CALIFORNIA
AMERICAN WATER

California American Water - Monterey
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June 11, 2025

Mr. John Forsythe
California Public Utilities Commission
Energy Division
505 Van Ness Avenue
San Francisco, CA 94102

Re: Monterey Peninsula Water Supply Project – Notice to Proceed Request No. 5a (NTPR-5a) for Preliminary Site Preparation at the Desalination Plant

Dear Mr. Forsythe,

In April 2012, California American Water ("CalAm") filed an application (A.12-04-019) with the California Public Utilities Commission ("CPUC") for the Monterey Peninsula Water Supply Project ("MPWSP"). CalAm intends the MPWSP to secure replacement water supplies for CalAm's Monterey District in conformance with legal decisions affecting existing supplies from both the Carmel River and the Seaside Groundwater Basin. On January 13, 2017, the CPUC as the California Environmental Quality Act ("CEQA") lead agency, and the Monterey Bay National Marine Sanctuary ("MBNMS") as the National Environmental Policy Act ("NEPA") lead agency, published the MPWSP Draft Environmental Impact Report/Environmental Impact Statement ("EIR/EIS"). The CPUC and MBNMS published the MPWSP Final EIR/EIS on March 30, 2018. On September 13, 2018, the CPUC certified the combined EIR/EIS, approved an alternative (6.4 million gallon per day ["mgd"]) Project, adopted settlement agreements, and issued a Certificate of Public Convenience and Necessity ("Decision 18-09-017"). The adopted Project, referred to as "Alternative 5a" in the Final EIR/EIS, consists of the construction and operations of a reduced size 6.4 mgd plant (compared with the 9.6 mgd for the originally proposed project). Decision 18-09-017, the Final EIR/EIS, and its Mitigation Monitoring and Reporting Plan ("MMRP") is available at:

https://ia.cpuc.ca.gov/environment/info/esa/mpwsp/comms_n_docs.html

NOTICE TO PROCEED REQUEST PURPOSE

CalAm intends to submit a series of Notice to Proceed Requests ("NTPRs") in connection with the construction of the MPWSP Desalination Plant. The scope of each NTPR will depend on the nature of the work proposed and associated construction activities. This NTPR is narrowly tailored to: 1) address the implementation of certain mitigation measures identified in the MPWSP Final EIR/EIS that must be completed prior to the initiation of construction; and, 2) preliminary site preparation activities in anticipation of construction. This NTPR will not cover any vertical construction or construction of the Desalination Plant. This request is limited to the following activities:

- mammal burrow collapse;
- installation of exclusionary fencing;
- stormwater best management practices;
- security fencing;
- removal of up to 23 non-native trees;
- vegetation removal/site preparation;
- mass grading/earthwork;
- extension of temporary electricity to the site; and
- establishment of temporary construction access.

This NTPR documents compliance with the applicable pre-construction mitigation measures, as shown in **Appendix A**, to the limited activities associated with this NTPR, so the CPUC may provide authorization to CalAm to proceed with activities outlined in this NTPR.

COVERED ACTIVITIES

All work performed under this NTPR would occur at the MPWSP Desalination Plant site, which is in unincorporated Monterey County, California (see **Appendix B-1).** Site access will be provided via Charles Benson Road. CalAm will need to coordinate directly with Monterey Regional Waste Management District ("ReGen Monterey") to gain access from Charles Benson Road to proceed with preliminary site preparation activities covered under this NTPR. All work under this NTPR will be performed exclusively in the area shown in **Appendix B-2.** CalAm, the Contractor, and biological monitors will perform the following activities under this NTPR:

- **Mammal Burrow Collapse:** CalAm's biological consultants, AECOM and Denise Duffy & Associates ("DD&A"), will survey the entire site, in accordance with the methodology included in the Relocation Plan, consistent with the requirements of Mitigation Measure 4.6-1o: Avoidance and Minimization Measures for California Red-legged Frog and California Tiger Salamander. The Relocation Plan will be submitted and approved by the United States Fish and Wildlife Service/California Department of Fish and Wildlife ("USFWS/CDFW") prior to the start of construction activities. All mammal burrows identified during the survey effort will be scoped and/or excavated to determine if any Covered Species are present. If Covered Species are documented within the construction area, a qualified biologist will relocate the individuals in accordance with the Relocation Plan. All mammal burrows determined to be vacant will be collapsed consistent with the requirements of Mitigation Measure 4.6-1o. Preconstruction surveys, mammal burrow clearance, and collapse will be done along the perimeter of the site to allow for the installation of wildlife exclusion fencing (described below). Following wildlife exclusion fence installation, all mammal burrows remaining within the site will be cleared and collapsed as described above. The phase of the preconstruction survey effort is estimated to be completed in approximately one (1) to two (2) weeks.
- **Exclusionary Fencing:** As mentioned above, wildlife exclusion fencing will be installed on the perimeter of the project site pursuant to Mitigation Measure 4.6-1c: General Avoidance Minimization Measures and in accordance with the Relocation Plan. For the purposes of this NTPR, DD&A Senior Biologist Matt Johnson, will serve as the Lead Biologist. The Lead Biologist will coordinate the installation of wildlife exclusion fencing following the pre-construction surveys. As part of wildlife exclusion fencing installation, the Contractor will grade a narrow swath along the fence alignment to prepare the site for fence installation, facilitate on-going fence monitoring, and make repairs during

construction. Wildlife exclusion fence installation will take approximately one (1) week. See **Appendix B-3** for fencing extent and **Appendix B-4** for an exclusionary fencing profile.

- **Stormwater Best Management Practices ("BMPs"):** In accordance with the Monterey County grading permit (19CP00658) and approved Stormwater Pollution Prevention Plan, CDM Smith (or subcontractor) will proceed with installation of silt fence and additional BMPs such as straw wattles. CalAm will also provide the approved grading permit once the Contractor pulls the permit. This work will take approximately one (1) to two (2) weeks.
- **Security Fencing:** In tandem with or after installation of stormwater BMPs, CDM Smith (or subcontractor) will proceed with installation of temporary chainlink security fencing and temporary access gates. This work will take approximately one (1) to two (2) weeks.
- **Tree Removal:** Vegetation clearing at the project site will require the removal of 13 trees (12 Monterey cypress [*Cupressus macrocarpa*] and 1 blue gum eucalyptus [*Eucalyptus globulus*]) and potential removal of up to 10 additional trees (10 Monterey cypress). Trees proposed for removal do not meet the definition of "protected trees" or "landmark trees" as defined in Monterey County Code (§16.60.030,) therefore a tree removal permit will not be required. To facilitate tree removal the Contractor will conduct clearance activities around the trees to be removed and for access from Charles Benson Road. Tree removal would not occur until after DD&A and AECOM complete the necessary preconstruction survey requirements (included in **Appendix A-1**) and the Contractor has installed the exclusionary fencing. Tree removal activities would be completed in approximately one (1) week. See **Appendix B-5** for the tree removal plan.
- **Vegetation Removal/Site Preparation:** Following the completion of the necessary preconstruction survey requirements included in **Appendix A-1**, installation of wildlife exclusion fencing, and tree removal, CalAm and their Contractor will proceed with initial vegetation removal and site preparation activities. Cleared off debris and excess soil will be off-hauled and disposed of at ReGen Monterey. Topsoil will be stockpiled and covered for future use at areas that will be landscaped areas as part of subsequent phases of construction. Clearing and grubbing activities would take approximately three (3) days.
- **Mass Grading/Earthwork:** Following clearing and grubbing activities, mass grading will begin to prepare the site for construction. Additionally, as part of this phase, CDM Smith and the Contractor will prepare an area for temporary site offices and construction worker parking. This work will include some deeper over excavation in accordance with the geotechnical requirements from the approved Monterey County grading permit. Additionally, the Contractor will backfill using structural fill in order to adequately support planned structures and roads. This work will also include grading and excavation of the planned bioretention and brine ponds. Additionally, grading work will include improvements and modifications to site access to allow temporary construction access. Mass grading and earthwork activities would take approximately six (6) weeks.
- **Temporary Construction Power:** This NTPR also includes the installation of site improvements to facilitate temporary construction power. This would include the construction of a 10-foot wide and approximately 200-foot long temporary access road to allow access to the existing power pole. Additionally, an overhead transformer, entrance cable and meter section would be installed. Temporary power will run from the power pole 200 feet to the Northeast of the site over to a pole at the Northeast corner of the of the site and then down and over to the future parking area which is the intended

location for temporary office facilities. This temporary office location may be adjusted as the construction plan develops. Installation of temporary construction power would be completed in approximately three (3) to four (4) weeks; though, lead times for delivery of electrical equipment may affect the start of this work. See **Appendix B-6** for location of the temporary power.

- **Temporary Construction Access:** This NTPR also includes the removal of a portion of the existing security fencing near the entrance to the Desalination Plant site and installation of a temporary construction access gate. The temporary access gate would be used for both entry and exit by construction personnel at the Desalination Plant site. The access gate would be installed for security measures during construction. The construction contractor would implement typical construction BMPs for personnel entering and exiting the site.

CONSTRUCTION EQUIPMENT

Equipment associated with this phase of construction would be limited to excavators, dozers, skip loaders, track loaders, boom/bucket trucks, cranes, forklifts and pickup trucks.

CONSTRUCTION SCHEDULE

The activities described above are anticipated to take approximately 16-20 weeks with initial work commencing in October 2025. Construction equipment would typically operate for eight hours a day. However, at times, workers and equipment could be on site up to 12-hours per day. Thus, construction activities would likely occur between 7:00AM and 7:00PM, Monday through Saturday. No 24-hour construction activities would be proposed for the facility construction.

MITIGATION MEASURE TRACKING AND REPORTING

During the execution of the scope of work under this NTPR CalAm will implement the applicable mitigation measures as identified by the CPUC in Decision 18-09-17 specific to the Desalination Plant. **Appendix A** of this NTPR identifies all mitigation measures and notes compliance with all pre-construction mitigation measures, as cited in the MPWSP Final EIR/EIS, which are applicable to the Desalination Plant. In addition, pursuant to the requirements of the MMRP, a number of technical reports/plans must be prepared. **Appendix C** includes a comprehensive environmental packet compiling all the applicable technical reports and plans that are applicable to this component.

For mitigation monitoring CalAm's biological monitor, DD&A will prepare daily monitoring compliance logs with observations and survey results in the field. These monitors will include the daily compliance logs in a monthly report and submit monthly reports upon request. The monthly monitoring report will provide information regarding the worker awareness training, surveys, and any observed special-status species, including any accidents on site, and ongoing compliance items. DD&A will document pre-construction survey results prior to the start of construction activities within the timeframes identified in each applicable mitigation measure.

DD&A will also provide annual monitoring reports on behalf of CalAm consistent with the sample monitoring report contained in the Mitigation Monitoring, Compliance, and Reporting Plan ("MMCRP") for the MPWSP.

PROJECT CONTACTS

The following table contains the names and contact information for key contacts for work covered under this NTPR.

Name	Title	Organization	E-mail	Phone
Tim O'Halloran	Engineering Manager – Coastal Division	CalAm	Tim.Ohalloran@amwater.com	Office: (831) 646-3291 Cell: (831) 320-1384
Tom Visosky	Design Builder	CDM Smith	Visoskyta@cdmsmith.com	Office: (213) 457-2133 Cell: (213) 200-3903
Tyler Potter	CalAm Compliance Project Manager	DD&A	TPotter@ddaplanning.com	Office: (831) 373-4341 Cell: (831) 915-4633
Matt Johnson	Lead Biologist	DD&A	MJohnson@ddaplanning.com	Office: (831) 373-4341 Cell: (831) 917-3242

CalAm respectfully requests authorization of this NTPR. If you have any questions or require additional information, please do not hesitate to contact me. As always, thank you in advance for your time and we look forward to working with you on this project.

Sincerely,

Tim O'Halloran, P.E.
Engineering Manager – Coastal Division
California American Water

APPENDICES

Appendix A – Tables of Applicable Mitigation Measures Identified in Approved MMRP
- Appendix A-1: Pre-Construction FEIR/EIS Mitigation Measures
- Appendix A-2: During Construction FEIR/EIS Mitigation Measures
- Appendix A-3: Post-Construction/Operational FEIR/EIS Mitigation Measures

Appendix B – Various Project Maps
- Appendix B-1: Project Vicinity Map
- Appendix B-2: Project Location Map
- Appendix B-3: Exclusionary Site Fencing
- Appendix B-4: Exclusionary Fencing Profile
- Appendix B-5: Tree Removal Plan
- Appendix B-6: Location of Temporary Construction Power Map

Appendix C – Technical Plans, Reports, and other Documentation
- Appendix C-1: General Avoidance and Minimization Measures
- Appendix C-2: Site Specific Health and Safety Plan
- Appendix C-3: Construction Equipment and Vehicle Efficiency Plan
- Appendix C-4: Construction Waste Reduction and Recycling Plan
- Appendix C-5: Soil and Groundwater Management Plan
- Appendix C-6: Stormwater Pollution Prevention Plan

Appendix A

Tables of Applicable Mitigation Measures Identified in Approved MMRP

A-1. Pre-Construction FEIR/EIS Mitigation Measures

A-2. During Construction FEIR/EIS Mitigation Measures

A-3. Post-Construction/During Operation FEIR/EIS Mitigation Measures

A-1. Pre-Construction FEIR/EIS Mitigation Measures

Monterey Peninsula Water Supply Project
Desalination Plant Phase 1
Pre-Construction FEIR/EIS Mitigation Measures

MM #	Condition Name	Status	Status Detail
4.6-1a	Retain a Lead Biologist to Oversee Implementation of Protective Measures	Complete	CalAm retained the same Lead Biologist as the NTPR-1. CalAm previously submitted documentation demonstrating compliance with the requirements of the mitigation measure. No further documentation is warranted at this stage.
4.6-1b	Construction Worker Environmental Awareness Training and Education Program	Complete	Video completed for WEAT presentation; CalAm previously submitted a copy of the training transcript/DVD as part of previous NTPR submittals. All construction personnel associated with this NTPR will undergo the construction WEAT program prior to the start of construction. Names of all personnel who attended the training with signed acknowledgement forms will be submitted to the CPUC following the pre-construction training.
4.6-1c	General Avoidance and Minimization Measures	On-going	CalAm has retained a Lead Biologist that will be responsible for overseeing on-going monitoring in connection with construction-related activities. On-site biological monitors will be present during construction consistent with the requirements of this mitigation measure. Additionally, the General Avoidance and Minimization Measures are included as **Appendix C-1**.
4.6-1e	Avoidance and Minimization Measures for Special-status Plants	Scheduled	Pre-construction surveys and any other applicable documentation will be provided to CPUC/ESA once complete.
4.6-1i	Avoidance and Minimization Measures for Nesting Birds	Scheduled	Pre-construction surveys and any other applicable documentation will be provided to CPUC/ESA once complete.
4.6-1j	Avoidance and Minimization Measures for American Badger	Scheduled	Pre-construction surveys and any other applicable documentation will be provided to CPUC/ESA once complete.
4.6-1l	Avoidance and Minimization Measures for Special-Status Bats	Scheduled	Pre-construction surveys and any other applicable documentation will be provided to CPUC/ESA once complete.
4.6-1n	Habitat Mitigation and Monitoring Plan	Complete	The Habitat Monitoring and Mitigation Plan for Phase 1 of the MPWSP was submitted to the CPUC as part of NTPR-1. No further documentation is warranted at this stage.
4.6-1o	Avoidance and Minimization Measures for California Red-Legged Frog and California Tiger Salamander	Scheduled	Pre-construction surveys will be completed prior to the start of construction. The survey results will be submitted to the CPUC following completion of the surveys. In addition, a relocation plan will be submitted to the USFWS and CDFW for approval prior to the start of construction.
4.6-1p	Control Measures for Spread of Invasive Plants	On-going	This measure will be monitored by the Lead Biologist during construction.
4.6-2b	Avoid, Minimize, and Compensate for Construction Impacts to Sensitive Communities and Environmentally Sensitive Habitat Areas	N/A	This NTPR does not include any work within the Coastal Zone or ESHA.
4.6-4	Compliance with Local Tree Ordinances	N/A	This NTPR includes the removal of up to removal of 13 trees (12 Monterey cypress and 1 blue gum eucalyptus) and potential removal of up to 10 additional trees (10 Monterey

MM #	Condition Name	Status	Status Detail
			cypress). These trees are not protected under local tree ordinances and do not require a tree removal permit. As a result, this mitigation measure is not applicable.
4.7-2a	Health and Safety Plan	Complete	The Health and Safety Plan is included as **Appendix C-2**.
4.7-2b	Soil and Groundwater Management Plan	Complete	The Soil and Groundwater Management Plan is included as **Appendix C-5**.
4.9-1	Traffic Control and Safety Assurance Plan	N/A	This NTPR consists of preliminary site preparation activities, including implementation of mitigation requirements contained in the MPWSP EIR/EIS. No work is proposed within public rights-of-way; therefore, this mitigation measure is not applicable.
4.9-6	Roadway Rehabilitation Program	On-going	Contractor/CalAm to prepare pre-construction photos; videos will be georeferenced and submitted upon request.
4.9-C	Construction Traffic Coordination Plan	N/A	This NTPR consists of preliminary site preparation activities, including implementation of mitigation requirements contained in the MPWSP EIR/EIS. No work is proposed within public rights-of-way; therefore, this mitigation measure is not applicable.
4.10-1a	Equipment with High-Tiered Engine Standards	Complete	The Construction Equipment and Vehicle Efficiency Plan is included as **Appendix C-3**.
4.10-1b	Idling Restrictions	Complete	The Construction Equipment and Vehicle Efficiency Plan is included as **Appendix C-3**.
4.10-1c	Construction Fugitive Dust Control Plan	Complete	The requirements of this mitigation measure are included as part of the Construction Equipment and Vehicle Efficiency Plan, which is included as **Appendix C-3**.
4.10-1e	Off-site Mitigation Program	N/A	This NTPR consists of preliminary site preparation activities, including implementation of mitigation requirements contained in the MPWSP EIR/EIS. Given the limited nature of this NTPR, this measure is not applicable at this stage. This measure will be addressed as part of future NTPR submittals.
4.11-1	GHG Emissions Reductions Plan	N/A	This NTPR consists of preliminary site preparation activities, including implementation of mitigation requirements contained in the MPWSP EIR/EIS. Given the limited nature of this NTPR, this measure is not applicable at this stage. This measure will be addressed as part of future NTPR submittals.
4.13-1a	Locate and Confirm Utility Lines	Scheduled	CalAm will coordinate with the Underground Service Alert ("USA") to identify the location of utility lines prior to construction.
4.-13-1b	Coordinate Final Construction Plans with Affected Utilities	Scheduled	CalAm will coordinate with local utility service providers prior to the start of construction.
4.13-1c	Safeguard Employees from Potential Accidents Related to Underground Utilities	Complete	The requirements of this mitigation measure are included in the Health and Safety Plan, which is included as **Appendix C-2.**
4.-13-1d	Emergency Response Plan	Complete	The requirements of this mitigation measure are included in the Health and Safety Plan, which is included as **Appendix C-2**.
4.13-1e	Notify Local Fire Departments	Scheduled	CalAm will coordinate with the local fire department prior to the start of construction for work near gas lines.
4.13-2	Construction Waste Reduction and Recycling Plan	Complete	The Construction Waste Reduction and Recycling Plan is included as **Appendix C-4.**

MM #	Condition Name	Status	Status Detail
4.14-2	Site-Specific Nighttime Lighting Measures	N/A	No nighttime lighting is proposed as part of this NTPR. Therefore, this mitigation measure is not applicable.
4.18-1	Construction Equipment and Vehicle Efficiency Plan	Complete	The Construction Equipment and Vehicle Efficiency Plan is included as **Appendix C-3**.

