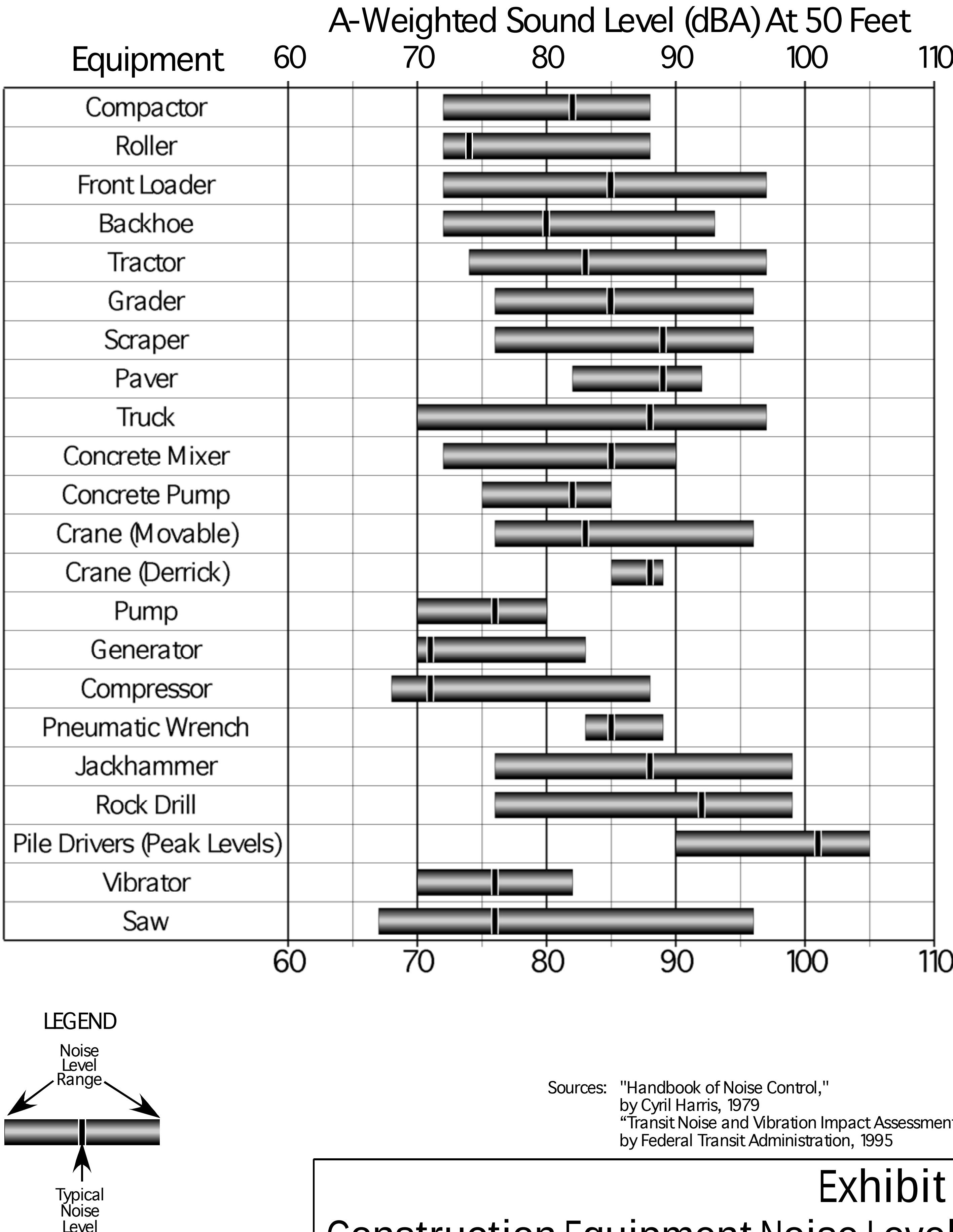
Construction noise represents a short term impact on ambient noise levels. Noise generated by construction equipment, including trucks, graders, bulldozers, excavator and loaders can reach high levels. Construction of the project includes grading, as well as importing and exporting of dirt.

Construction noise, generally, represents a short-term impact on ambient noise levels. Noise generated by construction equipment and construction activities can reach high levels. Construction equipment noise comes under the control of the Environmental Protection Agency's Noise Control Program (Part 204 of Title 40, Code of Federal Regulations). Examples of construction noise at 50 feet are presented in Exhibit 2. Note that at twice the distance (i.e. 100 feet) the noise levels will be 6 dB lower than those shown in Exhibit 2. At four times the distance (i.e. 200 feet), the noise levels will be 12 dB lower. Note that noise measurements made by Mestre Greve Associates for other projects show that the noise levels generated by commonly used grading equipment (i.e. loaders, graders and trucks) generate noise levels that typically do not exceed the middle of the range shown in Exhibit 2.

The nearest residential area is located along Rue Biarritz cul-de-sac to the north over looking the project site. Construction activities may occur approximately 50 feet from this home. At this distance, construction noise levels could be about 90 dBA. The average noise levels from construction equipment are typically 12 dBA lower, and could be in the range of 58 and 78 dBA at the nearest residential area.

The peak noise levels generated by on-site construction activities could be in excess of the daytime 75 dBA Lmax noise Ordinance Standard. However, Section 10.26.035.D of the Newport Beach Municipal Code exempts construction equipment from the provisions of the Noise Ordinance and requires them to comply with Section 10.28 of the Code. Section 10.28.040 of the Code restricts hours of construction to between the hours of 7:00 a.m. and 6:30 p.m. Monday through Friday and 8:00 a.m. and 6:00 p.m. on Saturday. Noise generating construction activities are not allowed on Sundays or Holidays. The project does not propose any construction activities outside of these hours, and therefore, will not result in a significant noise impact.

The grading associated with the project includes import and export of significant quantities of dirt. According to the City of Newport Beach, approximately 12,000 cubic yards will be moved to the adjacent surrounding areas, while approximately 7,000 cubic yards of hauled dirt will be exported to the east side of the Golf Course near MacArthur Boulevard approximately 3 miles away, and approximately 45,000 cubic yards of soil will be imported from the Orange County Sanitary District in City of Fountain Valley. Haul trucks associated mainly with the importing of 45,000 cubic yards of soil will generate noise along public roadways. The trucks are expected to enter and exit the site via Big Canyon Road, and thus, travel on Big Canyon Road, San Joaquin Hill Road and other adjacent roadways. The City’s information indicated that the importing of soil is anticipated to take about 32 days. Due to the limit of access on the project site, haul trucks of 10 cubic yard haul capacity will be utilized, resulting in approximately 141 haul trucks per day. This would add approximately 141 daily trucks or 282 truck trips per day to the adjacent roadways. Given a maximum of 282 truck trips a day, the CNEL noise levels due to the haul trucks via Big Canyon Road would be approximately 61 dBA at 40 feet from the centerline. This is the closest distance to the nearest typical home. This noise level is below the City’s 65 CNEL noise standard, and would not be considered to be significant. Once the trucks are on MacArthur Boulevard and other roadways, there is enough existing traffic on these roadways so that there will not be any significant impact.

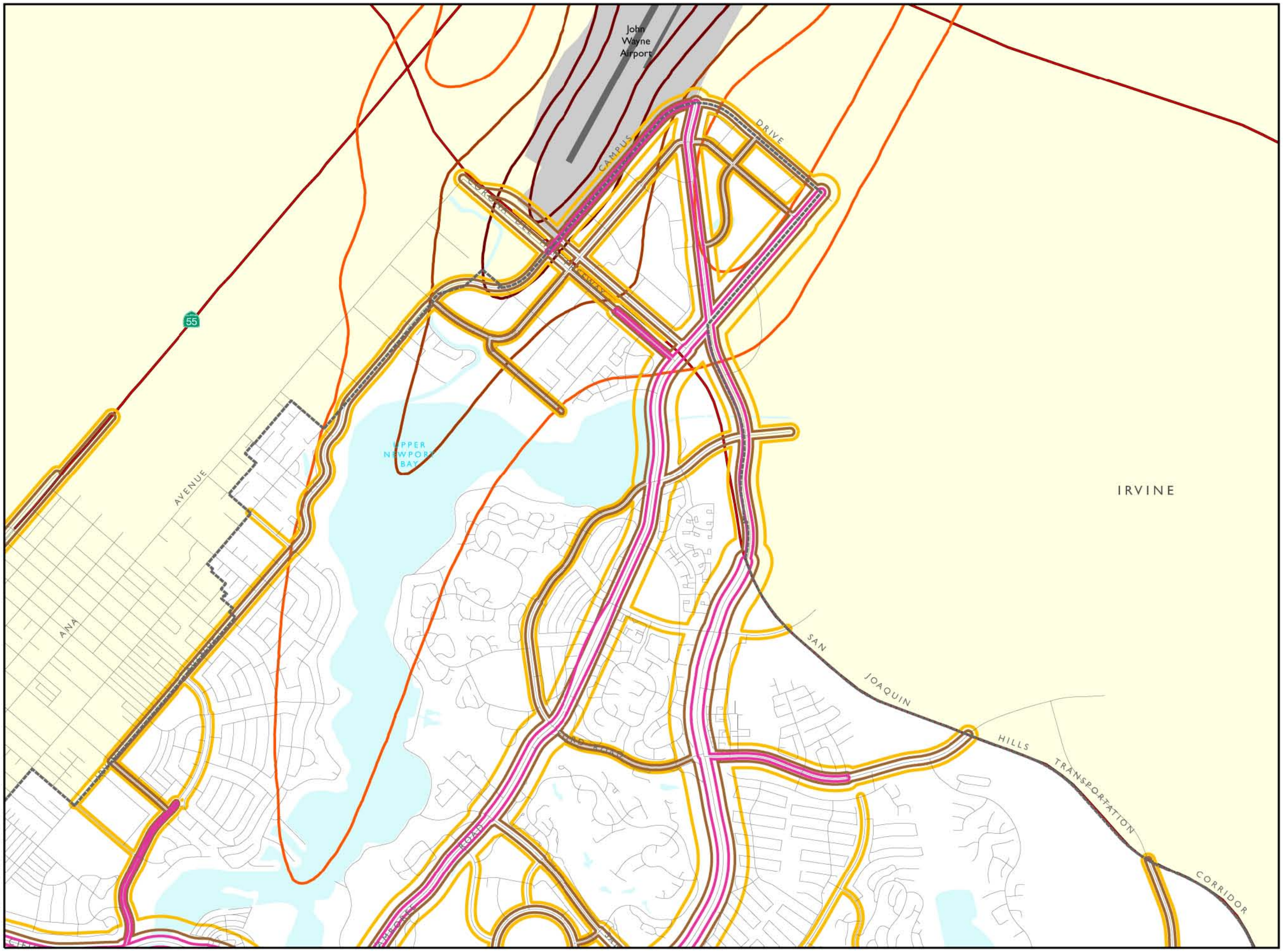


Sources: "Handbook of Noise Control," by Cyril Harris, 1979
"Transit Noise and Vibration Impact Assessment" by Federal Transit Administration, 1995

Exhibit 2
Construction Equipment Noise Levels

APPENDIX P

Figures N2 and N5: Existing Noise Contours and Future Noise Contours



CITY of NEWPORT BEACH
GENERAL PLAN

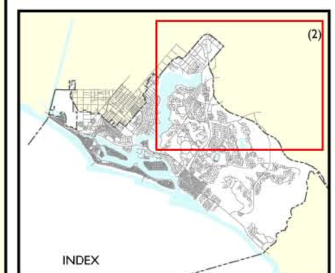
Figure N2

EXISTING NOISE CONTOURS

Roadway Noise Contours
- 70 CNEL
- 65 CNEL
- 60 CNEL

AELUP Noise Contours
- 70 CNEL
- 65 CNEL
- 60 CNEL
- City Boundary
- John Wayne Airport

The noise contours represent the maximum possible traffic noise levels at locations within them (i.e., they do not account for building placement or traffic speeds, nor include the attenuating effects of walls, structures, and terrain features that might intervene between the roads and any location of interest).