A-2. During Construction FEIR/EIS Mitigation Measures

Monterey Peninsula Water Supply Project
Desalination Plant Phase 1
Construction FEIR/EIS Mitigation Measures

MM #	Condition Name	Status	Status Detail
4.6-1a	Retain a Lead Biologist to Oversee Implementation of Protective Measures	Complete	CalAm retained the same Lead Biologist as the NTPR-1. CalAm previously submitted documentation demonstrating compliance with the requirements of the mitigation measure. No further documentation is warranted at this stage.
4.6-1c	General Avoidance and Minimization Measures	On-going	CalAm has retained a Lead Biologist that will be responsible for overseeing on-going monitoring in connection with construction-related activities. On-site biological monitors will be present during construction consistent with the requirements of this mitigation measure. Additionally, the General Avoidance and Minimization Measures are included as **Appendix C-1**.
4.6-1e	Avoidance and Minimization Measures for Special-status Plants	Scheduled	Pre-construction surveys and any other applicable documentation will be provided to CPUC/ESA once complete. The applicability of this measure will be determined based on pre-construction surveys.
4.6-1i	Avoidance and Minimization Measures for Nesting Birds	Scheduled	Pre-construction surveys and any other applicable documentation will be provided to CPUC/ESA once complete. The applicability of this measure will be determined based on pre-construction surveys.
4.6-1j	Avoidance and Minimization Measures for American Badger	Scheduled	Pre-construction surveys and any other applicable documentation will be provided to CPUC/ESA once complete. The applicability of this measure will be determined based on pre-construction surveys.
4.6-1l	Avoidance and Minimization Measures for Special-Status Bats	Scheduled	Pre-construction surveys and any other applicable documentation will be provided to CPUC/ESA once complete. The applicability of this measure will be determined based on pre-construction surveys.
4.6-1n	Habitat Mitigation and Monitoring Plan (HMMP)	Complete	The Habitat Monitoring and Mitigation Plan for Phase 1 of the MPWSP was submitted to the CPUC as part of NTPR-1. No further documentation is warranted at this stage.
4.6-1o	Avoidance and Minimization Measures for California Red-Legged Frog and California Tiger Salamander	Scheduled	Pre-construction surveys will be completed prior to the start of construction. The survey results will be submitted to the CPUC following completion of the surveys. In addition, a relocation plan will be submitted to the USFWS and CDFW for approval prior to the start of construction.
4.6-1p	Control Measures for Spread of Invasive Plants	On-going	This measure will be monitored by the Lead Biologist during construction.
4.6-2b	Avoid, Minimize, and Compensate for Construction Impacts to Sensitive Communities and Environmentally Sensitive Habitat Areas (ESHA)	N/A	This NTPR does not include any work within the Coastal Zone or ESHA.
4.6-4	Compliance with Local Tree Ordinances	N/A	This NTPR includes the removal of up to removal of 13 trees (12 Monterey cypress and 1 blue gum eucalyptus) and potential removal of up to 10 additional trees (10 Monterey cypress). These trees are not protected under local tree ordinances and do not require a tree removal permit. As a result, this mitigation measure is not applicable.

MM #	Condition Name	Status	Status Detail
4.7-2a	Health and Safety Plan	Complete	The Health and Safety Plan is included as **Appendix C-2**.
4.7-2b	Soil and Groundwater Management Plan	Complete	The Soil and Groundwater Management Plan is included as **Appendix C-5**.
4.9-1	Traffic Control and Safety Assurance Plan	N/A	This NTPR consists of preliminary site preparation activities, including implementation of mitigation requirements contained in the MPWSP EIR/EIS. No work is proposed within public rights-of-way; therefore, this mitigation measure is not applicable.
4.9-C	Construction Traffic Coordination Plan	N/A	This NTPR consists of preliminary site preparation activities, including implementation of mitigation requirements contained in the MPWSP EIR/EIS. No work is proposed within public rights-of-way; therefore, this mitigation measure is not applicable.
4.10-1a	Equipment with High-Tiered Engine Standards	Complete	The Construction Equipment and Vehicle Efficiency Plan is included as **Appendix C-3**.
4.10-1b	Idling Restrictions	Complete	The Construction Equipment and Vehicle Efficiency Plan is included as **Appendix C-3**.
4.10-1c	Construction Fugitive Dust Control Plan	Complete	The requirements of this mitigation measure are included as part of the Construction Equipment and Vehicle Efficiency Plan, which is included as **Appendix C-3**.
4.10-1e	Off-site Mitigation Program	N/A	This NTPR consists of preliminary site preparation activities, including implementation of mitigation requirements contained in the MPWSP EIR/EIS. Given the limited nature of this NTPR, this measure is not applicable at this stage. This measure will be addressed as part of future NTPR submittals.
4.11-1	GHG Emissions Reductions Plan	N/A	This NTPR consists of preliminary site preparation activities, including implementation of mitigation requirements contained in the MPWSP EIR/EIS. Given the limited nature of this NTPR, this measure is not applicable at this stage. This measure will be addressed as part of future NTPR submittals.
4.13-1a	Locate and Confirm Utility Lines	Scheduled	CalAm will coordinate with the Underground Service Alert ("USA") to identify the location of utility lines prior to construction.
4.13-1b	Coordinate Final Construction Plans with Affected Utilities	Scheduled	CalAm will coordinate with local utility service providers prior to the start of construction.
4.13-1c	Safeguard Employees from Potential Accidents Related to Underground Utilities	Complete	The requirements of this mitigation measure are included in the Health and Safety Plan, which is included as **Appendix C-2.**
4.13-1d	Emergency Response Plan	Complete	The requirements of this mitigation measure are included in the Health and Safety Plan, which is included as **Appendix C-2**.
4.13-1e	Notify Local Fire Departments	Scheduled	CalAm will coordinate with the local fire department prior to the start of construction for work near gas lines.
4.13-1f	Ensure Prompt Reconnection of Utilities	On-going	CalAm will submit documentation to the CPUC demonstrating that any disconnected utilities are promptly reconnected to the extent that this mitigation measure would apply to this NTPR.
4.13-2	Construction Waste Reduction and Recycling Plan	Complete	The Construction Waste Reduction and Recycling Plan is included as **Appendix C-4.**
4.14-1	Maintain Clean and Orderly Construction Sites	On-going	CalAm will ensure that the construction contractor adheres to the requirements of this mitigation measure during construction.

MM #	Condition Name	Status	Status Detail
4.14-2	Site-Specific Nighttime Lighting Measures	N/A	No nighttime lighting is proposed as part of this NTPR. Therefore, this mitigation measure is not applicable.
4.15-2b	Inadvertent Discovery of Cultural Resources	On-going	See AECOM Archaeological Monitoring Plan that was previously submitted as part of NTPR-1.
4.15-4	Inadvertent Discovery of Human Remains	On-going	See AECOM Archaeological Monitoring Plan that was previously submitted as part of NTPR-1.
4.18-1	Construction Equipment and Vehicle Efficiency Plan	Complete	The Construction Equipment and Vehicle Efficiency Plan is included as **Appendix C-3**.

A-3. Post-Construction/During Operation FEIR/EIS Mitigation Measures

Monterey Peninsula Water Supply Project
Desalination Plant Phase 1
Post-Construction/Operational Mitigation Measures

MM #	Condition Name	Status	Status Detail
4.3-4	Operational Discharge Monitoring, Analysis, Reporting, and Compliance	N/A	This NTPR consists of preliminary site preparation activities, including implementation of mitigation requirements contained in the MPWSP FEIR/EIS. Given the limited nature of this NTPR, this measure is not applicable at this stage. This measure will be addressed as part of future NTPR submittals.
4.3-5	Implement Protocols to Avoid Exceeding Water Quality Objectives	N/A	This NTPR consists of preliminary site preparation activities, including implementation of mitigation requirements contained in the MPWSP EIR/EIS. Given the limited nature of this NTPR, this measure is not applicable at this stage. This measure will be addressed as part of future NTPR submittals.
4.6-1n	Habitat Mitigation and Monitoring Plan	Complete	The Habitat Monitoring and Mitigation Plan for Phase 1 of the MPWSP was submitted to the CPUC as part of NTPR-1. No further documentation is warranted at this stage.
4.6-1o	Avoidance and Minimization Measures for California Red-Legged Frog and California Tiger Salamander	Scheduled	Pre-construction surveys will be completed prior to the start of construction. The survey results will be submitted to the CPUC following completion of the surveys. These surveys will determine the applicability of this mitigation measure after construction and during operation. In addition, a relocation plan will be submitted to the USFWS and CDFW for approval prior to the start of construction.
4.6-6	Installation and Monitoring of Bird Deterrents at the Brine Storage Basin	N/A	This NTPR consists of preliminary site preparation activities, including implementation of mitigation requirements contained in the MPWSP EIR/EIS. Given the limited nature of this NTPR, this measure is not applicable at this stage. This measure will be addressed as part of future NTPR submittals that include the construction and operation of the brine storage basin.
4.9-6	Roadway Rehabilitation Program	On-going	Contractor/CalAm to prepare pre-construction photos; videos will be georeferenced and submitted upon request.
4.11-1	GHG Emissions Reductions Plan	N/A	This NTPR consists of preliminary site preparation activities, including implementation of mitigation requirements contained in the MPWSP FEIR/EIS. Given the limited nature of this NTPR, this measure is not applicable at this stage. This measure will be addressed as part of future NTPR submittals.

Appendix B

Various Project Maps and Plans

B-1: Project Vicinity Map

B-2: Project Location Map

B-3: Exclusionary Site Fencing Map

B-4: Exclusionary Fencing Profile

B-5: Tree Removal Plan

B-6: Location of Temporary Construction Power Map

B-1. Project Vicinity Map

Project Vicinity Map

Date
4/2/2025

Scale
1 in = 6 mi

Denise Duffy & Associates, Inc.
Planning and Environmental Consulting

Figure
B-1

Path: C:\GIS\GIS_Projects\2016-64 MPWSP\NTP2\Desal NTP.aprx

B-2. Project Location Map

Project Location Map

Date
4/2/2025

Scale
1 in = 958 ft

Denise Duffy & Associates, Inc.
Planning and Environmental Consulting

Figure
B-2

Path: C:\GIS\GIS_Projects\2016-64 MPWSP\NTP2\Desal NTP.aprx

B-3: Exclusionary Site Fencing Map

Source: ESRI, 2019; AECOM, 2019

Title:

Exclusionary Site Fencing

Date: 10/11/2019

Scale: N/A

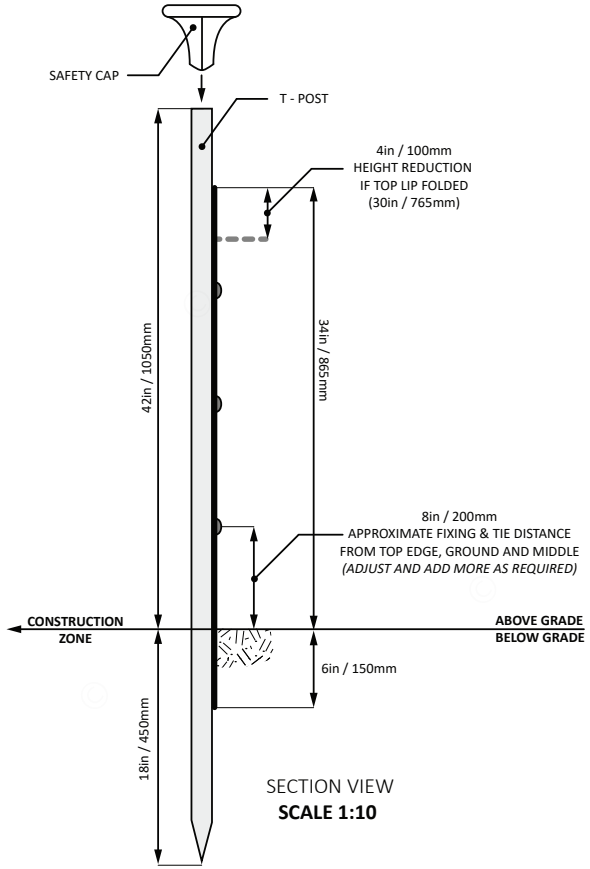
Project: 2016-64

Monterey | San Jose
Denise Duffy and Associates, Inc.
Environmental Consultants Resource Planners
947 Cass Street, Suite 5
Monterey, CA 93940
(831) 373-4341

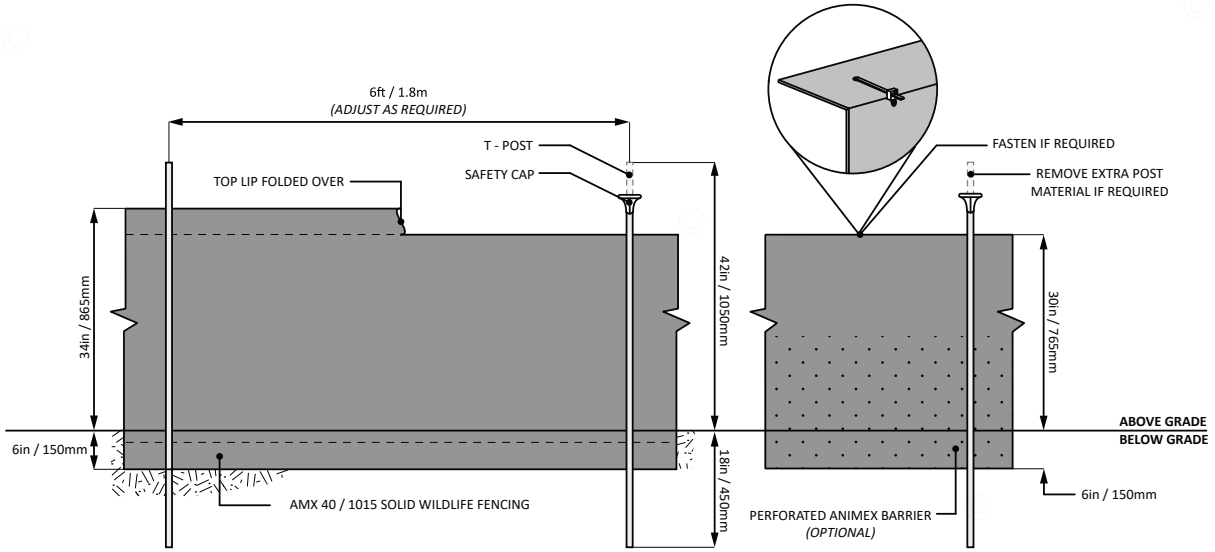
Figure

B-3

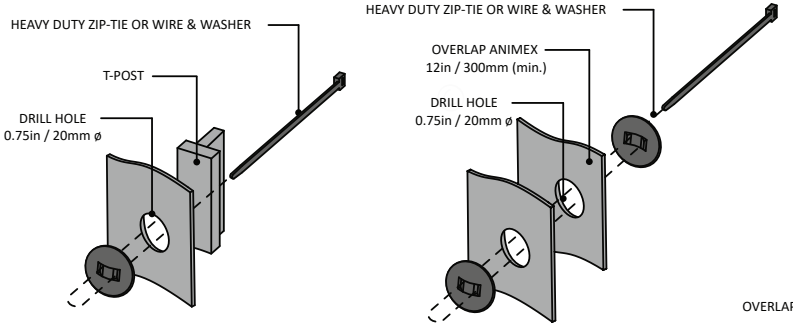
B-4. Exclusionary Fencing Profile



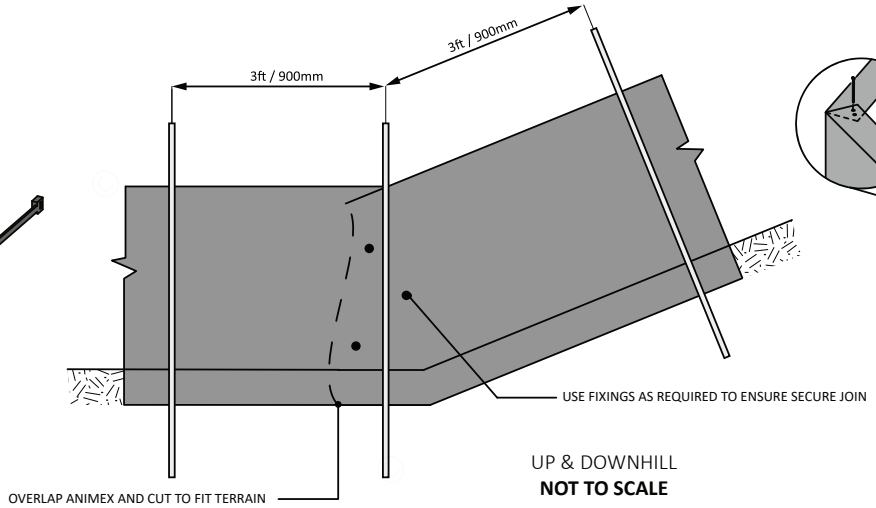
SECTION VIEW
SCALE 1:10



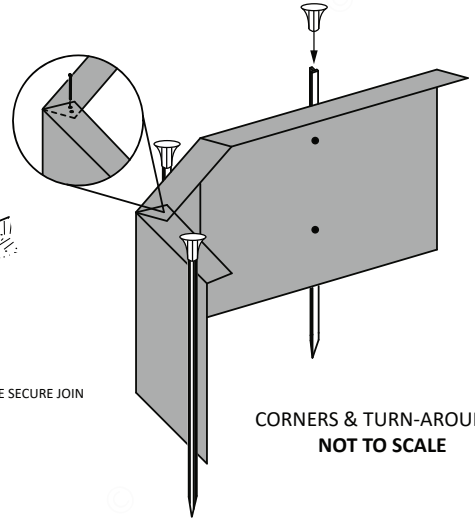
ELEVATION VIEW
SCALE 1:20



ATTACHING & JOINING SECTIONS
SCALE 1:4



UP & DOWNHILL
NOT TO SCALE



CORNERS & TURN-AROUNDS
NOT TO SCALE

Source: Joni L. Janecki & Associates, Inc., March 2019

Title:
Exclusionary Fencing Profile

Date: 10/11/2019
Scale: N/A
Project: 2016-64

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Environmental Consultants Resource Planners
947 Cass Street, Suite 5
Monterey, CA 93940
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Figure
B-4

B-5. Tree Removal Plan

TREE #	TREE DESCRIPTION	REMOVAL	POTENTIAL REMOVAL
1	22" CYP		X
2	48" CYP	X	
3	12" T		X
4	8" CYP		X
5	10" CYP	X	
6	20" CYP	X	
7	8" CYP		X
8	24" CYP		X
9	5" CYP		X
10	6" CYP	X	
11	12" CYP	X	
12	28" CYP	X	
13	10" CYP	X	
14	18" CYP		X
15	8" CYP		X
16	10" CYP		X
17	32" CYP	X	
18	32" CYP	X	
19	11" CYP	X	
20	13" CYP	X	
21	5" CYP	X	
22	20" CYP	X	
23	32" CYP		X
	TOTAL	13	10

Document Path: D:\GIS\GIS_Projects\2016-64 MPWSP\Map Products\Trees To Be Removed.mxd

Title:
Tree Removal Plan

Date: 10/15/2019
Scale: N/A
Project: 2016-64

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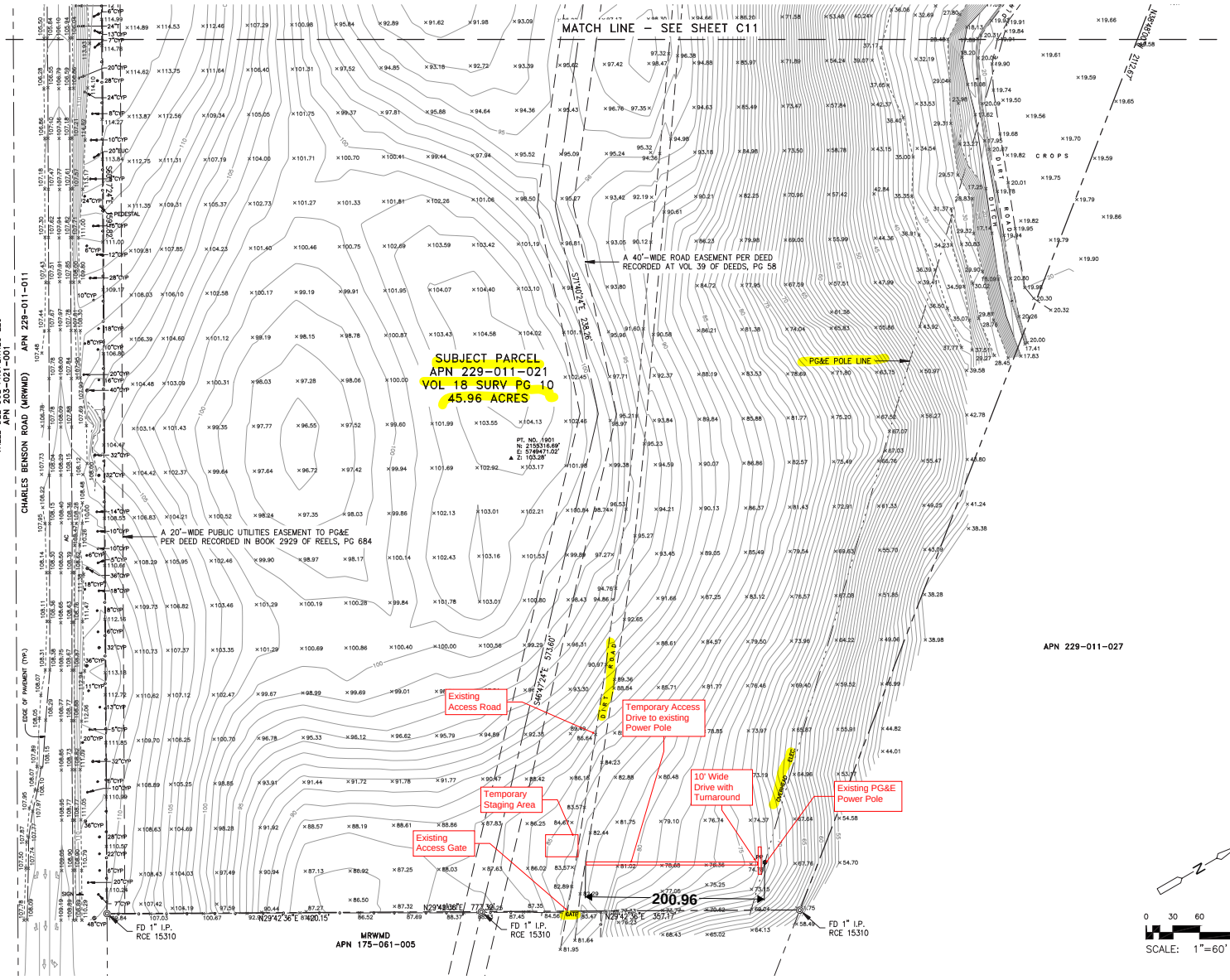
Figure
B-5

B-6. Location of Temporary Construction Power Map



LEGEND (FOR SHEETS C10 & C11)

100	GROUND CONTOUR
×71.81	SPOT GRADE
	SUBJECT PROPERTY LINE
	ADJACENT PROPERTY LINE
	EASEMENT LINE
	CENTER LINE
PT. NO. 1902 N: 2155919.61' E: 5748924.14' Z: 98.81'	CONTROL POINT
FD 1" I.P. LS0000	FOUND IRON PIPE, SIZE AND TAGGED AS NOTED
6"CYP	TREE (CYP = CYPRESS, EUC = EUCALYPTUS)
AC	ASPHALT CONCRETE
	OVERHEAD ELECTRIC
PP	POWER POLE
	GUY WIRE / ANCHOR
	SIGN
	WIRE FENCE
	CYCLONE FENCE
	GRADE BREAK (TOP/TOE OF SLOPE)

MAP NOTES (FOR SHEETS C10 & C11)

1. THIS MAP REPRESENTS A TOPOGRAPHIC SURVEY PERFORMED BY BESTOR ENGINEERS, INC. FOR CALIFORNIA-AMERICAN WATER, W.O. 6832.02, MAP DATED 5/17/13, MARKED "PRELIMINARY FOR REVIEW ONLY". IN 2014 WHITSON ENGINEERS FIELD LOCATED THE GPS CONTROL POINTS SHOWN, LOCATED VARIOUS BOUNDARY MONUMENTS AS NOTED, AND PERFORMED GRADE SPOT CHECKS AT VARIOUS POINTS WITHIN THE PROPOSED PROJECT AREA.
2. THIS MAP PORTRAYS THE SITE AT THE TIME OF THE SURVEY AND DOES NOT SHOW SOILS OR GEOLOGY INFORMATION, UNDERGROUND CONDITIONS, ZONING OR REGULATORY INFORMATION OR ANY OTHER ITEMS NOT SPECIFICALLY REQUESTED BY THE CLIENT.
3. DISTANCES AND DIMENSIONS SHOWN ARE EXPRESSED IN FEET AND DECIMALS THEREOF, UNLESS OTHERWISE NOTED.
4. ALL BOUNDARY SHOWN IS FROM RECORD DATA. BOUNDARY SHOWN IS PER THE RECORD OF SURVEY MAP RECORDED AT VOLUME 18, RECORD OF SURVEY PAGE 10. LOCATIONS SHOWN HEREON WERE DETERMINED WITH THE BENEFIT OF A FIELD SURVEY SUPPLEMENTED BY RECORD DATA. THIS MAP DOES NOT CONSTITUTE A BOUNDARY SURVEY.
5. THIS MAP WAS PREPARED WITHOUT THE BENEFIT OF A CURRENT TITLE REPORT. THERE MAY BE EASEMENTS OR OTHER RIGHTS, RECORDED OR UNRECORDED, AFFECTING THE SUBJECT PROPERTY WHICH ARE NOT SHOWN HEREON.
6. UNDERGROUND UTILITIES WERE NOT A PART OF THIS SURVEY. WHERE SHOWN, UTILITY LOCATIONS ARE BASED ON FIELD LOCATION OF VISIBLE SURFACE FEATURES IN CONJUNCTION WITH REVIEW OF RECORD DRAWINGS AND SCHEMATICS PROVIDED BY THE UTILITY OWNERS. THE EXISTENCE AND EXACT LOCATIONS AND DEPTHS OF UTILITIES SHOULD BE CONFIRMED PRIOR TO CONSTRUCTION.
7. DIAMETERS OF TREES ARE SHOWN IN INCHES. TREES SMALLER THAN 6" WERE NOT NECESSARILY LOCATED AS PART OF THIS SURVEY.

BENCHMARK / HORIZONTAL CONTROL:

1. ELEVATIONS SHOWN HEREON ARE RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) AS DETERMINED BY NETWORK REAL-TIME KINEMATIC (RTK) GPS METHODS AND VERIFIED WITH STATIC GPS OBSERVATIONS AND THE USE OF THE NATIONAL GEODETIC SURVEY'S (NGS'S) ONLINE POSITIONING USER SERVICE (OPUS).
2. COORDINATES SHOWN HEREON ARE PER THE CALIFORNIA COORDINATE SYSTEM, NAD83 (2011), ZONE IV, US SURVEY FEET.
3. COORDINATES AND ELEVATIONS OF GPS CONTROL POINTS ARE SHOWN HEREON. (TAKEN FROM BESTOR ENGINEERS, INC. TOPOGRAPHIC MAP)

Source: Whitson Engineers, Inc., July 2019

Title:

Location of Temporary Construction Power Map

Date: 10/11/2019

Scale: N/A

Project: 2016-64

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Denise Duffy and Associates, Inc.

Environmental Consultants Resource Planners

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Figure

B-6

Appendix C

Technical Plans, Reports, and other Documentation

C-1. General Avoidance and Minimization Measures

C-2. Site Specific Health and Safety Plan

C-3. Construction Equipment and Vehicle Efficiency Plan

C-4. Construction Waste Reduction and Recycling Plan

C-5. Soil and Groundwater Management Plan

C-6. Stormwater Pollution Prevention Plan

C-1. General Avoidance and Minimization Measures

Denise Duffy & Associates, Inc.
PLANNING AND ENVIRONMENTAL CONSULTING

MEMORANDUM

TO: Matthew Fagundes, Environmental Science Associates

CC: Tim O'Halloran, California America Water
Tyler Potter, J.D., AICP, DD&A

FROM: Matt Johnson, DD&A

DATE: June 11, 2025

SUBJECT: Desalination Plant Phase 1 Notice to Proceed Request: MM 4.6-1c General Avoidance & Minimization Measures

---

California America Water ("CalAm") has retained Denise Duffy & Associates ("DD&A") to serve as the Lead Biologist for the construction of Phase 1 of the Desalination Plant ("Project") component of the Monterey Peninsula Water Supply Project ("MPWSP"). DD&A will coordinate with the Contractor, once selected, to ensure the following avoidance and minimization measures and mitigation measures are implemented during construction. Furthermore, DD&A will provide on-going monitoring and reporting prior to, during, and after construction consistent with the requirements of MPWSP Mitigation Monitoring, Compliance, and Reporting Program ("MMCRP").

Mitigation Measure 4.6-1c: General Avoidance and Minimization Measures

Thhe Contractor will implement the following general avoidance and minimization measures, to the extent they are applicable, consistent with the requirements of Mitigation Measure 4.6-1c: General Avoidance and Minimization Measures. They will be implemented as follows:

1. The construction footprint, staging areas, equipment access routes, and disposal or temporary placement of spoils, shall be delineated with stakes and flagging prior to construction to avoid natural resources outside of the project area. Any construction-related disturbance outside of these boundaries, including driving, parking, temporary access, sampling or testing, or storage of materials, shall be prohibited without explicit approval of the Lead Biologist.

    - **Pre-Construction Monitoring Action:** Prior to the initiation of construction-related activities, the Contractor, in coordination with DD&A, will stake and flag the construction footprint, staging areas, equipment access routes, and areas identified for the disposal or temporary placement of spoils to avoid natural resources. All construction personnel will be made aware of this boundary and that any disturbance outside of this boundary will not be in compliance with the environmental documentation shown during the Worker Environmental Awareness Program. Entrance to the areas outside of the delineated project area will be prohibited without explicit approval of the Lead Biologist.

2. New access driveways shall not extend beyond the delineated construction work area boundary. Construction vehicles shall pass and turn around only within the delineated construction work area boundary or local road network. Where new access is required outside of existing roads or the

construction work area, the route shall be clearly marked (i.e., flagged and/or staked) prior to being used, subject to review and approval of the Lead Biologist.

- **Construction Monitoring Action:** DD&A will work with the Contractor to clearly mark the location for temporary construction access for the site prior to construction. CalAm and DD&A will ensure that construction best management practices ("BMP's") are incorporated into the access design, consistent with the Stormwater Pollution Prevention Plan ("SWPPP"). The SWPPP is included as **Appendix C-6.**

3. Vehicle speeds within the project area shall not exceed 15 miles per hour on roads within the sites.

   - **Construction Monitoring Action:** The Contractor will ensure that vehicle speeds within the project area do not exceed 15 miles per hour by posting signage around the project site.

4. Excavated soils shall be stockpiled in disturbed areas lacking native vegetation. Stockpile areas shall be marked by the Lead Biologist to define the limits where stockpiling can occur.

   - **Construction Monitoring Action:** All material will be stockpiled within stockpile areas within the construction footprint boundary that have been designated by DD&A, prior to being hauled to the off-site location.

5. Standard best management practices (such as setbacks and use of silt fences and fiber rolls) shall be employed to prevent loss of habitat due to erosion caused by project related impacts (i.e., grading or clearing for new roads). All detected erosion shall be remedied immediately upon discovery.

   - **Construction Monitoring Action:** Construction activities associated with the NTPR will be confined to the existing construction footprint. Where necessary, the Contractor will implement standard BMP's consistent with the requirements of the SWPPP and DD&A will ensure these are implemented to prevent the loss of habitat.

6. Fueling of construction equipment shall take place within existing paved areas, and at least 50 feet from drainages (including streams, creeks, ditches, culverts, or storm drain inlets) and native habitats. Contractor equipment shall be checked for leaks prior to operation and repaired when leaks are detected. Fuel containers shall be stored within appropriately sized secondary containment barriers.

   - **Construction Monitoring Action:** The Contractor will fuel all construction vehicles off-site. If fueling must occur on-site, an area will be at least 50 feet from drainage will be identified with signage, staked, and/or flagged, prior to the start of construction. Where necessary, the Contractor will implement standard BMP's and DD&A will ensure these are implemented to prevent the loss of habitat. Please also refer to the grading plans, which identified erosion control measures consistent with the intent of this measure.

7. The introduction of exotic plant species shall be avoided through physical or chemical removal and prevention. Measures to prevent the introduction of exotic plants into the construction site via vehicular sources shall include implementing track clean or other method of vehicle cleaning for vehicles coming to the site and leaving the site. Earthmoving equipment shall be cleaned prior to transport to the project area. Weed-free rice straw or other certified weed-free straw shall be used for erosion control. Weed populations introduced into the site during construction shall be eliminated by chemical and/or mechanical means approved by California Department of Fish and Wildlife ("CDFW") and the United States Fish and Wildlife Service ("USFWS").

   - **Construction Monitoring Action**: The Contractor will implement track cleaning practices for construction equipment entering the construction site to avoid the spread of exotic plants. During

construction DD&A will monitor for exotic plants in the construction area, and if necessary, require the Contractor to clean or otherwise remove the suspected material to the satisfaction of the CalAm Field Supervisor or their designee. Where straw materials are required for erosion control, only weed-free straw will be used.

8. Use of herbicides as vegetation control measures shall be used only when mechanical means have been deemed ineffective. All uses of such herbicidal compounds shall observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and state and federal legislation as well as additional project-related restrictions deemed necessary by the CDFW and/or USFWS. No rodenticides shall be used.