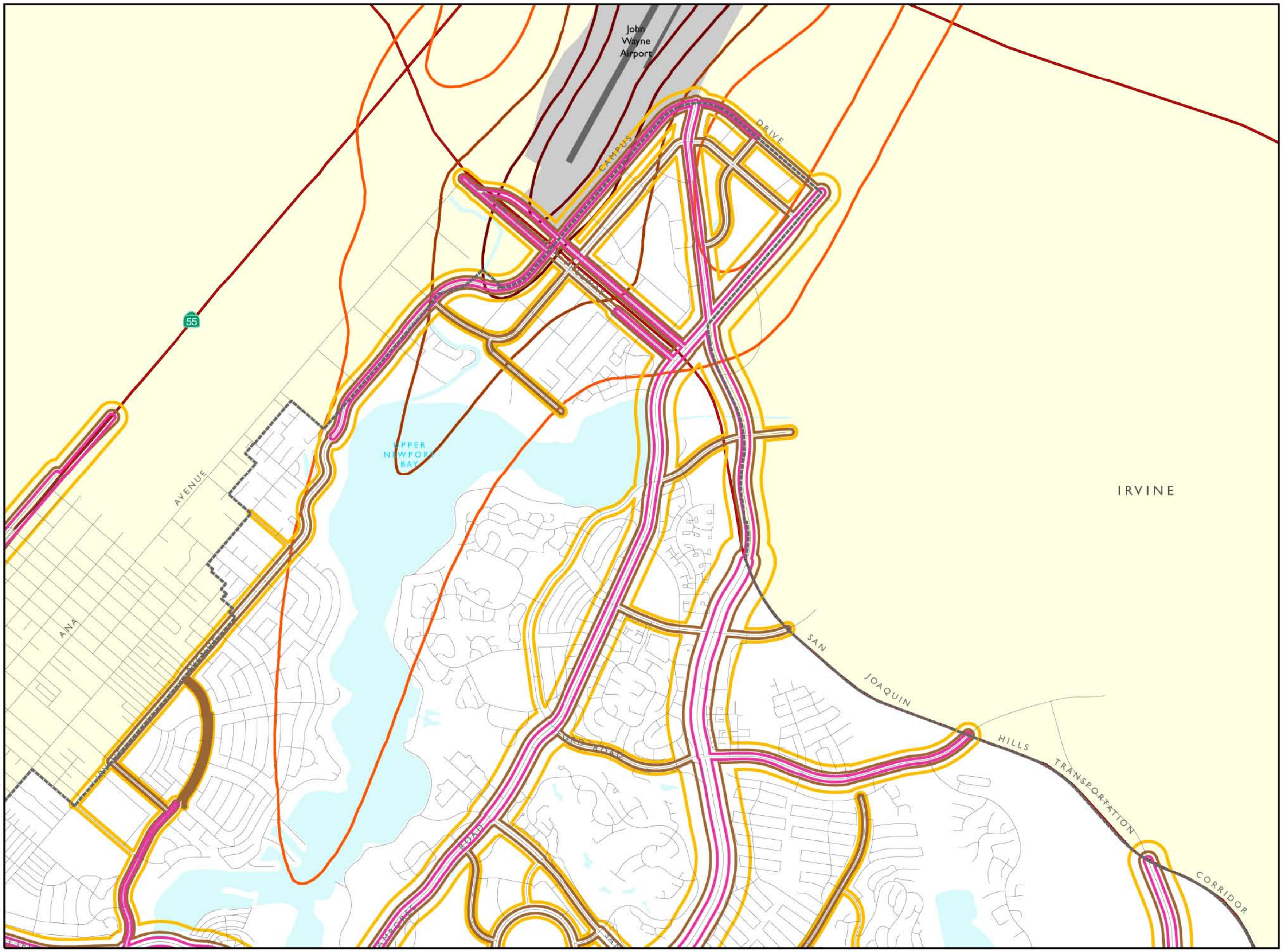
0
Miles

Source: City of Newport Beach, Mestre Greve Associates and EIP Associates

PROJECT NUMBER: 10579-01
Date: 4/20/06

EIP ASSOCIATES

N:/GISProjects/NewportBeach_10579/Noise1.mxd



CITY of NEWPORT BEACH
GENERAL PLAN

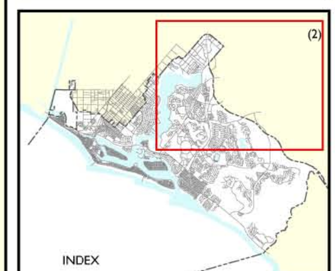
Figure N5

FUTURE NOISE CONTOURS

Roadway Noise Contours
- 70 CNEL
- 65 CNEL
- 60 CNEL

AELUP Noise Contours
- 70 CNEL
- 65 CNEL
- 60 CNEL
- City Boundary
- John Wayne Airport

The noise contours represent the maximum possible traffic noise levels at locations within them (i.e., they do not account for building placement or traffic speeds, nor include the attenuating effects of walls, structures, and terrain features that might intervene between the roads and any location of interest).



0 Miles

Source: City of Newport Beach, Mestre Greve Associates and EIP Associates

PROJECT NUMBER: 10579-01

Date: 4/20/06

EIP ASSOCIATES

N:/GISProjects/NewportBeach_10579/Noise1.mxd

APPENDIX Q

Cumulative Projects List

Cumulative Project List

The following projects were considered along with the proposed project to determine potential cumulative project impacts. As noted in the Environmental Analysis, reference to cumulative impacts refers to the listed projects below.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