   - **Construction Monitoring Action:** Any vegetation controls required will be performed using mechanical means under the supervision of DD&A and the CalAm Field Supervisor (also a qualified biologist).

9. Prior to the start of construction at any proposed facility site where special-status amphibians, reptiles and mammals have a moderate or high potential to occur, the construction work area boundary shall be fenced with a temporary exclusion fence to prevent special-status wildlife from entering the site during construction (see Table 4.6-6 for the list of special-status species that could be significantly impacted at each project facility site). The exclusion fencing shall be constructed of metal flashing, plastic sheeting, or other materials that will prohibit California horned lizards, Monterey shrews, and other special-status reptiles, amphibians, and rodents from climbing the fence. If meshing is used it shall be of a size that would not catch wildlife. The fencing shall be buried a minimum of 6 inches below grade to secure the fence and extend a minimum of 30 inches above grade. The fencing shall be inspected by the Lead Biologist or qualified biological monitor on a daily basis during construction activities to ensure fence integrity. Any needed repairs to the fence shall be performed on the day of their discovery. Fencing shall be installed and maintained during all phases of construction. Final fence design and location shall be determined in consultation with USFWS and CDFW. Exclusion fencing shall be removed once construction activities are complete.

   - **Pre-Construction Monitoring Action:** DD&A will prepare a Relocation Plan and conduct biological surveys prior to the start of construction. Additionally, wildlife exclusion fencing will be installed, as directed by DD&A or ESA/CPUC.

10. If special-status wildlife species are found on the site immediately prior to construction or during project construction, construction activities shall cease in the vicinity of the animal until the animal moves on its own (if possible, as determined by the Lead Biologist or biological monitor) outside of the project area. Additional mitigation measures specific to special-status plants; Smith's blue butterfly; black legless lizard, silvery legless lizard, and coast horned lizard; western burrowing; American badger; Monterey dusky-footed woodrat, California red-legged frog and California tiger salamander are described in Mitigation Measures 4.6-1f, 4.6-1g, 4.6-1h, 4.6-1j 4.6-1k, and 4.6-1o. The Lead Biologist and Lead Agencies shall consult with wildlife resource agency(ies) with jurisdiction over the species regarding any additional avoidance, minimization, or mitigation measures that may be necessary if the animal does not move on its own. A report shall be prepared by the Lead Biologist to document the activities of the animal within the site; all fence construction, modification, and repair efforts; and movements of the animal once again outside the exclusion fence. This report shall be submitted to the CPUC and pertinent wildlife agencies with jurisdiction over the wildlife species.

    - **Pre-Construction/Construction Monitoring Action:** DD&A will enforce this minimization measure along with the specific mitigation measures for the special-status plants and species. DD&A will prepare a monitoring report to document the activities of the animal within the site; all fence construction, modification, and repair efforts; and movements of the animal once again outside the exclusion fence.

11. Vegetation removal and grading activities shall be conducted during daylight hours. Immediately prior to conducting vegetation removal or grading activities inside fenced exclusion areas, the Lead Biologist or a qualified biologist shall survey within the exclusion area to ensure that no special-status species are present. The Lead Biologist or a qualified biologist shall also monitor vegetation removal or grading activities inside fenced exclusion areas for the presence of special-status species. If special-status species are present, then measure 10 above shall be implemented.

    - **Construction Monitoring Action**: DD&A will monitor to ensure off-site vegetation adjacent to the work area are marked or fenced if they contain special-status species.

12. To prevent the inadvertent entrapment of special-status wildlife during construction, all excavated, steep-walled holes or trenches more than 2 feet deep shall be covered with plywood or similar materials at the close of each working day, or escape ramps constructed of earth fill or wooden planks shall be positioned within the excavations to allow special-status wildlife to escape on their own. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped animals. If trapped animals are observed, escape ramps or structures shall be installed immediately to allow escape. If listed species are trapped, they shall only be relocated with authorization from USFWS and/or CDFW, as appropriate.

    - **Construction Monitoring Action**: All excavated holes or trenches will be covered each day by DD&A or the CalAm Field Supervisor. If the holes or trenches are not covered, then DD&A or the CalAm Field Supervisor will set up escape ramps for wildlife in accordance with the requirements of this avoidance and minimization measure. Prior to filling excavated holes or trenches, DD&A will thoroughly inspect any openings for trapped animals. If trapped animals are discovered, then DD&A will immediately set up escape ramps to allow animals to escape. If listed species are trapped, DD&A will relocate them with authorization from the USFWS and/or CDFW, as applicable.

13. All construction pipes, culverts, or similar structures that are stored at a construction site for one or more overnight periods and with a diameter of 4 inches or more shall be inspected for special-status wildlife before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a special-status animal is discovered inside a pipe, that section of pipe shall not be moved until the appropriate resource agency, with jurisdiction over that species, has been consulted to determine the appropriate method for relocation. If necessary, under the direct supervision of the qualified biologist, the pipe may be moved once to remove it from the path of construction activity until the animal has escaped.

    - **Construction Monitoring Action:** DD&A will ensure that all construction pipes, culverts, or similar structures that are stored at a construction site for one or more overnight periods and with a diameter of 4 inches or more will be inspected for special-status wildlife before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a special-status animal is discovered inside a pipe, that section of pipe will not be moved until the appropriate resource agency is notified. If necessary, under the direct supervision of DD&A, the pipe may be moved once to remove it from the path of construction activity until the animal has escaped.

14. All vertical tubes used in project construction, such as chain link fencing poles or signage mounts, shall be temporarily or permanently capped at the time they are installed to avoid the entrapment and death of special- status birds.

    - **Construction Monitoring Action**: DD&A will observe and confirm all vertical tubes used in project construction, such as chain link fencing poles or signage mounts, are or permanently capped at the time they are installed to avoid the entrapment and death of special-status birds.

15. Water used for dust abatement shall be minimized in an effort to avoid the formation of puddles that could attract common ravens and other predators to the construction work areas.

- **Construction Monitoring Action**: Dust control techniques for proposed work will include the use of water trucks at the active construction site and sweeping of paved roadways; therefore, DD&A will ensure water used for dust abatement does not puddle so that common ravens and other predators are not attracted to the work area.

16. No vehicle or equipment parked in the project area shall be moved prior to inspecting the ground beneath the vehicle or equipment for the presence of wildlife. If present, the animal shall be left to move on its own.

- **Construction Monitoring Action**: DD&A, or the CalAm Field Supervisor, will inspect the ground beneath vehicles and equipment prior to movements on-site and allow any such wildlife to move on its own.

17. All vehicles and equipment shall be in proper working condition to ensure that there is no potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. The Lead Biologist shall be informed of any hazardous spills within 24 hours of the incident. Hazardous spills shall be immediately cleaned up and the contaminated soil shall be properly disposed of at a licensed facility.

- **Construction Monitoring Action:** DD&A will be notified of any potential hazardous material spills during construction. All construction personnel shall have access to and know the location of a spill response kit.

18. A trash abatement program shall be implemented during construction. Trash and food items shall be contained in closed containers and removed from the construction site daily to reduce the attractiveness to opportunistic predators such as common ravens, coyotes, and feral dogs.

- **Construction Monitoring Action**: The Contractor will install trash receptacles on the construction site and within work trucks, as needed. DD&A will ensure that trash and food items are contained in closed containers and removed from the construction site daily.

19. Workers shall be prohibited from feeding wildlife and bringing pets and firearms to the construction work areas.

- **Construction Monitoring Action**: DD&A will be responsible for monitoring construction-related activities. As part of daily monitoring activities, DD&A will ensure compliance with the requirements of this avoidance and minimization measure.

20. Intentional killing or collection of wildlife species, including special-status species in the project area and surrounding areas shall be strictly prohibited.

- **Construction Monitoring Action**: DD&A will be responsible for monitoring construction-related activities. As part of daily monitoring activities, DD&A will ensure compliance with the requirements of this avoidance and minimization measure.

21. All temporarily disturbed areas shall be returned to pre-project conditions or better. Existing access roads within the CEMEX site shall be returned to their existing use.

- **Construction Monitoring Action:** DD&A will be responsible for monitoring construction-related activities. As part of daily monitoring activities, DD&A will ensure compliance with the requirements of this avoidance and minimization measure. Furthermore, this NTPR does not include any work at the CEMEX site.

If you have any questions or comments, please do not hesitate to contact me to discuss further. Thank you.

C-2. Site Specific Health and Safety Plan

PRELIMINARY SITE SPECIFIC HEALTH AND SAFETY PLAN

Monterey Peninsula Water Supply Project (MPWSP)
Project No.:

Version 0.0
Date: May 2, 2025

Prepared by: James Conway, SHSS
Reviewed by: Ken Meyer, PE, RG, CHST, CSP;
Jacky Welborn, PMP
Tyler Marriott,
Submittal:

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Section 1
Plan Preparation

1.1 Plan Preparation

This Health and Safety Plan (HASP) was developed specifically for the Monterey Peninsula Water Supply Project Project in accordance with the requirements of 29 CFR 1910 and 29 CFR 1926, and State of California's Department of Industrial Relations – California Code of Regulations, Title 8.

This plan was prepared by: _____

James Conway, CDM Constructors SHSS

This plan was approved by: _____

Matthew Carelas, CDM Constructors Superintendent

Plan concurrence: _____

Ken Meyer, CDM Constructors CHSD

Plan concurrence: _____

Tyler Marriott, CDM Constructors Project Manager

Section 2

Introduction/Scope of Work

2.1 Project Information

The project scope of work includes construction of a new desalination water treatment plant with a rated capacity of 4.8 million gallons a day of drinking water with provisions for expansion to 6.4 mgd. Major treatment elements include disinfection, post stabilization treatment with, CO2 and Calcite Contactors. Major structures to be constructed include, Reverse Osmosis Building, Administration Building, Treated Water Steel Tanks, Brine Ponds.

CDM Smith

2.2 Definable Features of Work, Hazardous Activities and Activity Hazard Analysis (AHA)

Definable features of work (DFOWs) are listed in **Appendix A.** A Preliminary Hazard Analysis (PHA) was developed after review of the DFOWs (refer to **Appendix B**). Based on the PHA and the review of the DFOWs, AHAs (refer to **Appendix C**) were developed as examples for subcontractors, for the purpose of pre-work task specific safety training of the CDM Constructors' team and as reference for inspections only.

Subcontractors may develop their own AHAs based on safety and best practices considerations or may work in accordance with CDM Constructors AHA.

Each crew member will be asked to sign off on the AHA after verbal review by their supervisor prior to work as an indication of hazard awareness.

Emphasis will be placed on the Construction Manager and foremen to observe and closely supervise lower tier subcontractors.

All new AHAs or modified AHAs must be submitted to CDM Constructors for review at least 24 hours prior to the beginning of the work that the AHA addresses.

Section 3

Statement of Health and Safety Policy

3.1 Health and Safety Philosophy

CDM Constructors Inc., referred to herein as CCI or CDM, Health and Safety Program is guided by the belief that our people and workers are our greatest resource and that every employee's health and safety must receive top priority and support. Prevention of occupationally related injuries and illnesses is an integral part of the firm's goals for quality service to clients, growth, and profit.

CCI will maintain a Health and Safety Program designed to minimize the number of injuries and illnesses, with the goal of zero accidents and injuries. CCI's program will be equal or superior to the standard of practice in our industry. CCI guided by its management, shares responsibility for health and safety and will provide the appropriate supervision, training, and protective equipment to keep its employees safe and healthy, and to protect its client's property and interests. Full participation by all CCI employees and Subcontractors is crucial to the overall success of the program.

3.2 Health and Safety Principles

To guide our employees in understanding and adhering to the company's Health and Safety Program, CCI's health and safety goals can be summarized by the following principles. Our firm believes that:

- Occupationally caused injuries and illnesses are preventable.
- Preventing occupationally caused injuries and illnesses is one of our highest responsibilities.
- Providing safe working conditions in the office and in the field requires commitment from all involved parties.
- Workers have a right to information and training.
- Working safely is a condition of employment and a shared responsibility between management and staff.
- Neither CCI nor its projects can succeed unless injuries and exposures are mitigated, managed, and prevented.

Section 4
Responsibilities

4.1 Identification and Accountability of Personnel Responsible for Safety

4.1.1 Safety Organization

CCI Constructors safety organization is exhibited on **Figure 4-1** below.

To be Added

Figure 4-1 Project Safety Organization Chart

4.1.2 Safety Accountability

CDM Constructors Project Manager of Construction

The Project Manager (PM) along with the Construction Manager (CM) is responsible for overall safety performance of this project assignment. The CM and SHSS developed a Preliminary Activity Hazard Analysis as the basis of this Site-Specific HASP. The PM must administer the HASP and continuously review the safety program to assure that full cooperation, compliance, and proactive planning measures are an integral part of the construction planning and performance effort every workday.

The PM will assess work hazards daily and will advise and manage all construction leadership team members such that necessary precautions and proactive safety emphasis becomes part of the daily routine.

Additionally, the PM will assess and review all near miss, accidents, injuries, and property loss incidents and make the required reports. The PM will assure appropriate measures are taken to prevent reoccurrence. And will review and monitor the overall project safety activity daily and

The CCI Construction Manager is responsible for coordinating subcontractor and supplier activities related to the safety program. The General Superintendent will also review project accidents to assure that proactive corrective measures are taken promptly and that lessons learned communications for safety improvements are made immediately throughout the construction work force.

The CCI Construction Manager is responsible for coordinating subcontractor and supplier activities. The Construction Manager will also review project accidents to assure that proactive corrective measures are taken promptly and that lessons learned communications for safety improvements are made immediately throughout the construction work force.

CDM Constructors I&C Superintendent
The CCI I&C Superintendent is responsible for coordinating the interactions between the electricians and I&C personnel.

CDM Constructors Construction Specialists
The Construction Specialists are responsible for providing periodic assistance to the Project Manager and the Construction Manager. Their duties may include those of the Superintendent when necessary.

Safety and Health Officer (SSHO)
The SSHO will report to the Project Manager and SHSS and will be responsible for the following activities.

- Leading Daily Safety Meetings
- Identifying construction hazards through inspections and follow through with subcontractor supervision to ensure timely corrective action.
- Stopping any work activities that pose an imminent danger to workers or the public.
- Maintaining a safety inspection log.
- Tracking and posting a lucky list of unsafe acts to increase construction worker awareness.
- Reviewing Activity Hazard Analysis (AHA's) and recommend appropriate revisions.

- Suggesting revisions of the Health and Safety Plan (HASP) to include AHA's, if required.
- Ensuring employee participation in the safety-training programs on site.
- Investigating all serious bodily injury and property damage occurrences.
- Maintaining required safety reference material on site.
- Conducting Safety On-Boarding Orientations.
- Participating in the weekly foremen's meetings to review safety issues.
- Managing all safety plans as outlined in this HASP.

Assistant Safety and Health Officer (SSHO)
The Assistant SSHO will report to the Construction Manager and the SHSS and will be responsible for the following activities.

- Lead Morning Safety Meetings and Weekly (once a week) Safety Toolbox Talks at adjacent Phase B project site locations.
- Assist the SSHO in all project start up activities such as AHA review, as well as site/contractual client H&S policies for project locations.
- Track and maintain Heavy Equipment daily checklists and collect for documentation.
- Identify construction hazards through inspections and follow through with subcontractor supervision to ensure timely corrective action.
- Stop any work activities that pose an imminent danger to workers or the public.
- Review Activity Hazard Analysis (AHA's) with the SSHO and recommend appropriate revisions.
- Specify proper levels of PPE requirements of the HASP, conducts PPE assessments as needed
- Maintain project health and safety inspections using Predictive Solutions.
- Provide and keep a record of site safety orientation for contractor employees, subcontractor employees, and site visitors.

CDM Constructors Pacific Region Senior Health and Safety Specialist (SHSS) The Senior Health and Safety Specialist are responsible for providing periodic oversight, audits and support to the Construction Manager/Safety Coordinator onsite, including incident investigations, safety inspections, and other responsibilities as they arise. They will also make regular site visits to guide and monitor the effectiveness of the safety program.

The SHSS will be onsite frequently and will assist both the Project Manager of Construction, Construction Manager the SSHO and assistant SSHO's in all matters concerning health and safety.

CDM Constructors Corporate H&S Director
The Corporate H&S Director is responsible for providing oversight and support to the project. Similar to SHSS, the CCI H&S Director will make periodic site visits and will audit and advise as to potential safety issues and improvements to the overall construction safety program.

Subcontractor Superintendents and Foremen
Each subcontractor must designate an individual to carry out its safety program. Notification of the responsible individual must be made in writing to the CCI Construction Manager. Typically, this person will be the Subcontractor Superintendents and Foremen who will be expected to provide supporting safety leadership and communications to all crews and workers. They will be or become proficient in Activity Hazard Analysis (refer to example in Appendix C) and they will share in the daily toolbox talks and the look ahead task planning.

The expectation will be that every worker will arrive on time in a prepared manner with appropriate safety gear and with some limited knowledge of the upcoming day's work tasks and surrounding or parallel hazards by other work crews. The Project Manager and Construction Manager will be responsible for providing and maintaining current OSHA training certificates for all workers engaged under their control. Proactive planning and safety leadership discussions to this effect will be provided by superintendents and foremen to generally support and augment the safety program. Their safety attitudes and embracing of the safety program will be viewed as a key element to the overall success of the construction safety program.

All Construction Workers
Each construction worker and CCI employee has a personal responsibility for his/her own safety. Workers are responsible for understanding and following the safe methods to perform their assignments. Specifically, all workers and site visitors will be required to:

- Bring valid and current proof certificates of their OSHA safety training and/or training certifications.
- Be drug free and not under the influence of alcohol. Be mentally prepared to work every day.
- Be at the site on time and attend daily toolbox meetings.
- Always adhere to all PPE requirements while on site.
- Have an acute awareness of tool and equipment operating hazards as well as surrounding conditions.
- Cooperate fully with all safety and job planning functions while maintaining a positive attitude toward safety and supervision.
- Recognize changed conditions job hazards and take precautions to assure their personal safety and the safety of others.

- Inform his/her supervisor of hazards and help eliminate or minimize each hazard.
- Actively participate and cooperate in the overall safetyprogram.
- Know and be aware of the Site Emergency Action Plan.
- Competent Persons must be designated for work activities in accordance with OSHA requirements. Competent Persons are subject to change as the project is executed.
- Use cell phones safely out of the line of fire for any ongoing work and only in accordance with site protocol.

4.2 Safety Management on Site

4.2.1 Project Management

To control project safety, the most influential factor CCI possesses is effective project management by project managers and Construction Mangers. Listed below in descending order are the five most important tools that project managers and can use to influence project safety:

- Effective project management
- Job coordination
- Safety emphasis by management
- Communication
- Safe work environment

Jobs that run smoothly and are planned properly will show good safety performances. The opposite also holds true; jobs that run poorly because of, for example, bad scheduling, understaffing, or poor equipment will ultimately show reduced safety performances.

4.2.2 Planning

Safety must be incorporated into the project from start to finish maintaining good safety performance. Incorporating safety into initial project planning enables site workers to perform tasks safely with adequate staff, time, and equipment. Up-front planning also allows for comprehensive hazard recognition and control planning by qualified staff. Activities such as shoring, confined space entry, emergency response, and site safety meetings must be recognized and coordinated early in the project planning stages.

When planning for safety, project managers and the Construction Manager should consider the following:

- Costs. Costs should be considered for safety equipment such as decontamination trailers, shoring equipment, air monitoring instruments, rescue equipment, protective clothing,and respirators. (See Project Planning for Safety Costs form in Appendix D, for an example cost checklist.)

- Staff. Utilizing the Project Planning for Safety Staff form, Project Managers should plan for adequate, qualified staff to perform the job safely. Staffing considerations include rescue personnel, partners for the buddy system, staff to perform air monitoring, and preparation and implementation of the HASP. (refer to **Appendix D** - Forms)

- Time. Time should be allotted for necessary safety activities, including site safety inspections, weekly Toolbox Safety meetings, and HASP preparation and review.

4.2.3 Effective Job Coordination

Safety performance improves with improved job coordination. The following areas, when effectively coordinated by project managers and Construction Managers, can improve project safety performance:

- Subcontractor activities
- Staff and crew size
- Local hospital, rescue, and fire departments
- Public notices, public meetings, and site security
- Prompt waste disposal
- Equipment and material deliveries

4.2.4 Management Emphasis on Safety

Management emphasis on safety is a key component of site safety management. Project managers and Construction Managers convey respect for safety and lead by example. Project managers and site superintendents should wear appropriate safety equipment, maintain safety as a routine topic of planning and progress meetings, and reward safe employees and discipline unsafe employees. Effective project managers and Construction Managers will send a clear and consistent message that safe behavior is expected, and anything less will not be tolerated.

4.2.5 Communication

Possessing good "people skills" is often a significant factor in project safety. Construction Managers and project managers need to communicate safety expectations and instructions effectively. Site employees should understand the site safety procedures and be aware that compliance with them is required. They should feel comfortable to ask questions, report injuries, incidents, and safety concerns, and to provide general feedback and recommendations to the site superintendent and project manager.

Toolbox Safety meetings offer not only the opportunity to provide technical safety instruction, but also provide occasion for feedback and suggestions from site employees. Personnel performing their craft can often suggest effective solutions to hazards, especially those pertinent to their trade. Overlapping hazards require effective communication and teamwork between the involved project staff. For example, welding in a contained asbestos abatement area requires

communication between the site superintendent, the welder, and the asbestos abatement contractor to ensure ventilation is adequate and work zones are appropriate.

4.2.6 Safe Work Environment

Construction Managers maintain a safe work environment by consistently implementing the HASP and adhering to OSHA standards and guidelines. Whether subcontractors have an approved HASP of their own or follow the CCI HASP, CCI Construction Managers and subcontractor superintendents should require that it be consistently implemented.

The SHSS should be consulted when tasks change, and unanticipated hazards arise to discuss safety issues and amend health and safety procedures accordingly.

The first step in controlling hazards is the recognition of the hazard. Employees share responsibility for observing the work areas and procedures to identify potential or existing hazards. Site superintendents perform inspections to identify and direct the correction of unsafe conditions and work practices.

4.2.7 Safety Audits

Safety audits are an effective tool in identifying unsafe conditions and work practices. Safety audits may be conducted by Construction Specialists, Project Managers, Construction Managers, SSHO's, and/or the SHSS and CHSD, on a weekly basis, or when new substances, processes, procedures, or equipment are introduced that pose a new occupational safety and health hazard and when new or unrecognized hazards are observed. The Jobsite Safety Audit Form (refer to Appendix D - Forms) is used for documenting audits.

CCI Safety Audits will be performed using the Predictive Solutions Safety Net system.

Completed audits will be submitted into Microsoft Teams, e-Builder and ProjectWise.

Subcontractor operations will be included in the assessment in addition to CCI operations.

Subcontractor operations are audited to evaluate compliance with federal, state, and local regulations. The CHSD and SHSS perform audits as necessary to supplement the local management audits.

4.2.8 Correcting Unsafe Conditions

Unsafe conditions noted during safety audits are assigned to a responsible person(s) for required follow-up action. The Project Manager, Construction Manager, SHSS and CHSD review safety audits to assure follow-up actions adequately control the hazard(s). Project managers and the SHSS will not close a Site Safety Audit Report file until the required follow-up action is complete.

For situations presenting an imminent hazard to employees, the auditor directs work to cease and workers to exit the area immediately until the hazards are controlled. The Construction Manager, SSHO, SHSS, CHSD, and project manager have the authority to stop work until hazards are abated.

Hazards must be controlled as quickly as possible, based on the severity of the hazard as determined by the Project Manager, Construction Manager, SHSS or the CHSD.

4.2.9 Thermal Stress

Workers may be exposed to temperature extremes hot working environments. Outdoor temperatures on jobsite can range from 40° to more than 100° F, creating hazards of heat illness.

The use of PPE and clothing can also create or increase the risk for heat illness which should be considered in the selection of the equipment and determining workers work rest cycle.

Thermal stress can also increase the risks of accidents in the workplace. Thermal stress can fatigue workers making them tired and careless. Workers may have a hard time concentrating on work and ignore safety.

The Occupational Safety and Health Administration (OSHA) does not have a special standard for thermal stress. However, the state of California has a particular standard (Cal/OSSH-title 8. 3395. Heat Illness Prevention in Outdoor Places of Employment) to address thermal stress.

For the protection of all persons involved with the construction of all CCI projects, the following Heat Illness Prevention Plan shall be followed:

- **Hydration:**
  - Workers shall have access to potable drinking water. The water should be located as close as practicable to the work area. Quantities of water should be to enough to ensure that all works can drink one or more quarts of water per hour.
- **Access to shade:**
  - When temperatures exceed 80 degrees Fahrenheit shade shall be present to accommodate the number of workers on the recovery or rest period.
  - When temperatures do not exceed 80 degrees Fahrenheit shade shall be provided or provide timely access to shade upon a worker's request.
  - Workers shall be allowed and encourage to take preventative cool-down rest in shade.
  - Provide first aid or emergency response if a worker exhibits signs or reports symptoms of heat illness during a cool-down rest.
- **Work in temperatures more than 95 degrees Fahrenheit:**
  - Maintain effective communication from workers to supervisor.
  - Observation of workers shall be collected and documented for alertness and signs or symptoms of heat illness.
  - Enform all workers, they can call emergency medical services if a serious heat illness occurs.
  - Remind workers to frequently to drink water.

- Complete pre shift meeting to review of Heat Illness Prevention Plan.

- **Emergency response procedures will be cover in section 13.1.2 Medical Emergencies**
- **Acclimatization:**
  - Workers shall be monitored closely during heat waves or any day that predicted high is above 80 degrees Fahrenheit and 10 degrees above 5-day average temperature.
  - Newly assigned workers to high heat shall be observed for the first 14 days.
  - Workers in hot environments need time to become acclimated to both hot conditions. Gradually increase exertion levels over several days to help adjust to temperature extremes.
- **Training:**
  - Training will be provided to all workers and supervisors in accordance with Cal/OSSH-title 8 3395. Heat Illness Prevention in Outdoor Places of Employment section (h)**.**
  - Additional awareness of the hazards of temperature extremes, the symptoms of heat illness, and how to prevent them is essential to preventing thermal illnesses will take place during toolbox safety meetings.

Section 5

Subcontractors and Suppliers

5.1 Identification of Major Subcontractors and Suppliers

CCI intends to utilize about six to eight primary subcontractors for construction. Additional lower tier subcontractors may be used by CCI subcontractors; however, all subcontractor personnel will be required to conform to the health and safety program and site-specific requirements.

5.2 Means of Controlling and Coordinating Subcontractors and Suppliers

Subcontractors and suppliers are required to sign a contract and/or purchase order agreeing to follow all safety procedures of this HASP. The work of subcontractors and suppliers will be coordinated through the Construction Manager. Subcontractor safety performance will be controlled through the use of the Activity Hazard Analysis (AHA), which will be reviewed at preparatory meetings prior to the start of work. The active involvement of the subcontractor's supervisor will be required through the performance of safety inspections and training.

Without exception, all truck drivers bringing deliveries of concrete, steel and other materials to the job site must comply fully with the minimum site PPE requirements before exiting their vehicle appropriate attire must be hard hats, safety glasses, minimum 4-inch shirt sleeves, long pants and hard toed safety shoes. It must become the responsibility of CCI subcontractors to control and enforce this minimum PPE requirement for all deliveries.

UPS, FedEx and other truck drivers making routine deliveries from their trucks directly to administration trailers in the support zone are exempted from PPE requirements.

5.3 Safety Responsibilities of Subcontractors and Suppliers

The tasks and duties assigned to each subcontractor and supplier must determine the training requirements necessary to provide a safe workplace. A complete training curriculum is discussed in Section 6 of this document.

At a minimum, all parties under CCI control will be required to attend a Site-Specific Safety Orientation prior to working onsite and sign a statement acknowledging that elements of the presentation were fully understood.

Subcontractors and suppliers must adhere to the CCI HASP and subcontractors are encouraged to have representatives at CCI morning Safety Meetings. ALL Subcontractors will receive a copy of the MPWSP HASP.

Generally, the subcontractor must develop Activity Hazard Analyses (AHAs) for all field operations.

If any member of a subcontractor crew does not read, write, or speak English, the subcontractor must provide a supervisor for the crew who is capable of interpreting and always communicating with the crew.

In addition, the assigned bilingual translator must have the supervisory authority to stop work and make on the spot corrections throughout the day should safety issues become apparent.

Section 6

Training

6.1 General Employee/Subcontractor Safety Training

As stated earlier, upon their initial reporting date to work, all CCI and Subcontractor workers must be given a site-specific safety orientation (refer to **Appendix E** - Orientation Checklist). As a prerequisite to starting work on this project, all employees will be trained by completion of OSHA 10 – Hour Construction Safety course or through other evidence of training and/or documented experience.

All first-tier subcontractors will be required to announce 48 hours in advance of new lower tier subcontractor arrivals on site. Advanced plans and accommodations will be made by CCI for site orientation and HASP overview training. Under no circumstances will workers be permitted to simply arrive and start work without such orientation, and proper supervision.

Subcontractors are responsible for ensuring that employees are qualified to perform their duties. Copies of certifications for explosive actuated tools, crane operators, forklift operators, competent persons, etc., will be submitted at the request of CCI.

Lower tier subcontractors will be checked for having a properly trained and qualified competent person assigned to each work crew. OSHA training certificates will be checked and validated for all high hazard aerial work and for operation of moving equipment.

CCI will devote extra time for safety oversight during the first few days of lower tier subcontract work on site. Safety communications, hazard awareness, proper preparations and planning, and close supervision at all levels will always remain of primary importance work is being accomplished.

Competent persons may be required for the following activities:

- Confined Space Entry
- Crane Safety
- Electrical
- Trenching/Excavations
- Fall Protection
- Rigging (qualified)
- Scaffolding
- Signal Persons (Cranes)

Competent persons for both CCI and subcontractors must be designated using the Designation of Competent Person Form in Appendix D, or other equivalent form.

Hazardous tools include:

- Powder-Actuated Tools
- Power Tools
- Heavy Equipment
- Demolition and chop saws
- Radial Arm Saws
- Welders

Emergency response training will be provided to all CCI employees on the jobsite and will be reviewed frequently during weekly tailgate safety meetings. All employees (CCI and Subcontractor's) shall be trained in Wildfire Smoke Awareness in accordance with California Title 8 Section 5141.1 Protection from Wildfire Smoke. Subcontractors are responsible for training their employees in Wildfire Smoke Awareness.

The SSHO or designee will facilitate supervisory and employee safety meetings.

6.2 Daily Safety Meetings and Weekly Toolbox Discussions

Daily Morning Safety Meetings are site-specific discussions on work tasks and hazard controls designed to maintain employee safety awareness. These safety meetings are typically led by the Construction Manager and include a review of actual field conditions and feedback and suggestions from employees.

The first Safety Meeting is an on-boarding safety orientation and HASP review on the first day of the job. After the initial meeting, Construction Managers, foremen and all workers must be required to attend the morning safety meetings at 6:30AM or TBD (time to be determined) each morning. The safety meeting will address specific applicable safety topics in relation to that day's work, and will alert personnel to the degree of hazards, injuries, or accidents, and the number of employees and/or subcontractors. Daily Safety Meetings will also discuss specific work tasks, the hazards involved, and controls for those hazards.

Daily Safety Meetings are typically completed in thirty minutes or less. Documentation of the meeting is recorded on the Daily Morning Safety Meeting sign-in form. Copies of safety meetings sign-in sheets will be kept on the project site in a binder for access.

A weekly Toolbox Talk will be conducted each week regarding a safety topic that is to be led by the Construction Manager, SSHO or assistant SSHO. However, all CCI personnel are encouraged to participate in leading the weekly toolbox discussion. Documentation of the toolbox Talk is

recorded on the Weekly Safety Toolbox Talk sign-in form. Copies of the Toolbox Talk sign-in sheets will be kept on the project site in a binder for access.

All lower tier subcontract personnel will be required to conduct a Daily Safety Meeting briefing before their work begins. The emphasis will be on daily preparation and awareness of all personnel to the surrounding hazards.

6.3 Mandatory Training Requirements

The following training requirements are mandatory for CCI personnel:

All employees:

- Wildfire Smoke Awareness
- Silica Awareness
- Heat Injury/Illness Prevention
- Site orientation

Task-specific training requirements (applicable to employees and contractors exposed to these hazards:

- Falls from height greater than 4 feet
- Riggers
- Excavations
- Mobile Elevating Work Platforms
- Confined Spaces (supervisors, entrants, attendants)
- Hazardous energy isolation (worker exposed to electricity, pressurized systems, etc.)
- Scaffolding

6.4 Task Specific Training Requirements

Several tasks require additional training beyond the training previously discussed. Additional task specific training is required for:

- Aerial Work Platforms (applicable to all types)
- Confined Space Attendant
- Confined Space Entry
- Confined Space Supervisor
- Crane Assembly Subject Matter Expert (SME)
- Qualified Signalman
- Crane Operation (NCCO or equiv. certified)
- Electrical Work (properly trained, qualified and licensed)

- Excavation Competent Person
- Fire Watch
- Riggers
- Qualified Scaffold Builder
- Scaffold Building and Inspections Competent Person
- Welding

Training records shall be maintained by the contractors performing specific task and will be reviewed by CDM Constructor management.

Section 7

Health and Safety Inspections

7.1 Inspections

CCI and all subcontractors must ensure that work areas, materials and equipment are inspected daily by Qualified Persons. Inspections must be documented, and all deficiencies corrected immediately (if possible).

All equipment must be inspected prior to entry to the Project Site and at specific intervals depending on the type of equipment and its intended use.

At a minimum, subcontractors must establish periodic and documented inspections of the following:

- Project work areas – daily
- Scaffolding, excavations, confined spaces - prior to work/entry
- Project loss prevention inspections – monthly
- Fire extinguishers – after each use, monthly and annual inspections.
- Cranes – current annual certification report, monthly and prior to each lift (see the Cranes, Crane Operators, Lifting and Rigging Section for additional clarification).
- Crane hooks – a current Magnaflux certificate with serial number unique to each hook.
- Rigging – before each use and monthly (refer to the Lifting and Rigging Section for additional clarification).
- Aerial work platforms – prior to each use, monthly, and annual inspection (by a third-party independent inspector).
- Other equipment (including but not limited to dozers, loaders, etc.) – before each use and monthly, with documentation prior to use.

Unless noted otherwise, jobsite safety inspections will be performed randomly and without advance notice by the SSHO and the Construction Superintendent. The inspections will take place as prescribed above.

Inspections will be documented by using the Predictive Solutions smart phone APP when performed by CCI personnel.

Identified health and safety issues and deficiencies will be corrected immediately.

Section 8

Health and Safety Expectations and Compliance

8.1 Health and Safety Expectations

All Employees share the following responsibilities and expectations to implement the Health and Safety Program (HSP) effectively and prevent injuries, including:

- Learning and understanding the hazards of the tasks expected.
- Following the guidelines presented in the CCI Health and Safety Manual, the procedures outlined at daily safety meetings and safety training courses, and the instruction of supervisors.
- Reporting unsafe conditions or practices and offering suggestions to maintain a safe work site.
- Inspecting equipment, tools, and work areas and maintaining safe working conditions by repairing and reporting deficiencies.
- Reporting all injuries, illnesses, falls, and near misses to the site superintendent and SHSS immediately.
- Maintaining proper and positive health and safety attitudes during the performance of all tasks associated with project activities.
- Advising the project manager and SHSS of any required medication to be taken during the performance of any site activity.