Project	Proposed Land Uses	Location	Determination/Status	Discretionary Actions
North Newport Center Planned Community	The North Newport Center PC Development Plan serves as the controlling zoning ordinance for the sub-areas identified in the Planned Community Development Plan and is authorized and intended to implement the provisions of the Newport Beach General Plan.	The North Newport Center Planned Community District is comprised of seven sub-areas that include Fashion Island and Block 600 and portions of Block 100, Block 400, Block 500, Block 800, and San Joaquin Plaza.	As of December 31, 2010, the remaining entitlement consists of 126,933 square feet of retail in Fashion Island; 430 dwelling units in Block 500; and 434,736 square feet of office in Block 600.	• Addendum to the General Plan Program EIR
919 Bayside Dr Project	Development of 17 individual residential lots; 1 common recreational lot with possible pool and trellis structure; 2 landscape/open space lots; waterfront and dock lots.	919 Bayside Dr; southwest of Bayside Dr and Jamboree Rd	IS/MND and project approved in 2008. The CDP has been approved by the Coastal Commission. Project has not been constructed.	• IS/MND • Code Amendment • Use Permit • TTM • CDP (CCC)
AERIE Project	Residential development including the following: (a) the demolition of the existing residential structures on the 1.4-acre site; (b) the development of 8 residential condominium units; and (c) the replacement, reconfiguration, and expansion of the existing gangway platform, pier walkway, and dock facilities on the site.	201–207 Carnation Ave and 101 Bayside Pl; southwest of Bayside Dr between Bayside Pl and Carnation Ave, Corona del Mar	Final EIR was certified and project approved by the City on July 14, 2009. Project currently in litigation. The CDP has been approved by the Coastal Commission. Project has not been constructed.	• EIR • GP Amendment • Coastal Land Use Plan (CLUP) Amendment • Zone Change • Tract Map • Modification Permit • CDP (CCC)

Project	Proposed Land Uses	Location	Determination/Status	Discretionary Actions
Coast Community College District-Newport Beach Learning Center Project	3-story, 67,000-sf learning facility	505–1533 Monrovia Ave; west of Monrovia Ave and north of the terminus of 15th St	IS/MND and project approved August 2009. Pursuant to the City's Traffic Phasing Ordinance, a traffic study is required. The traffic study and parcel map were approved by the City on April 22, 2010. The project is currently under construction.	• IS/MND • Parcel Map • Traffic Study
Hoag Memorial Hospital Presbyterian Master Plan Update Project	Reallocation of up to 225,000 sf of previously approved (but not constructed) square footage from the Lower Campus to the Upper Campus.	1 Hoag Dr; northwest of West Coast Hwy and Newport Blvd	Final EIR certified and project approved on May 13, 2008. No new development has been constructed.	• EIR • GP Amendment • Planned Community Development Plan (PC) Text Amendment • Development Agreement Amendment • CDP (CCC)
Hyatt Regency Newport Beach Expansion Project	Improvements to the existing hotel which include the addition of 88 new timeshare units; a 24,387-sf, 800-seat ballroom/meeting building; a 10,072-sf spa and new pool; and a 2-level parking garage.	1107 Jamboree Rd; northwest of Back Bay Dr and Jamboree Rd	Final EIR certified and project approved on February 24, 2009. The project has not obtained a CDP; therefore, the City's entitlements cannot be implemented.	• EIR • Use Permit • Parcel Map • Modification Permit • Development Agreement • CDP (CCC)
LDS Rectory Project	Construction of a rectory with a 2,316-sf project footprint which consists of 1,825 sf of living space and a 491-sf, attached 2-car garage; fuel modification buffer extending 40 ft to the nearest property line; approximately 6,066-sf site.	2300 Bonita Canyon Dr; northeast of Bonita Canyon Dr at terminus with Prairie Rd	IS/MND and project approved on November 19, 2009. No activity.	• IS/MND • Use Permit • Site Plan Review
Newport Beach City Hall and Park Development Project	Relocation of City Hall (except for the Fire Department). Construction and operation of the following: (a) an approximate 98,000-sf City Hall building, Community Room, and Council Chambers; (b) a 450-space parking structure; (c) an approximate 17,000-sf expansion of the Newport Beach Central Library; and (d) construction of a public park.	1100 Avocado Ave; between Avocado Ave and MacArthur Blvd	Final EIR certified and project approved on November 24, 2009. Project construction began in May 2010. Construction is proposed to be completed in late 2012/early 2013.	• EIR • Design plans • Exemption from Zoning Code and PC 27

Project	Proposed Land Uses	Location	Determination/Status	Discretionary Actions
Santa Barbara Condominiums Project	79 condominium units totaling approximately 205,232 net sf; approximately 97,231 gross sf of subterranean parking structures for a total of 201 parking spaces on site; approximately 79,140 sf of open space and approximately 21,300 sf of recreational area.	Santa Barbara Drive west of Fashion Island	IS/MND and project approved in January 2006. The CDP has been approved by the Coastal Commission. No activity.	• IS/MND • GP Amendment • CLUP Amendment • Code Amendment • Parcel Map • TTM • Modification Permit • CDP (CCC)
Beauchamp Project	5 unit residential development	2000-2016 East Balboa Blvd ; east of East Balboa Street and L Street	Draft IS/MND was released for public review on January 12, 2010. Planning Commission recommended approval on March 4, 2010. The IS/MND and the project were approved by the City Council on May 25, 2010. The CDP has been approved by the Coastal Commission. Project has not been constructed.	• GP Amendment • CLUP Amendment • CDP (CCC)
Newport Business Plaza Project	Demolition of 2 existing connected buildings to construct a new 46,044 gross square foot business plaza.	4699 Jamboree Road and 5190 Campus Drive	The City Council approved the project on January 25, 2011.	• GP Amendment • PC text amendment • Tentative Parcel Map
Newport Marina – ETCO Development	A mixed use development consisting of 27 residential units and approximately 36,000 square feet of retail and office uses	2300 Newport Boulevard	FEIR certified in February 2006. Tentative Tract Map extended in October 2010.	• Site Plan Review • Use Permit • Tentative Tract Map
Marina Park Project	Development includes a public park and beach with recreational facilities; restrooms; a new Girl Scout House; a public short-term visiting vessel marina and sailing center; and a new community center with classrooms, and ancillary office space.	1700 Balboa Blvd; west of 15th St and east of 19th St	Draft EIR was released for public review from February 27, 2009, through April 13, 2009. Due to changes in the project, a Draft Recirculated EIR was prepared and released for public review on January 25, 2010. The Final EIR was certified and the project approved by the City on May 11, 2010. The CDP application is under review by the Coastal Commission. Construction is proposed to start mid-year 2012 and be completed in 2014.	• EIR • General Construction Activity Storm Water (NPDES) Permit (RWQCB) • CDP (CCC) • Section 401 Certification (RWQCB) • Section 1602 Streambed Alteration Agreement (CDFG)

Project	Proposed Land Uses	Location	Determination/Status	Discretionary Actions
Mariner's Medical Arts Project	A 12,763 sq. ft. addition to an existing 17,500 sq. ft. medical office complex. The existing medical office complex was designed by Master architect Richard Neutra and is considered to be significant historical resource.	1901 Westcliff Dr	City staff is determining the scope of the project. Environmental documentation has not been completed.	• Undetermined
Megonigal Residence Project	3,566 sf, single-family residence.	2333 Pacific Dr, Corona del Mar	Final EIR and project approved on January 12, 2010. The CDP has been approved. Building permits have been issued for this project.	• EIR • Modification Permit
Newport Beach Country Club Project	Demolition of existing tennis and golf clubhouses to construct a new 3,735 sf tennis clubhouse and 35,000 sf golf clubhouse. Included in the project are 27 short-term visitor-serving units (bungalows); a bungalow spa/fitness area and concierge and guest meeting facilities; and five single-family residential dwelling units (villas).	1600 East Coast Hwy	IS/MND was released for public review from September 20, 2010 through October 19, 2010. This project is currently scheduled for review at Planning Commission on August 4, 2011.	• Development Agreement • PC Development Plan Amendment • TTM • Transfer of Development Rights • CDP (CCC)
Newport Beach Country Club (International Bay Club)	Demolition of existing golf course and clubhouse to construct of a new 51,213 sf golf clubhouse and ancillary facilities including a cart barn and bag storage.	1600 -1602 East Coast Highway; northwest of Pacific Coast Highway and Newport Center Drive	An IS/MND was released for public review from October 8, 2010 November 8, 2010. This project is currently scheduled for review at Planning Commission on August 4, 2011.	• General Plan Amendment • Planned Community (PC) Text Adoption • Temporary Use Permit • Development Agreement • CDP (CCC)
PRES Office Building B Project	Increase the maximum allowable entitlement by 11,544 gross sf; increase the maximum allowable entitlement in office suite B by 9,917 net sf to allow for development of a new 2-level office building over a ground-level parking structure.	4300 Von Karman Ave	An IS/MND was released for public review on May 19, 2010. The Final EIR was certified and the project approved by the City Council on February 22, 2011.	• GP Amendment • PC Text Amendment
Old Newport GPA Project	Demolition of 3 existing buildings to construct a new 25,000-sf medical office building.	328, 332, and 340 Old Newport Blvd	IS/MND approved on March 9, 2010. No activity.	• Modification Permit • Traffic Study • Use Permit • GP Amendment
Rhine Channel Contaminated	Dredging of approximately 150,000 cubic yards of contaminated sediments within portions of Lower Newport	In the vicinity of Marina Park, the American Legion Post, and 15th Street	An IS/MND and conceptual project were approved by City Council on July 27, 2010. Application for	• Section 404 Permit (USACE) • Section 10 Permit

Project	Proposed Land Uses	Location	Determination/Status	Discretionary Actions
Sediment Cleanup Project	Harbor, specifically from the Rhine Channel and nearby areas bayward of Marina Park, the American Legion Post and 15th Street. Transport sediment by ocean barge for disposal and beneficial reuse within the approved Port of Long Beach Middle Harbor Redevelopment Project confined aquatic disposal facility.		disposal has been filed with the Port of Long Beach.	(USACE) ▪ 401 Water Quality Certification (RWQCB) ▪ CDP (CCC) • Dredging Lease (California State Lands Commission)
Sunset Ridge Park Project	Develop the approximate 18.9-acre site with active and passive recreational uses and an access road to the park through Newport Banning Ranch.	Northwest of West Coast Hwy and Superior Ave	The Final EIR was certified and the project approved by the City on March 23, 2010. The project is in litigation.	• EIR • Site Plan • CDP (CCC) • Streambed Alteration Agreement (CDFG) • Section 7 (USFWS)
Koll/Conexant Conceptual Plan; Uptown Newport Village Specific Plan Project:	1,504 unit residential development; 260 units on Koll site and 1,244 units on Conexant site (Uptown Newport Village)	4343 Von Karman Avenue and 4311, 4321, and 4343 Jamboree Rd; north of MacArthur Blvd and Jamboree Rd	City Council approved the Conceptual Development Plan on September 28, 2010. NOP for preparation of an EIR on Uptown Newport Village Specific Plan (Conexant site) released for public review on May 28, 2010. The project is on hold at the applicant's request.	• Specific Plan Adoption • PC Development Plan Amendment • Regional Water Quality Control Board • South Coast Air Quality Management District • Caltrans District 12 • Airport Land Use Commission • Department of Toxic Substances Control
Plaza Corona del Mar	Development of 1,750 sf new office space and seven (7) detached townhomes.	3900-3928 East Coast Highway	MND to be processed.	• Tentative Tract Map
Earl's Landing	Demolition of an existing restaurant and construction of new mixed-use building with a restaurant and 6 residential units	2751 and 2801 West Coast Highway	Submitted to the City on January 11. 2011.	• GP Amendment • Tentative Tract Map • Planned Development Permit • CUP
Bella Cara Dermatology GPA	9,500-square-foot office building containing 4,000 square feet of medical office space and 5,500 square feet of general office space	481-485 Old Newport Boulevard	Class 3 exemption. Project was denied by the Planning Commission and is currently on appeal to the City Council.	• GP Amendment