Each employee and subcontractor must successfully implement the guidelines and procedures discussed in this CCI Site Specific Health and Safety Plan. Employees and subcontractors can void the efforts and intentions of the CCI Site Specific Health and Safety Plan. by choosing to use unsafe work practices. It often takes only one bad decision to result in injury and erase the accident prevention efforts of many others.

8.2 General Safety Rules

Good safety practices must be always exercised. Work should be done in a manner that assures protection of fellow employees and equipment. The following general rules which will govern the site will form the basis of the health and safety practices onsite:

- Unsafe conditions such as obstructions in walkways, improperly made electrical connections, unstable piling of materials, loose material overhead, and tripping hazards, must be avoided.
- Areas where overhead hazards, excavation, open grating or other unsafe conditions exist must be properly blocked off with appropriate warning signs and barricades. **Red**

(DANGER) and **Yellow (CAUTION)** barricade tape are appropriate barricades to maintain a work perimeter. Orange plastic fencing or rigid barricade must be used to block roads (with blinking lights for night), and barricade open ends or holes in elevated floors and platforms. Work is to be so planned that these conditions exist for a minimum length of time.

- **A tag should be placed on installed barricades and tape which shows the date of installation and the party who installed the barricade or tape.**
- Anyone moving, destroying, or crossing **Red (DANGER)** tape without the permission of the party who installed the tape, and therefore is in control, must be terminated.
- Do not leave lumber with protruding nails lying around. Either remove or bend down all nails.
- Hard hats and safety glasses are required to be worn by operators while operating heavy equipment and cranes with open cabs or open windows.
- Each employee must use safety equipment properly.
- Smoking is prohibited is prohibited on the CCI MPWSP Project site.
- Any person whose clothing becomes chemically contaminated is required to shower immediately. Chemically contaminated clothing may have to be destroyed.
- Spill of any materials creating hazards are to be cleaned up immediately. Oily rags and waste are to be disposed of in metal containers and removed each day.
- Facial hair (beards, sideburns, and chin whiskers) is not permitted when respiratory protection is required. This requirement does not include mustaches, provided they do not extend into the sealing area of a respirator.
- Personnel must not ride on truck tailgates, running boards, bumpers, fenders, etc. Personnel must only be transported in vehicles where spaces (seats) have been specifically provided for this purpose.
- Personnel may not be transported in the bed of pick-up trucks or similar vehicles. All vehicles will follow the site speed limit of 10 MPH.
- The consumption or storing of food or drinks is prohibited in areas where chemicals are handled or stored. Tobacco must not be used while in the building or in areas where chemicals are handled or stored.
- Photographic equipment is prohibited on company premises without prior written approval by the Site Representative.
- No person must be in possession of any alcoholic or intoxicating beverage or illegal drugs in the site, or drink alcoholic or intoxicating beverages, or use illegal drugs on company

premises. Persons reporting to work in an unsafe condition will not be allowed to work in the site.

- Horseplay, practical jokes, scuffling, and fighting lead to accidents and injuries. Such actions are forbidden on company premises. Yelling and running are prohibited on company premises, except in the event of an emergency.
- Throwing of trash on company premises, in other than prescribed containers, is prohibited. Each subcontractor is responsible for housekeeping in his/her assigned work area.
- Solicitation of any type, collecting, or offering articles for sale on company premises at any time is prohibited.
- Possession of firearms or other unauthorized explosive devices on company premises is prohibited.

8.3 Employee Health and Safety Rules Non-compliance

CCI has a zero-tolerance policy. Employees who violate the HSP will be issued a Notice of Safety Infraction and Warning (refer to Appendix D - Forms). Employees who knowingly or willfully violate HSP rules may be subject to discharge without prior warning.

Only two warnings will be given directly to the worker along with an advisory to the foreman and superintendent. A third infraction by the worker will lead to expulsion from the job site. This will be covered from the outset and full cooperation is expected.

Section 9

Standard Site Procedures

Due to the diverse nature of activities performed by CCI, there are several construction industry standards that must be considered during the performance of construction activities. In addition, there are standard procedures that are applicable to activities performed at all hazardous, or potentially hazardous, waste sites. This section summarizes some of the key OSHA standards and procedures that may be applicable to construction activities.

The following project HASP rules are adopted for the protection of all persons involved with the construction on all CCI projects. These rules apply to management, owner, and contractor personnel as well as visitors while on the job site. These rules are general in nature and are not to be considered all-inclusive, nor do they relieve CCI, subcontractors, or their employees from applicable occupational health and safety regulations promulgated by governmental authorities.

9.1 Work Permits

Each day before starting work, the CCI Construction Manager or designee representative must plan activities and produce necessary permits to perform the work. CCI will be responsible for and will issue its own permits for:

- Hot Work
- Crane Lifts
- Excavation
- Vessel or Confined Space Entry
- Line Breaking
- Lockout/Tagout
- Aerial Platform Use
- Aerial Work Platform Exiting; and
- Other Potentially Hazardous Work Activities

9.2 Material Handling, Storage, Disposal and Housekeeping

Material handling, storage, disposal, and housekeeping must be performed in accordance *with 29 CFR 1926.25 Housekeeping and Subpart H – Materials Handling*, *Material Handling and Storage*. The following material handling, storage, disposal and housekeeping rules apply:

- An employee must obtain assistance in lifting heavy objects or power equipment must be used.

- When two or more persons carry a heavy object that is to be lowered or dropped,there must be a prearranged signal for releasing the load.
- When two or more persons are carrying an object, each employee, if possible, should face the direction in which the object is being carried.
- The right way to lift is easiest and safest. Crouch or squat with the feet close to the object to be lifted, secure good footing, take a firm grip, bend the knees, keep the back vertical, and lift by bending at the knees and using the leg and thigh muscles. Employees must not attempt to lift beyond their capacity. Caution must be taken when lifting or pulling in an awkward position.
- Employees should avoid twisting or excessive bending when lifting or setting down loads.
- When moving a load horizontally, employees should push the load rather than pull it.
- When performing a task that requires repetitive lifting, the load should be positioned to limit bending and twisting. The use of lift tables, pallets, and mechanical devices should be considered.
- When using such tools as screwdrivers and wrenches, employees should avoid using their wrists in a bent, flexed, extended, or twisted position for long periods of time. Employees should maintain their wrists in a neutral or straight position.
- When gripping, grasping, or lifting an object such as a pipe or board, the whole hand and all the fingers should be used. Gripping, grasping, and lifting with just the thumb and index finger should be avoided.
- Leads, hoses, and extension cords must be hung up with a nonconductive material, off all floors, stairways, and walkways. Available material, equipment, concrete forms, pipe, etc., are to be stacked orderly away from walkways, doors, stairways, and ladders.
- Where such items as protruding rebar or anchor bolts create a tripping hazard, they must be properly protected and conspicuously marked.
- All materials must be stored in a stable position to prevent rolling or

falling. Disposal and Housekeeping practices must be followed:

- CCI and its subcontractors must maintain a clean and sanitary working environment for their employees.
- Trash such as drinking cups, cans, and scraps from lunch are not to be thrown down but disposed of properly in marked containers.
- **As work progresses, the work areas must be always kept clear. *Daily clean-up activities* are required to maintain a clean work area.**
- **Combustible scrap and debris must be removed at *regular intervals*.**

- ***Oil, grease, and other such liquid spills must be cleaned up at the time of spill and are not to be left unattended. Subcontractors must provide spill kits to protect against migration of spills from their equipment.***
- Each craft is responsible for housekeeping in their respective work areas.
- Housekeeping and materials storage must be evaluated in safety inspections and audits.

9.3 Fall Protection

Fall protection must comply with the requirements of *29 CFR 1926 Subpart M – Fall Protection*. For the protection of all persons involved with the construction of all CCI projects, the following fall prevention rules apply:

- A fall protection competent person (qualifications of the competent person to be pre-approved by the client) must be on the jobsite at any time that work involving fall hazards and the use of fall arrest systems or equipment is taking place.
- Fall protection is required 100 percent of the time when exposed to a fall more than four feet or when required by additional rules. One hundred percent fall protection is required whether climbing, traveling from point A to point B, connecting structural steel, or erecting scaffolds or other temporary platforms. No employee or work operation is exempt from the 100 percent fall protection requirement.
- When not protected by any other means of fall protection, such as safety nets or scaffold with proper guardrails, employees must use full body harnesses, lanyards with double-locking snap hooks, and an adequate anchorage (fall arrest equipment). To achieve 100 percent fall protection, employees may need to use a double lanyard system and/or vertical or horizontal lifelines, retractable lifelines, or other approved positioning devices.
- Employees must rig fall arrest equipment so that they can neither free-fall more than four feet or contact any lower object. Anchorage points for fall arrest equipment must be capable of supporting twice the potential impact energy of an employee free-falling six feet or the distance permitted by the system, whichever is less. Anchorage points for fall arrest equipment must be located above the employee's body harness attachment point where practical.
- When vertical lifelines are used, a separate lifeline must protect each employee. The lifeline must be properly weighted at the bottom and terminated to preclude a device such as a rope grab from falling off the line.
- Horizontal lifelines should be limited to two persons at one time between supports and maintain a safety factor of at least two.
- Prior to each use, employees must visually inspect all fall arrest equipment for cuts, cracks, tears or abrasions, undue stretching, overall deterioration, mildew, operational defects, heat damage, or acid or other corrosion. Equipment showing any defect must be withdrawn

from service. All fall arrest equipment subjected to impacts caused by a free-fall or by testing must be removed from service.

- Employees should store all fall arrest equipment in a cool dry place not subjected to direct sunlight.
- Employees must not use fall arrest equipment until they have been properly trained and show an understanding of its use.
- Foremen must ensure fall protection is available and used as required for all employees for whom they are responsible.
- Fall arrest equipment must not be used for any other purpose, such as tow ropes or hoist lines.
- Proper guardrails must be installed on open sides of all walkways and runways where the fall distance exceeds four feet. Barricades such as tape, cones, rope, and K rails will be used during trenching and excavations. Proper guardrails must be installed on open sided floors where the fall distance exceeds six feet. All floor openings or floor holes must be protected by guardrails or hole covers. If hole covers are used, they must be strong enough to support two (2) times the maximum intended load, secured against displacement, and properly labeled.
- When operating a scissor lift work platform, the lift must have guardrails on all open sides, with the door access chains or rails in place. Employees in scissor lifts must be tied off to a factory installed or manufacturer approved anchor.
- Employees operating aerial lifts must wear a body harness and lanyard attached to the aerial lift. Employees must not attach the lanyard to an independent structure.
- Employees must not exit aerial lifts at elevations of 6 feet or greater without first obtained an approved Aerial Lift Permit (refer to Appendix D – Forms).
- Employees working on wall forms or rebar must wear a body harness lanyard and/or positioning device when exposed to a fall in excess of six feet. Position devices must be rigged to prevent a free-fall greater than 24 inches.
- Stairs, ladders, or ramps must be provided for all access ways where there is a change in elevation greater than 19 inches.
- When guardrails are used for fall protection, they must consist of a top rail, intermediate rail, and toe board. The top rail must have a vertical height of 42 inches; the mid-rail must be at 21 inches, and the toe board four inches. When wood railings are used, the post must be of at least two inch by four-inch stock spaced not to exceed eight feet, the top rail must be of at least two inch by four-inch stock, and the intermediate rail must be of at least one inch by six-inch stock. If pipe is used, it must be at least 1 ½ inch nominal diameter. If structural steel is used, it must be of two inch by two inch by 3/8-inch angles or equivalent.

If wire rope is used for railings, it must have a diameter of at least two-inch and must be stretched taut to allow no more than a three-inch deflection.

- Manila or synthetic rope must not be used as guardrails.
- Employees must not stand or sit on guardrails.
- Personal fall arrest systems must not be attached to guardrail systems.

9.4 Compressed Gases

Compressed gas cylinders must be managed in accordance with the requirements of *29 CFR 1926 Subpart F – Welding and Cutting* and other relevant paragraphs of the regulations. For the protection of all persons involved with the construction of all CCI projects, the following rules apply when compressed gases are located or used at the project site:

- Care must be exercised in handling all compressed gas cylinders. They must not be dropped, jarred, or exposed to temperature extremes.
- Cylinders must have the valve cap or valve protection device in place at all times, except when in actual use or connected to a welding set.
- Cylinders must not be rolled and must not be lifted by the valve or valve cap; a suitable cradle or other device must be used to move or lift cylinders.
- Cylinders must have their contents properly identified.
- Cylinders not having fixed hand wheels must have keys, handles, or nonadjustable wrenches on the valve stems while the cylinders are in service.
- Compressed gas cylinders, whether full or empty, must be stored and transported in an upright position and chained or otherwise secured so they cannot fall or be upset.
- Cylinders must not be placed where they might become part of an electrical circuit or within five feet of an electrical outlet.
- Employees must never force connections, which do not fit, nor must they tamper with the safety relief devices of cylinder valves.
- Before the regulator is removed from a cylinder, the valve must be closed and all pressure released from the regulator.
- A leaking cylinder must not be used. Such cylinders must be taken outdoors away from sources of ignition. The supervisor must be notified.
- A flame must never be used to detect gas leaks.
- The recessed top of cylinders must not be used as a place for tools.

- In addition to the above handling rules, special care must be used for the following compressed gases.

9.4.1 Oxygen

Oil, grease, or similar materials must not be allowed to come in contact with any valve, fitting, regulator, or gauge of oxygen cylinders.

Oxygen must never be used as a substitute for compressed air.

Oxygen cylinders in storage must be separated from fuel-gas cylinders or combustible materials, especially oil or grease, a minimum distance of 20 feet or by a 5-foot high noncombustible barrier having a fire resistance rating of at least one hour.

When an oxygen cylinder is in use, the valve should be opened fully in order to prevent leakage around the valve stem.

9.4.2 Acetylene

Acetylene cylinders must be properly secured and always used, transported, or stored in a vertical position.

Cylinders must be protected from sparks, flames, and contact with energized electrical equipment.

An acetylene cylinder valve must not be opened more than one and one-half turns of the spindle and preferably no more than three-fourths of a turn.

Employees must not use acetylene in a free state at pressures higher than 15 pounds per square inch (psi).

9.5 Welding and Cutting

All welding and cutting activities must be performed in accordance with *29 CFR 1926 Subpart J – Welding and Cutting.* For the protection of all persons involved with the construction of all CCI projects, the following welding and cutting rules apply:

- Before performing welding, cutting, grinding, or any other "hot work" in a hazardous area on a CCI construction site, employees must obtain a Hot Work permit (refer to Appendix D - Forms). Hazardous areas are those areas where there is the presence or the potential of the presence of flammable or combustible materials, liquids, gases, vapors, mists, or dusts.
- Only experienced and properly trained persons must perform welding and cutting. Before welding or cutting is started, the area must be inspected for potential fire hazards.
- When welding or cutting in elevated positions, precautions must be taken to prevent sparks or hot metal from falling onto people or flammable material below.
- Suitable fire extinguishing equipment must be immediately available at all locations where welding and cutting equipment is used.

- Welders or their assistants must not carry matches when engaged in welding or cutting operations.
- Without exception, a Trained and Qualified Fire Watch must be maintained wherever welding or cutting is performed in locations where combustible materials present a fire hazard. A fire check must be made of the area two hours after completion of welding.
- The Fire Watch is required by OSHA regulations to **remain on watch for a minimum of 30 minutes after termination or suspension of the hot work activities** to assure no flare-ups and that all surfaces and welding splatter are cold.
- In case of a fire or gas emergency alarm, all hot work must be stopped immediately.
- Where combustible materials such as paper clippings, coal, or wood shavings are present, the floor must be swept clean for a radius of 35 feet before welding. Combustible floors must be kept wet or protected by fire-resistant shields. Where floors have been wetted down, personnel operating arc welding or cutting equipment must be protected from possible shock.
- Extensive fire blanket coverage must be used to prevent fire and damage to piping, tubing, and wiring made of fiberglass, plastic, rubber and other fragile materials, and to keep sparks out of process trenches.
- To protect the eyes, face, and body during welding and cutting, the operator must wear an approved helmet or goggles, proper protective gloves, and clothing. Helpers or attendants must wear proper eye protection. Other employees must not observe welding operations unless they use approved eye protection.
- When welding is being done, proper shields are to be used to protect all other personnel from eye injury due to the welding flash.
- Proper eye protection must be worn to guard against flying particles when the helmet or goggles are raised.
- Machinery, tanks, equipment, shafts, or pipes that could contain explosive or highly flammable materials must be thoroughly cleaned and decontaminated prior to the application of heat. A four-gas atmosphere monitor must be used to monitor for explosive conditions.
- In dusty or gaseous spaces where there is a possibility of an explosion, welding or cutting equipment must not be used until the space is adequately ventilated.
- Welders must place welding cable, hoses, and other equipment so that it is clear of passageways, ladders, and stairways.
- Where the work permits, the welder should be enclosed in an individual booth or must be enclosed with noncombustible screens. Workers or other persons adjacent to the welding areas must be protected from rays by shields or must be required to wear appropriate eye and face protection.

- After welding or cutting operations are completed, the welder must mark the hot metal or provide other means of warning other workers.

Potentially hazardous materials are materials used in fluxes, coatings, and coverings, filler metals used in welding and cutting, or materials released to the atmosphere during welding or cutting operations. While welding or cutting, adequate ventilation or approved respiratory protection equipment must be used. Special precautions must be taken when using materials that contain cadmium, fluorides, mercury, chlorinated hydrocarbons, stainless steel, zinc, galvanized materials, beryllium, and lead. Employees should refer to CCI's Hazard Communication program for specific requirements pertaining to the above listed hazardous materials (see Section 14.3 of this HASP).

In addition to the above welding and cutting rules, special attention must be given to the equipment used.

9.5.1 Gas Welding and Cutting

Only approved gas welding or cutting equipment must be used.

Approved backflow check valves must be used on gas welding rigs in both gas and oxygen lines.

Welding hose must not be repaired with tape.