Project	Proposed Land Uses	Location	Determination/Status	Discretionary Actions
Mariner's Pointe	A 23,015-sf, two-story commercial building and a three-story parking structure.	200-300 West Coast Highway	Draft EIR was released for public review from April 11, 2011, through May 11, 2011. The project is currently scheduled for review by the Planning Commission on June 23, 2011.	• GP Amendment • Code Amendment • CUP • Variance • Site Development Review • Traffic Study
MacArthur at Dolphin-Striker Way	Demolition of a 7,996-sf restaurant 13,525 sf commercial retail development.	4221 Dolphin-Striker Way	IS/MND under preparation.	• PC text amendment • TDR • Traffic Study
AELUP: Airport Environs Land Use Plan; CDP: Coastal Development Permit; CUP: Conditional Use Permit; cy: cubic yards; DA: Development Agreement; DTSP: Downtown Specific Plan; EIR: Environmental Impact Report; FAA: Federal Aviation Administration; GPA: General Plan Amendment; gsf: gross square feet; HBGS: Huntington Beach Generating Station; I-405: Interstate 405 freeway; IBC: Irvine Business Complex; IS: Initial Study; ITC: Irvine Technology Center; LAFCO: Local Agency Formation Commission; LCP: Local Coastal Program; MCAS: Marine Corps Air Station; MND: Mitigated Negative Declaration; ND: Negative Declaration; PA: Planning Area; PC: Planned Community; sf: square feet; SP: Specific Plan; SR-73: State Route 73; TDR: transfer of development rights; TPM: Tentative Parcel Map; TTM: Tentative Tract Map; VTTM: Vesting Tentative Tract Map; ZC: Zone Change				

APPENDIX R

Mitigation Monitoring Program

Mitigation Monitoring and Reporting Program
Big Canyon Residential Lot Grading
Newport Beach, CA

No.	Mitigation Measure	Method of Verification	Timing of Implementation	Responsibility
Air Quality				
MM -1	All diesel powered construction equipment shall use diesel oxidation catalyst.	Grading Plan Approval	Prior to the start of and throughout grading	Grading Contractor Building Division
MM - 2	To reduce daily PM_{10} emissions, the on-site cut/fill activities shall be limited to a maximum of 400 cubic yards per day, when grading activities are within 25 meters (82 feet) of the nearest homes. The grading in this area would involve approximately 5,000 cubic yards and take approximately 13 days. Once the grading activities are outside the 25 meter zone, the on-site cut/fill activities shall be operated at a maximum 1,422 cubic yards per day. The grading for the remaining project area (outside 25 meters) would total ~~14~~59,000 cubic yards, and take approximately ~~10~~ 42 days.	Grading Plan Approval	Throughout grading	Grading Contractor Building Division
MM-3	Soil stabilizers shall be applied to inactive areas, and ground cover shall be replaced in disturbed areas that are inactive within five days.	Grading Plan Approval	Throughout grading	Grading Contractor Building Division
MM-4	All exposed dirt surfaces shall be watered three times daily	Grading Plan Approval	Throughout grading	Grading Contractor Building Division
MM-5	Water shall be provided while loading and unloading dirt to reduce visible dust plumes.	Grading Plan Approval	Throughout grading	Grading Contractor Building Division
MM-6	The speed of construction equipment on unpaved roads shall be less than 15 mph.	Grading Plan Approval	Throughout grading	Grading Contractor Building Division
MM-7	Haul road dust shall be watered three times daily.	Grading Plan Approval	Throughout grading	Grading Contractor Building Division
Geology and Soils				
MM-8	The underlying soils shall be removed and compacted per the grading recommendations in the Associated Soils Engineering Geotechnical Plan dated June 25, 2010 and to the satisfaction of the City Engineer prior to the issuance of a building permit.	Grading Plan Approval	Prior to the issuance of a grading permit	Grading Contractor Building Division

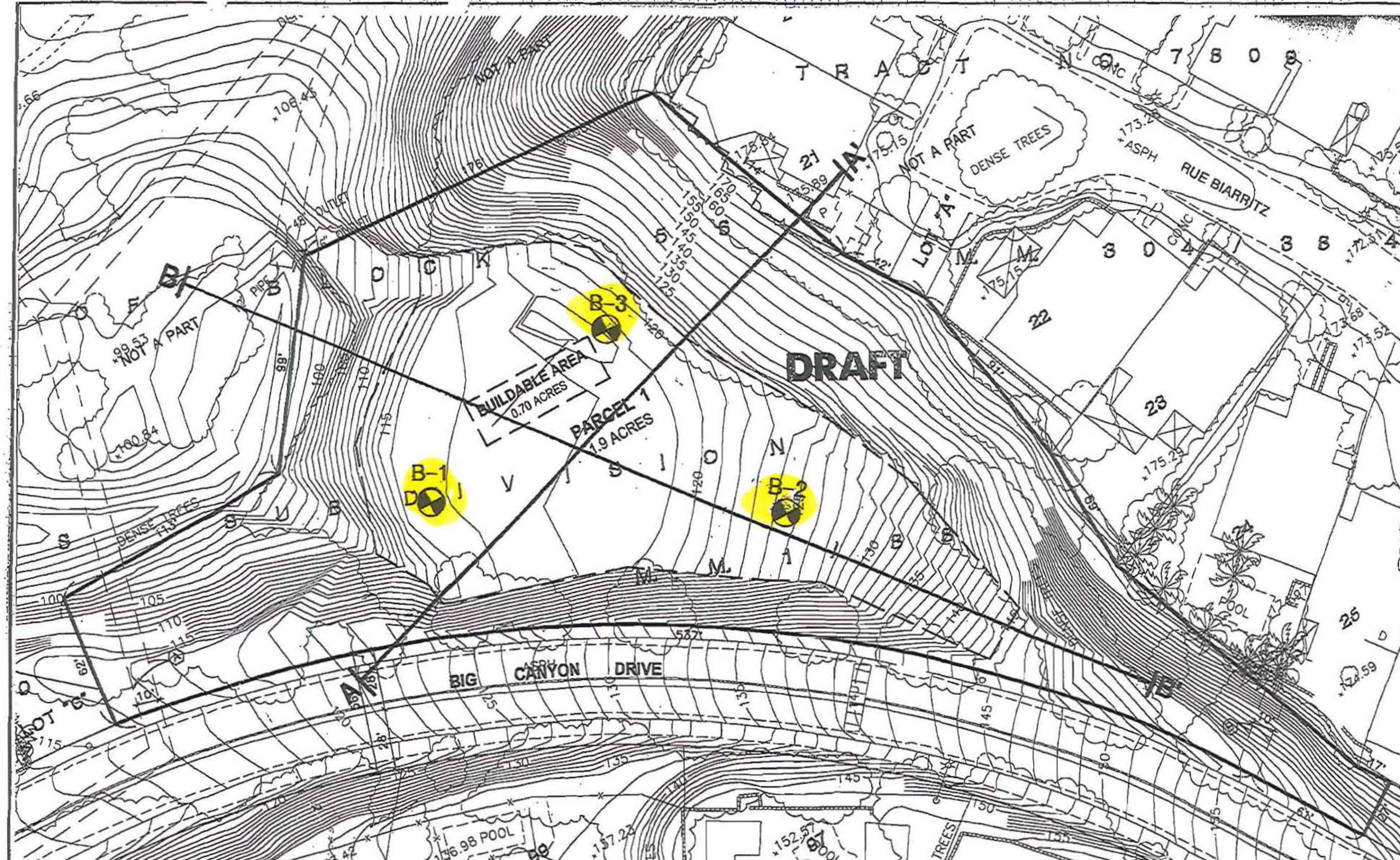
No.	Mitigation Measure	Method of Verification	Timing of Implementation	Responsibility
Hydrology and Water Quality				
MM-9	Should the resource agencies determine that the project would impact the 0.004 acres of relict drainage, the project applicant shall either provide 0.004 acres of on-site drainage adjacent to the existing CDFG wetland mitigation area on the golf course, acquire 0.004 acres of drainage area within an approved off-site CDFG mitigation bank or pay an in-lieu fee.	Resource Agency Approval and Proof of mitigation	Prior to the start of construction	Project Applicant Planning Division
MM-10	Prior to the issuance of a grading permit, an adequate vehicular turnaround area shall be provided on-site, suitable to the City Traffic Engineer. All trucks and construction equipment shall drive forward from the site onto Big Canyon Drive. Backing onto Big Canyon Drive from the site shall be prohibited.	Grading Plan Approval	Prior to the issuance of a grading permit	Project Applicant Public Works Department
The following mitigation measures are applicable carry-over measures from MND 2008-003				
Biology				
MM-11	The project site has some potential to support nesting migratory birds. Impacts to such species are prohibited under the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code. In order to ensure that the proposed project will not impact nesting migratory birds, the following mitigation measure is recommended: If vegetation is to be removed during the nesting season, recognized from February 1 through August 31, a qualified biologist will conduct a nesting bird survey of potentially suitable nesting vegetation no more than three days prior to vegetation removal. If active nests are identified during nesting bird surveys, then the nesting vegetation will be avoided until the nesting event has completed and the juveniles can survive independently from the nest. The biologist will flag the active nesting vegetation, and will establish an adequate buffer around the nesting vegetation of 300 feet (500 feet for raptors). If active nests are identified, clearing/grading shall not occur within the buffer until the nesting event has completed.	Survey from a qualified biologist	Prior to Issuance of the grading permit	Applicant Planning Division
Cultural Resources				
MM-12	Prior to approval of a grading plan, the property owner/developer shall submit a letter to the Planning	Letter from a qualified archaeologist	Prior to Issuance of the grading permit	Applicant Planning Division