Matches must not be used to light a torch; a torch must not be lighted on hot work. A friction lighter or other approved device must be used.

Oxygen, acetylene, or fuel gas cylinders must not be taken into confined spaces.

9.5.2 Electric Welding

Only approved electric welding equipment must be used.

The electric welding machine must be properly grounded prior to use.

Rules and instructions supplied by the manufacturer or affixed to the machine must be followed.

Welders must not strike arc with an electrode whenever there are persons nearby who might be affected by the arc. When electrode holders are to be left unattended, the electrodes must be removed and the holders must be so placed or protected that they cannot make electrical contacts with employees or conducting objects.

When the welder must leave his work, or stop work for any appreciable length of time, or when the welding machine is to be moved, the power supply switch to the equipment must be opened.

9.6 Excavations and Trenching

Excavations and trenching activities must be planned, permitted and managed in accordance with *29 CFR 1926 Subpart P – Excavations*. For the protection of all persons involved with the construction of all CCI projects, the following excavation rules apply:

- ***CCI requires that all underground utilities must be physically located before starting any excavation. It is the Subcontractor's responsibility to commission One Call, Dig Safe or other certified utility locating firm to perform utility locates.***
- Subcontractors must obtain a CCI permit provided in Appendix D for all excavations (regardless of the depth of the hole, trench or excavation).
- Daily Excavation Checklist form provided in Appendix D will be completed.
- Subcontractor must provide protective systems such as trench boxes or shoring for all trenches five (5) feet or more in depth unless benching or sloping is maintained in compliance with OSHA guidelines. Excavations for this project are expected to exceed 5 feet in depth.
- A Competent Person may be required to determine additional protective measures for trenches of less than five (5) feet in depth if soil conditions require it.
- A CCI or designated Competent Person must inspect each excavation daily prior to employee entry, intermittently during excavation operations and after each rain fall.
- All employees performing excavation work must be properly trained in the potential hazards and the required safety precautions.
- Safe access and egress into and out of all excavations must be established and maintained.
- All excavations that are four feet deep or deeper must have a ladder for access into the excavation with no more than 25 feet of lateral travel in any direction.
- All excavations must be barricaded with the appropriate barrier tape and other protective devices as required.
- When entering an excavation that may be considered a hazardous environment by site safety representatives, proper personal protective equipment must be worn.

9.7 Work Platforms and Scaffolding

Work on scaffolding and work platforms must be performed in accordance with the requirements of *29 CFR 1926 Subpart L – Scaffolds*. For the protection of all persons involved with the construction of all CCI projects, the following rules apply for use of work platforms and scaffoldings:

- No employee, or any material or equipment, must be supported or permitted to be supported on any portion of a pole structure, scaffold, ladder, walkway, or other elevated structure, crane or derrick, etc., without it first being determined that such support is adequately strong and properly secured in place.
- Employees must not use a scaffold unless it is properly tagged according to the project scaffold tagging procedure:

- **GREEN TAG – "COMPLETED READY TO USE"**, if it has accepted guardrails, toe boards and open holes no greater than 2 inches.
- **YELLOW TAG– "USE WITH CAUTION"**, if the scaffold is safe but has restrictions such as need of a harness, etc. personnel using scaffolding that has restrictions are responsible to follow all restrictions listed on the tag.
- **RED TAG – "DO NOT USE**", if the scaffold is unsafe to use. This tag will stay in place until the scaffold has been removed or until unsafe conditions have been corrected and the scaffold is re-certified by a Competent Person. ***Scaffolds are not to be used if they have a "DO NOT USE" tag or no tag affixed.***

- A trained Competent Person must assure that the scaffold is designed to bear material loads.
- **A scaffold must be re-certified every 90 days.**
- Precautions must be made so that the scaffold is not overloaded. Materials must be brought up as they are needed.
- All scaffolds must be inspected each shift or re-inspected if modified by a trained Competent Person in scaffold inspection.
- No scaffold must be erected, moved, dismantled, or altered except under the supervision of a Competent Persons.
- All personnel who perform work using scaffolds are required by OSHA to have scaffold user safety training prior to being allowed upon any scaffold. Subcontractors' documentation showing proof of training must be submitted to CCI.
- Employees must not use a scaffold from four to 10 feet in height having a mini- mum horizontal dimension of less than 45 inches unless proper guardrails are present to provide employee protection.
- ***Employees must not use a scaffold over 10 feet in height unless a standard guardrail is present, with mid-rails and toe board, to provide adequate employee protection.***
- ***All scaffolding will have handrails on the top platform. The top rail must be 42-inches and the mid-rail 21-inches from the top platform.***
- The width of all scaffolds, ramps, and platforms must be sufficient to prevent congestion of persons, materials, or equipment, and in no case must they be less than 18 inches wide.
- Scaffold planks must be secured in place and extend over their end supports by not less than six inches, unless cleated, or more than 12 inches.
- ***Toe boards on the work platform are necessary to protect personnel. A toe board with a 3 ½ to 4-inch vertical height must be attached to the scaffold when a minimum height of the scaffold reaches 6 feet above the floor or ground.*** If material is piled to such a

height that a standard toe board does not provide protection, paneling or screening from the floor to intermediate rail or top rail must be provided.

- Loose materials should not be left lying on pipes, scaffolds, or other elevations where they may become dislodged and fall. Scaffold planks must be secured to the scaffold structure.
- Scaffolds must not be moved without first removing all loose tools, materials, and equipment resting on the scaffold deck.
- The footing or anchorage points for scaffolds must be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Unstable objects such as barrels, boxes, loose brick, or concrete blocks must not be used to support scaffolds or planks.
- Scaffolds must be erected level and plumb and rigidly braced to prevent swaying and displacement.
- Scaffolds must not be altered or moved horizontally while being used or occupied except when specifically designed for such use. Movable scaffolds must have the casters or wheels locked to prevent movement.
- Synthetic or natural fiber rope must not be used as guardrails.
- An independent lifeline, body harness, and a lanyard must protect employees working on suspended scaffolds.
- ***Safe access must be provided for all scaffolds. Structural members should not be used as a means of access.***

9.8 Ladders, Floor and Wall Openings, Stairs, and Railing Systems

9.8.1 Ladders

Ladder usage, inspection, and maintenance must be in accordance with *29 CFR 1926 Subpart X – Stairways and Ladders* and other relevant paragraphs of the regulation:

- Wooden ladders must not be used onsite.
- All types of collapsible cage platform ladders are not allowed onsite.
- **Type IA, Extra Heavy Duty Industrial (300-pound capacity) and Type IAA, Special Duty (375-pound capacity), Type I Heavy Duty Industrial (250-pound capacity), are preferred. Type II Medium Duty Commercial (225-pound capacity) and Type III Light Duty Household (200-pound capacity) ladders are not allowed onsite.**
- All ladders must be inspected frequently and regularly. At a minimum, all ladders must be inspected before use. Ladders with weakened, broken, or missing steps, broken side rails, or other defects must be tagged and removed from service.

- Ladders and scaffolds must be sufficiently strong for their intended use.
- Portable metal ladders must not be used in the vicinity of energized electrical circuits. (Exception: Such ladders may be used in specialized work, such as high voltage substations, where nonconductive ladders might present a greater hazard. These ladders must be properly marked.)
- Ladders must not be placed in front of doors opening toward the ladder unless the door is open, locked, or guarded.
- When ascending or descending ladders, employees must have both hands free and must face the ladder. ***Workers must not be allowed to carry anything in their hands while ascending or descending a ladder.***
- Only one employee must work from a ladder at one time, except for hook type ladders. If two employees are required, a second ladder must be used.
- Ladders must not be used as scaffold platforms.
- Boxes, chairs, etc., must not be used as ladders.
- Portable straight ladders must not be used without non skid bases.
- The ladder must be placed so that the distance between the bottom of the ladder and the supporting point is approximately one-fourth of the ladder length between supports.
- Straight ladders must not be climbed beyond the third step from the top.
- When working from a portable ladder, the ladder must be securely placed, held, tied, or otherwise made secure to prevent slipping or falling.
- When dismounting from a ladder at an elevated position (e.g. from a roof), the employee must ensure that the ladder side rails extend at least three feet above the dismount position, or that grab bars are present.
- Employees must wear a body harness and lanyard, and tie off to a secure anchor whenever both hands must be used for the job or are exposed to a fall in excess of six feet.
- Ladders must not be spliced together to form a longer ladder.
- A ladder must not be placed against an unsafe support.
- Employees climbing a ladder with a fall exposure greater than 24 feet must be protected by an approved cage, ladder-climbing device, or by the use of personal fall arrest equipment.
- The top two steps of step ladders must not be used.
- Stepladder legs must be fully spread, and the spreading bars locked in place.
- Stepladders must not be used as straight ladders.

- When an employee is working on a stepladder over six feet high, the employee must use a body harness and lanyard attached to a substantial anchor.

9.8.2 Stairways and Handrails

Stairways and handrails must be provided and maintained in accordance with *29 CFR 1926 Subpart X – Stairways and Ladders* and other relevant paragraphs of the regulations.

9.8.3 Floor, Wall, and Roof Openings and Holes

Floor, wall, and roof openings must be protected in accordance with 29 CFR 1926 Subpart M – Fall Protection and other relevant paragraphs of the regulations.

A hole is a void or gap that is 2 inches or more in the least dimension in a floor, roof, or other walking/working surface.

- Covers must be used to close holes in floors, platforms and walkways. These covers must be capable of supporting the maximum potential load they may be subjected to.
- Covers must completely cover the opening/hole and be secured against accidental displacement and marked.
- All covers must be color coded or bear the markings "HOLE" or "COVER."

An Opening is a gap or a void 30 inches or higher and 18 inches or wider, in a wall or partition, through which employees can fall to a lower level.

- Each employee working on, at, above, or near wall openings (including those with chutes attached) where the outside bottom edge of the wall opening is 6 feet or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches above the walking/working surface must be protected from falling by the use of a guardrail system, a safety net system, or a personal fall arrest system.
- Personal fall arrest systems, covers, or guardrail systems must be erected around holes (including skylights) that are more than 6 feet above lower levels.

9.9 Concrete, Masonry and Steel Erection and Roofing

All concrete, masonry and steel erection must be performed in accordance with applicable OSHA Standards. For the protection of all persons involved with the construction of all CCI projects, the following material handling rules apply:

- The fall protection threshold height requirement is four feet for ALL WORK, unless specified differently below, including steel erection activities, systems-engineered activities (prefabricated) metal buildings, and scaffolding work.
- Construction loads must not be placed on a structure or portion of a structure unless CCI determines, based on information from a person who is qualified in structural design, that the structure or portion of the structure can support the loads.

- Employees must not be permitted to work above or in positions exposed to protruding reinforcing steel, fasteners, or other impalement hazards unless provisions have been made to control the hazard.
- No employee must be permitted to work under concrete buckets, bundled material loads, or other suspended loads (riggers securing lower loads to multi-lift rigging and workers setting suspended structural components such as beams, trusses, and precast members are excluded from this requirement. In these cases, work controls should be used to minimize the time spent directly under loads).
- Elevated concrete buckets and loads will be routed to minimize the exposure of workers to hazards associated with falling loads or materials from the loads.
- All concrete and masonry work must be performed in accordance with *29 CFR Subpart Q – Concrete and Masonry Construction*.
- All structural steel assembly work must be performed in accordance with *29 CFR 1926 Subpart R – Steel Erection.*
- Prior to beginning the erection of any structural steel, a Steel Erection Plan must be submitted to CCI for review and acceptance. The plan will include the identification of the site and project; and will be signed and dated by the Qualified Person(s) responsible for its preparation and modification.
- All roofing work must be performed in accordance with applicable paragraphs of *29 CFR 1926 Subpart M – Fall Protection.*

9.10 Powered Industrial Trucks (Forklifts)

Powered industrial truck operation, maintenance and training must be in accordance with 29 CFR 1910. 178 – Powered Industrial Trucks, 1926.602(c) Lifting and Hauling Equipment and 1926.602(d) Powered Industrial Truck Operator Training. Supporting forms and documents are provided in Appendix D.

For the protection of all persons involved with the construction of all CCI projects, the following rules apply for use of powered industrial trucks or forklifts:

- Only authorized persons must be permitted in the cab or on the equipment. Only those designated persons who are trained and must have the required three-year operator certification the required three-year operator certification operate a powered industrial truck.
- Industrial trucks must be examined daily before being placed in service. The vehicle must not be placed in service if any condition is found that would adversely affect safety.
- No unauthorized person must be permitted to ride on truck.
- Industrial trucks must not be altered unless approved by the truck manufacturer.

- Load limits, as specified by the manufacturer, must not be exceeded under any circumstances.
- Operating and maintenance procedures, as specified by the manufacturer, must be followed.
- Any power-operated industrial truck not in safe operating condition must be removed from service. Authorized personnel must make all repairs.
- No load must be lifted until its weight has been determined.
- Only stable or safely arranged loads must be handled. Caution must be exercised when handling off-center loads that cannot be centered.
- Trucks must not be driven up to anyone standing in front of any fixed object.
- No person must be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty.
- When a truck is left unattended, out of view, or is located more than 25 feet away, the load engaging means must be fully lowered, controls must be neutralized, power shut off, and brakes set. Wheels must be blocked if on an incline.
- The truck operator must be required to look in the direction of, and keep a clear view of, the path of travel.
- When ascending or descending grades more than ten degrees, loaded trucks must be driven slowly with the load upgrade.
- No truck must be operated with a leak in the fuel system until the leak has been corrected.
- Truck operators must exercise extreme caution when in close proximity to energized lines or equipment. The operator must maintain ten feet of clearance from the energized source.

9.11 Hand Tools

Hand tool usage must be in accordance with the requirements of *29 CFR 1926 Subpart I-Tools – Hand and Power* and relevant paragraphs of *1926 Subpart V – Power Transmission and Distribution*. For the protection of all persons involved with the construction of all CCI projects, the following hand tools rules apply:

- All tools, regardless of ownership, must be of an approved type and maintained in good condition. Tools are subject to inspection at any time. A foreman has the authority and responsibility to condemn unserviceable tools, regardless of ownership.
- Defective tools must be tagged to prevent their use, or they must be removed from the jobsite.
- Employees must always use the proper tool for the job performed.

- Hammers with metal handles, screwdrivers, knives with metal continuing through the handle, and metallic measuring tapes must not be used on or near energized electrical circuits or equipment.
- Tools must not be thrown from place to place or from person to person; tools that must be raised or lowered from one elevation to another must be placed in tool buckets or firmly attached to hand lines.
- Tools must never be placed unsecured on elevated places.
- All impact tools such as chisels, punches, drift pins, etc., that become mushroomed or cracked must be dressed, repaired, or replaced before further use.
- Chisels, drills, punches, ground rods, and pipes must be held with suitable holders or tongs, not with the hands, while being struck by another employee.
- Shims must not be used to make a wrench fit.
- Wrenches with sprung or damaged jaws must not be used.
- Pipe must not be used to extend a wrench handle for added leverage unless the wrench was designed for such use.
- Tools must be used only for the purposes for which they have been approved.
- Tools with sharp edges must be stored and handled so that they will not cause injury or damage. They must not be carried in pockets.
- Wooden handles that are loose, cracked, or splintered must be replaced. The handle must not be taped or lashed with wire.
- All cutting tools such as saws, wood chisels, knives, or axes must be kept in suitable guards or in special compartments.
- Tools must not be left lying around where they may cause a person to trip or stumble.
- When working on or above open grating, a canvas or other suitable covering must be used to cover the grating to prevent tools or parts from dropping to a lower level where others are present or the danger area must be barricaded or guarded.
- The insulation on hand tools must not be depended upon to protect users from shock.

9.11.1 Portable Electronic Tools

Portable electric tool usage must be in accordance with the requirements of *29 CFR 1926.302(a) and 1926.951(f) (2)*. For the protection of all persons involved with the construction of all CCI projects, the following rules apply when portable electric tools are used:

- Ground fault circuit interrupters (GFCI) will protect all power tools and cord sets.

- The noncurrent-carrying metal parts of portable electric tools such as drills, saws, and grinders must be effectively grounded when connected to a power source unless the tool is an approved double-insulated type, or the tool is connected to the power supply by means of an isolating transformer or other isolated power supply, such as a 24-volt DC system.
- All power tools must be examined prior to use to ensure general serviceability and the presence of all applicable safety devices. The electric cord and electric components must be given an especially thorough examination.
- All electrical cords, hoses and welding leads must be securely routed overhead when practical, to minimize tripping hazards and damage.
- All cords, hoses and leads routed on the ground must be properly protected from damage.
- Electrical equipment cords, including extension cords brought onto the project must not have cuts or other defects. Splices completed by a qualified electrician are allowed if the insulation is intact and usage characteristics are the same as a new cord.
- Power tools must be used only within their capability and must be operated in accordance with the instructions of the manufacturer.
- All tools must be kept in good repair and must be disconnected from the power source while repairs are being made.
- Electrical tools must not be used where there is a hazard of flammable vapors, gases, or dusts.

9.11.2 Pneumatic Tools

Pneumatic tool usage must be in accordance with the requirements of *29 CFR 1926.302(b) and 1926.951(f) (4)*. For the protection of all persons involved with the construction of all CCI projects, the following rules apply when pneumatic tools are used:

- Compressed air and compressed air tools must be used with caution.
- Compressed air hoses and couplings must be inspected daily prior to use. All hose couplings must have positive locking devices. Chicago-type fittings must be properly secured with wire or clips.
- Pneumatic tools must never be pointed at another person.
- Pneumatic power tools must be secured to the hose or whip by some positive means to prevent the tool from becoming accidentally disconnected.
- Safety clips or retainers must be securely installed and maintained on pneumatic impact tools to prevent attachments from being accidentally expelled.
- Compressed air must not be used for cleaning purposes except when reduced to less than 30 pounds per square inch (psi) and then only with effective chip guarding and personal protective equipment.