No.	Mitigation Measure	Method of Verification	Timing of Implementation	Responsibility
	Division showing that a qualified archaeologist has been hired to ensure that the following actions are implemented. • The archaeologist must be present at the pregrading conference in order to establish procedures for temporarily halting or redirecting work to permit the sampling, identification, and evaluation of artifacts if potentially significant artifacts are uncovered. If artifacts are uncovered and determined to be significant, the archaeological observer shall determine appropriate actions in cooperation with the property owner/developer for exploration and/or salvage. • Specimens that are collected prior to or during the grading process will be donated to an educational or research institution. • Any archaeological work at the site shall be conducted under the direction of the certified archaeologist. If any artifacts are discovered during grading operations when the archaeological monitor is not present, grading shall be diverted around the area until the monitor can survey the area. • A final report detailing the findings and disposition of the specimens shall be submitted to the City Engineer. Upon Completion of the grading, the archaeologist shall notify the City as to when the final report will be submitted.			
MM-13	Prior to approval of a grading plan, the property owner/develop shall submit a letter to the Planning Division showing that a certified paleontologist has been hired to ensure that the following actions are implemented: • The paleontologist must be present at the pregrading conference in order to establish procedures to temporarily halt or redirect work to permit the sampling, identification, and evaluation of fossils. If potentially significant materials are discovered, the paleontologist shall determine appropriate actions in cooperation with the property owner/developer for exploration and/or salvage. • Specimens that are collected	Letter from a qualified paleontologist	Prior to issuance of the grading permit	Applicant Planning Division

No.	Mitigation Measure	Method of Verification	Timing of Implementation	Responsibility
	prior to or during the grading process will be donated to an appropriate educational or research institution. • Any paleontological work at the site shall be conducted under the direction of the certified paleontologist. If any fossils are discovered during grading operations when the paleontological monitor is not present, grading shall be diverted around the area until the monitor can survey the area. • A final report detailing the findings and disposition of the specimens shall be submitted. Upon the completion of the grading, the paleontologist shall notify the City as to when the final report will be submitted.			
MM-14	The Traffic Engineer shall require during the grading plan check review phase that the proposed project be designed to accommodate vehicular turnaround on-site. Backing out on to Big Canyon Drive shall be prohibited.	Grading Plan Approval	Prior to issuance of the grading permit	Applicant Public Works Department

APPENDIX S

Map of Water Bore Sample Site B-1



Associated Soils Engineering, Inc. 2860 WALNUT AVENUE–SIGNAL HILL, CALIF. 90755–PHONE 562/426-7990 – FAX 562/426-1842

Geotechnical Map	PROJECT# 09-6169	PLATE A–1

APPENDIX T

Orange Coast Analytical, Inc.
Laboratory Report Form

ORANGE COAST ANALYTICAL, INC.
3002 Dow, Suite 532, Tustin, CA 92780 (714) 832-0064 Fax (714) 832-0067
4620 E. Elwood, Suite 4, Phoenix, AZ 85040 (480) 736-0960 Fax (480) 736-0970

LABORATORY REPORT FORM

ORANGE COAST ANALYTICAL, INC.

3002 Dow Suite 532 Tustin, CA 92780

(714) 832-0064

Laboratory Certification (ELAP) No.: 2576
Expiration Date: 2013
Los Angeles County Sanitation District Lab ID# 10206

Laboratory Director's Name:

Mark Noorani

Client:	Associated Soils Engineering, Inc.
Laboratory Reference:	ASE 18050
Project Name:	Big Canyon Country Club
Project Number:	
Date Received:	9/14/2011
Date Reported:	9/26/2011
Chain of Custody Received:	☑
Analytical Method:	200.8,

Mark Noorani

Mark Noorani, Laboratory Director

Mr. John Whitney
Associated Soils Engineering, Inc.
2860 Walnut Ave
Signal Hill, CA, 90755

Lab Reference # ASE 18050
Project Name: Big Canyon Country Club
Project #:

Case Narrative

Sample Receipt:

All samples on the Chain of Custody were received by OCA at 4°C, on ice.

Holding Times:

All samples were analyzed within required holding times unless otherwise noted in the data qualifier section of the report.

Analytical Methods:

Sample analysis was performed following the analytical methods listed on the cover page.

Data Qualifiers:

Within this report, data qualifiers may have been assigned to clarify deviations in common laboratory procedures or any divergence from laboratory QA/QC criteria. If a data qualifier has been used, it will appear in the back of the report along with its description. All method QA/QC criteria have been met unless otherwise noted in the data qualifier section.

Definition of Terms:

The definitions of common terms and acronyms used in the report have been placed at the back of the report to assist data users.

Comments:

None

Mr. John Whitney
Associated Soils Engineering, Inc.
2860 Walnut Ave
Signal Hill, CA, 90755

Lab Reference # ASE 18050
Project Name: Big Canyon Country Club
Project #:

Client Sample Summary

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix
Ground Water	18050-001	9/14/2011	9/14/2011	Water

Mr. John Whitney
Associated Soils Engineering, Inc.
2860 Walnut Ave
Signal Hill, CA, 90755

Lab Reference # ASE 18050
Project Name: Big Canyon Country Club
Project #:

Metals

Client Sample ID	Lab Sample Number	Date Received	Date Sampled	Matrix	
Ground Water	18050-001	9/14/2011	9/14/2011	Water	Dissolved Metals

ANALYTE	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Selenium	200.8	9/23/2011	9/23/2011	4.3	µg/L	--

Method Blank — Water — Dissolved Metals

ANALYTE	MB ID	EPA Method	Date Extracted	Date Analyzed	Result	Units	Qual
Selenium	MBCT0923111	200.8	9/23/2011	9/23/2011	<2	µg/L	--

QA/QC Report
for
Metals

Reference #: ASE 18050

Reporting units: ppb

Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

200.8 Waste Dissolved

Analyte	Date of Extraction	MS Date of Analysis	MSD Date of Analysis	Laboratory Sample #	R1	SPC CONC	MS	MSD	%MS	%MSD	RPD	ACP %MS	ACP RPD	Qual
Selenium	9/23/2011	9/23/2011	9/23/2011	18050-001	4.30	100	107	110	103	106	3	70-130	20	--

Laboratory Control Sample

Analyte	Date of Extraction	LCS Date of Analysis	LCSD Date of Analysis	Laboratory Sample #	SPC CONC	LCS	LCSD	%LCS	% LCSD	RPD	ACP %LCS	ACP RPD	Qual
Selenium	9/23/2011	9/26/2011	9/26/2011	CT0923111	100	99.2	95.3	99	95	4	85-115	20	--

Definition of terms:

R1	Results Of Laboratory Sample Number
SP CONC	Spike Concentration Added to Sample
MS	Matrix Spike Results
MSD	Matrix Spike Duplicate Results
%MS	Percent Recovery Of MS: {(MS-R1) / SP} x100
%MSD	Percent Recovery Of MSD: {(MSD-R1) / SP} x 100
RPD	Relative Percent Difference: {(MS-MSD) / (MS+MSD)} x 100 x 2
LCS	Laboratory Control Sample Results
LCSD	Laboratory Control Sample Duplicate Results
%LCS	Percent Recovery Of LCS: {(LCS-R1) / SP} x100
%LCSD	Percent Recovery Of LCSD: {(LCSD-R1) / SP} x 100
RPD (for LCS/LCSD)	Relative Percent Difference: {(LCS-LCSD) / (LCS+LCSD)} x 100 x 2
ACP %MS(MSD)	Acceptable Range of Percent
ACP RPD	Acceptable Relative Percent Difference
D	Detectable, result must be greater than zero
Qual	A checked box indicates a data qualifier was required for this analyte; see attached explanation.
ND	Analyte Not Detected

Analysis Request and Chain of Custody Record

Lab Job No: 18050
Page ______ of ______

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Phoenix, AZ 85040
(480) 736-0960 Fax (480) 736-0970

REQUIRED TURN AROUND TIME: Standard: X
72 Hours: ______ 48 Hours: ______ 24 Hours: ______

CUSTOMER INFORMATION	PROJECT INFORMATION
COMPANY: ASSOCIATED SOILS ENGINEERING	PROJECT NAME: BIG CANYON COUNTRY CLUB
SEND REPORT TO: JOHN WHITNEY	NUMBER:
EMAIL: john@associatedsoils.com	ADDRESS: 10 BIG CANYON DR
ADDRESS: 2860 WALNUT AVE	
SIGNAL HILL CA 90755	P.O. #:
PHONE: (562) 426-7990 FAX: (562) 426-1842	SAMPLED BY: JOHN WHITNEY

ANALYSIS REQUEST / PRESERVATIVE

SAMPLE ID	NO. OF CONTAINERS	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER TYPE	Selenium										REMARKS/PRECAUTIONS
Ground Water	1	9/14	1045	W		X										

Total No. of Samples: Method of Shipment: Preservative: 1 = Ice 2 = HCl 3 = HNO_3 4 = H_2SO_4 5 = NaOH 6 = Other

Relinquished By:	Date/Time:	Received By:	Date/Time:
[signature]	9/14/11 11:55 AM		
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received For Lab By: [signature]	Date/Time: 9/14/11 1155

Sample Matrix: DW - Drinking Water, GW - Groundwater, WW - Wastewater, SS - Soil/Solid, OT- Other

Sample Integrity: Intact ✓ On Ice ✓ 4 °C