- Compressed air must not be used to blow dust or dirt from clothing.
- The manufacturer's safe operating pressure for hoses, pipes, valves, filters, and other fittings must not be exceeded.
- The use of hoses for hoisting or lowering tools must not be permitted.
- All hoses exceeding 2-inch inside diameter must have a safety device at the source of supply or branch line to reduce pressure in case of hose failure or disengagement of a connection.
- Before making adjustments or changing air tools, unless equipped with quick- change connectors, the air must be shut off at the air supply valve ahead of the hose. The hose must be bled at the tool before breaking the connection.
- Eye protection, foot protection, and other protective devices must be worn when their use could reduce the possibility of injury.
- Pneumatic tools must be operated only by competent persons trained in their use.
- A pneumatic tool used where it may contact exposed live electrical parts must have a nonconductive hose and an accumulator to collect moisture.
- Employees must not use any part of their bodies to locate or attempt to stop an air leak.

9.12 Cranes and Hoisting Equipment

Cranes and hoisting equipment must be assembled, modified, utilized, inspected, operated and disassembled in accordance with the requirements of *29 CFR 1926 Subpart CC – Cranes and Derricks in Construction, July 28, 2010*. For the protection of all persons involved, the following rules apply when cranes, derricks, or hoisting equipment is involved used during the construction of all CCI projects. An Activity Hazard Analysis will be developed to address all pertinent site hazards for crane and equipment use.

9.12.1 Inclement Weather

CCI subcontractors and crane operators must continuously monitor the weather forecast for the possibility of severe thunder and lightning storms or tornados in the region. All crane lifts and aerial steel erection work must cease when there is a threatening storm or visible lightning 10 miles from the jobsite. See Appendix J.

WORK MUST NOT COMMENCE UNTIL ONE HALF HOUR AFTER THE LAST STRIKE.

9.12.2 Crane Assembly, Disassembly, Modifications, Maintenance and Repair

A competent and qualified person or a competent person assisted by one or more qualified person(s) will oversee onsite crane assembly, disassembly, modifications or repairs. This specifically includes SME's experience with the specific crane type and their knowledge of and possession of manufacturer's recommendations for the assembly, disassembly, modification or repair activity.

CCI must prepare a written plan prior to the start of any crane assembly, disassembly, modifications, or repair to demonstrate that CCI has the requisite experience and competence to oversee the work. Whenever it is feasible, all minor equipment modifications must be made prior to Site delivery.

During the assembly or disassembly process no part of the equipment, load line or load (including rigging and lifting accessories) will be no closer to a power line than permitted under *29 CFR 1926.1408.* Refer to **Table 9 -1**(below).

Table 9-1 Minimum Clearance Distances

Voltage (nominal, kV, alternating current)	Minimum Clearance Distance (feet)
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1,000	45
over 1,000	(As established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).

Note: The value that follows "to" is up to and includes that value. For example, over 50 to 200 means up to and including 200kV

If minimum clearance (based on Table 9-1) cannot be achieved, then the power lines must be de-energized and grounded prior to work.

During modification, disassembly or assembly and testing, an "exclusion zone" must be setup that "isolates" one hundred twenty (120) percent of the potentially affected areas to the front, rear and sides of the equipment until it becomes governed by an accepted rigging plan.

Any swing radius over an operating area during assembly, disassembly or modification must be governed by the activities around an operating facility.

9.12.3 Cranes

All cranes must follow all Laws, Regulations and Standards, *ANSI Standard B30.5*, and other requirements.

Operation of equipment adjacent to overhead power lines will comply power line safety requirements under *29 CFR 1926 Subpart* CC – Cranes and Derricks in Construction regarding required minimum clearances and equipment incapable of breaching the minimum clearance.

9.12.4 Crane Inspections/Testing

Daily, weekly, monthly, and annual inspections must be compliant with manufacturer recommendations, Client requirements, and industry standards (whichever is most stringent). Hoists on drill rigs are not considered cranes.

Completed inspection forms will be maintained on-site.

9.12.5 Crane Operators

Only authorized persons must be permitted in the cab or on the equipment.

All crane operators (including boom trucks operators) must be trained and certified by the National Commission for the Certification of Crane Operators (NCCCO or equiv.). Training and qualification records along with crane inspection paperwork will be submitted to CCI two weeks before beginning work and copies will be maintained by CCI or its designee on-site.

All cranes and hoisting devices must have the safety devices and operational aids required by *29 CFR 1926. 1415 – Safety Devices and 1416 – Operational Aids*. Safety devices and operational aids must not be used as a substitute for the exercise of professional judgment by the operator.

Operators must not leave their position at the controls of cranes, hoists, derricks, or other lifting devices while the load is suspended.

Cranes must be operated in accordance with the requirements of *29 CFR 1926 Subpart CC Cranes and Derricks in Construction*.

9.12.6 Crane Signal Person

A signal person must be provided in each of the following situations:

- The point of operation, meaning the load travel or the area near or at load placement, is not in full view of the operator.
- When the equipment is traveling, the view in the direction of travel is obstructed.
- Due to site-specific safety concerns, either the operator or the person handling the load determines that it is necessary.

9.12.6.1 Crane Signal Person Qualification

Each CCI subcontractor will ensure that each signal person meets the OSHA Qualification Requirements for Signal Person. This evaluation will be made by an oral or written test and through a practical test prior to the signal person giving any signals.

Each signal person must:

- Know and understand the type of signals used. If hand signals are used, the signal person must know and understand the Standard Method for Hand Signals at *Appendix A of Subpart CC of Part 1926* (refer to **Appendix F** – Standard Method for Hand Signals).
- Be competent in the application of the type of signals used.
- Have a basic understanding of equipment operation and limitations, including the crane dynamics involved in swinging and stopping loads and boom deflection from hoisting loads.
- Know and understand the relevant general signal requirements *of 29 CFR 1926.1419 through 1926.1422 and 1926.1428.*

- Must demonstrate that he/she meets the requirements through an oral or written testand through a practical test.

9.13 Lifting

9.13.1 Non-Critical Standard Lifts

Prior to all non-critical lifts between two thousand (2,000) pounds and one hundred thousand (100,000) pounds and less than ninety (90) percent of chart capacity, the CCI Pre-Lift Rigging Checklist must be completed (refer to Appendix D – Forms). The supervisor must ensure that all required signatures have been obtained prior to each lift.

Primarily:

- Load limits as specified by the manufacturer must not be exceeded under any circumstances.
- Operating and maintenance procedures as specified by the manufacturer must be followed.
- Environmental conditions affecting cranes and hoisting equipment operations will be monitored.
- Outriggers must be fully extended for any lift. Where cribbing is used under the outrigger, it must only be under the pedestal.
- Crane supported personnel platforms are prohibited, except when the erection, use, and dismantling of conventional means of reaching a work site, such as a personnel hoist, ladder, stairway, aerial lift, elevating work platform or scaffold would be more hazardous or is not possible because of structural design or worksite conditions.
- If crane-supported personnel platforms must be used, they will be considered critical lifts and will be performed in accordance with OSHA requirements.

9.13.2 Critical Lifts

Critical lifts are defined as all single-crane lifts of one hundred thousand (100,000) pounds or greater, all multiple crane lifts (excluding tail cranes), or any lift with a load greater than ninety (90) percent of chart capacity.

Critical lifts also include multiple lift rigging (MLR) practices. CCI allows MLR for the purpose of erecting/placing structural steel ONLY. Strict compliance with Section 13.20 - Rigging of this document and *1926.753 Subpart R – Steel Erection* must be mandated.

A lifting and rigging plan must be developed by a Competent Person and submitted to CCI.

All critical lifting and rigging plans, regardless of crane size or amount of weight lifted, must be reviewed by the qualified rigging person.

9.14 Rigging

Rigging equipment for cranes and drill rig hoists must be managed and used in accordance with 29 CFR 1926.251 Rigging Equipment for Material Handling and 1926.Subpart CC – Cranes and Derricks in Construction. For the protection of all persons involved with the construction of all CCI projects, the following rules apply when rigging equipment.

9.14.1 General

WIRE ROPE SLINGS ARE TO BE USED ON ALL LIFTS WHEN FEASIBLE.

SYNTHETIC SLINGS MAY ONLY BE USED WHEN AUTHORIZED AND INSPECTED BY THE COMPETENT RIGGER PRIOR TO THE LIFT.

No employee must be under a suspended load or inside the angle of a hoist line. No employee must stand or work near a cable, chain, or rope under tension unless the nature of his work requires it.

All rigging equipment must be sufficient strength, proper type, and safe for its intended use.

Rigging equipment must not be loaded more than its recommended safe working load.

All rigging must be inspected by a Competent Person prior to and intermittently during use. At a minimum, a monthly inspection must be performed by a designated Competent Person.

Makeshift lifting devices formed from bolts, rods, or reinforcing steel must not be used.

Rigging equipment must be marked with the rated load, lifting capacities, date placed in service and other pertinent information.

Wire rope, slings, and chains removed from service due to defects must be cut up or plainly marked as unfit for further use as rigging.

9.14.2 Rigging Personnel Qualifications

Any worker acting in the capacity of **Rigger** must meet the requirements of this section. Any worker engaged in the duties and the performance of rigging must be a **Qualified Rigger** and must meet the following requirements:

- Be at least 18 years of age.
- Be able to communicate effectively with the crane or hoist operator, the lift supervisor, flagman and affected employees on site.
- Have basic knowledge and understanding of equipment operating characteristics, capabilities, and limitations.

In addition, Qualified Riggers and Lift Supervisors must be able to demonstrate knowledge and proficiency to appropriate management personnel in the following:

- Personnel roles and responsibilities

- Rigging equipment and materials
- Safe Operating procedures
- Principles of safe rigging
- Environmental hazards (overhead interferences)
- Rigging the load, handling the load, common causes of crane-related accidents

9.14.3 Slings

- Slings must not be shortened with knots, bolts, or other makeshift devices.
- Multiple sling legs must not be applied to the shackle pin.
- Slings used in a basket hitch must have the load balanced to prevent slippage.
- Slings must be securely attached to the load using hooks with retaining devices or using shackles or another positive latching device.
- Slings must be padded or protected from the sharp edges of their loads.
- A sling must not be pulled from under a load when the load is resting on the sling.

Wire Rope Slings

- Slings must be long enough to provide the maximum practical angle between the sling leg and the horizontal plane of the load.
- Wire rope clips attached with U-bolts must have the U-bolts on the unloaded (dead) or short end of the rope. The clip nuts must be retightened immediately after initial load carrying use and at frequent intervals thereafter.
- Protruding ends of strands in splices on slings and bridles must be covered or blunted.
- Fabricated slings with eyes or endless loop slings using wire rope clips for hoisting material or lifting are prohibited except where the application precludes the use of prefabricated slings. All slings fabricated using wire rope clips must be designed by a Registered Professional Engineer for the specific application.
- Except for eye splices in the ends of wires and for endless wire rope slings, wire rope used in hoisting, lowering, or pulling loads must consist of one continuous piece without knot or splice.
- An eye splice made in any wire rope must have not less than five full tucks (this requirement must not preclude the use of another form of splice or connection that can be shown to be as efficient and that is not otherwise prohibited).
- Wire rope must not be secured by knots except on haul back lines on scrapers.

- Eyes in wire rope bridles, slings, or bull wires must not be formed by wire rope clips or knots.
- Wire rope clips must not be used to splice rope.

9.14.4 Chain Falls, Come-along and Other Such Devices

- Chain must be inspected before initial use and weekly thereafter. Inspect chains on an individual link basis. Chains must be cleaned before they are inspected, as dirt and grease can hide nicks and cracks.
- Only alloyed chain must be used in rigging.
- Chain stretch must be evaluated by comparing the chain with its rated length or with a new length of chain. If the length is increased 3%, the chain must be thoroughly inspected. If the length is increased by 5% or more, the chain must be replaced.
- Deformed links: Deformed (twisted or bent) links, or any chain in which a link assembly does not hinge freely with the adjoining link.

Replace chain if depth of a cut/gouge exceeds the maximum wear value shown on **Table 9-2.**

Table 9-2 Maximum Allowable Wear at Any Point of Link

Chain Size (inches)	Maximum Allowable Wear (inch)
1/4	3/64
3/8	5/64
1/2	7/64
5/8	9/64
3/4	5/32
7/8	11/64
1	3/16
1 1/8	7/32
1 ¼	1/4
1 3/8	9/32
1 ½	5/16
1 3/4	11/32

- Chain falls, come-along, and other such devices must always be rigged for a straight pull.
- Chain falls, come-along, and other such devices must not be loaded beyond their rated capacities.
- Chains must be removed from service if there are cracks and other visible damage that causes doubt as to the strength of the chain.

- The chain or hoist cable for chain falls, come-along, or other such devices must not be wrapped around a load and used in place of a sling unless specifically designed for that purpose.

9.14.5 Shackles and Hooks

- Shackles must be inspected visually before each use by a designated competent person and at least annually to determine condition is safe for use.
- Shackles must not be eccentrically loaded (apply load to center of bow), shock loaded, nor must they be loaded more than the rated capacity.
- Repairs and/or modifications may only be as specified by the manufacturer or Qualified Person. Replacement parts, like pins, must meet or exceed the original manufacturer's specifications.
- Each new shackle pin must be marked by manufacturer to show name or trademark of manufacturer and grade, material type or load rating.
- Shackle pins must never be replaced with bolts or other non-approved devices. Only marked shackles (marked by manufacturer with name or trademark of manufacturer, rated load and size) must be used. Shackles must be maintained by the user to be legible throughout the life of the shackle.
- Only hooks with approved retaining devices must be used. Hooks must never be rigged so that there are points loaded at the tip of the hook unless they are designed for that purpose. The load must be securely seated in the saddle of the hook.
- All crane hooks must have a current Magnaflux certificate. The certificate must show the date of Magnaflux inspection and serial number unique to each hook.
- When eyebolts are used, care must be taken to ensure the bolt is not side loaded.

9.15 Motor Vehicles, Machinery and Mechanized Equipment, All Terrain Vehicles, Utility Vehicles, and Specialty Vehicles

For the protection of all persons involved with the construction of this project, the applicable requirements of 29 CFR 1926 must apply. Specifically, the following rules apply when operating motor vehicles, machinery and mechanized equipment, all- terrain vehicles, utility vehicles, and specialty vehicles:

- All vehicles, machinery and mechanized equipment must be inspected, at a minimum, before each use and monthly.
- All vehicles and equipment must be tested, maintained, and repaired in accordance with manufacturers recommendations or when determined necessary.
- All vehicles and equipment must have the guarding and safety devices required by 29 CFR 1910 and 1926.

- Operations of vehicles and equipment will comply with industry standards and 20 CFR 1926 regarding required minimum clearances and equipment incapable of breaching the minimum clearance.
- All fuel storage tanks require a temporary earthen dike of suitable size to contain total tank capacity in the event of tank rupture. Other containment methods may be used with CCI approval (refer to Section 9.18 for Fire Prevention and Protect requirements for Flammable/Combustible Liquids).
- When refueling motor driven equipment such as welding machines, compressors, cars, trucks, etc., the motor must be shut off. Open type buckets or cans must not be used to pour flammable liquids when refueling. Only approved, vapor-tight cans must be used to transport flammable liquids, i.e., gasoline.
- Smoking is prohibited fueling areas.

Motor vehicles to be used on public roads must comply with the requirements of the State's Department of Transportation.

9.16 Mobile Aerial Platforms

For the protection of all persons involved with the construction of all CCI projects, the following rules apply around use of mobile aerial lifts, including articulating, JLG type, boom-lifts, scissor lifts, etc.:

- All aerial lifts must be designed and constructed in accordance with the applicable requirements of the American National Standards for "Vehicle Mounted Elevating and Rotating Work Platforms".
- Any modifications to aerial lifts must be certified by the manufacturer.
- Lift controls and equipment must be tested and inspected before each use.
- Only properly trained and authorized personnel may operate aerial lifts. The aerial work platform training requirements include, at a minimum, the following:
- A qualified trainer must administer both classroom and hands-on training on the specific type of equipment.
- The general training that covers all types of aerial work platforms must cover the purpose and use of manuals, equipment problems and malfunctions, stability, placards, inspection, safety guidelines, operator warnings and instructions, and the authorization to operate.
- Under the direction of a qualified trainer, the trainee must operate the specific type of equipment for a sufficient amount of time to demonstrate that they have obtained the skills needed to operate the equipment safely.
- Refresher training is required every three (3) years.

- Load limits must not be exceeded.
- Aerial lifts must have a working back-up alarm.
- Employees must stand with both feet on the floor and must not climb on the rails or edges of the basket. Employees must not use boxes or any other device to increase their height.
- ***Safety harnesses will be used on all aerial lifts (including articulating, JLG type, boom-lifts, scissor lifts, etc.).***

A permit is required when an employee will be exiting the aerial work platform while elevated, operating within twenty (20) feet of any energized overhead line or other potentially hazardous working applications as determined by CCI.

Subcontractor must provide written documentation of all inspections and, depending on Client requirements, a third-party independent inspection may be required.

Operators will ensure that the safety chain or entry gate is secured prior to operating the lift (horizontal or vertical). AHAs in Appendix - B addresses specific hazard mitigation for various types of mobile aerial platforms.

9.17 Foundation and Rebar

A safe work surface must be provided to ensure that all hazards to step through rebar are eliminated.

CCI will review work sequencing to ensure minimal exposure from walking on rebar. (Example: placing all anchor-bolts and embeds on mud mat prior to rebar placement).

- Upper Rebar Mats - Wire mesh is required on all mats to prevent workers from falling through during the concrete pour.
- Bottom Rebar Mats - Rebar mat less than 6 inches high off ground - Wire mesh or plywood planking is typically not required. Rebar mat equal to or greater than 6 inches off ground - Wire mesh or plywood is required.
- Area paving - Wire mesh or plywood planking is typically not required.

9.18 Fire Prevention and Protection/Flammable and Combustible Liquids

Fire prevention and protection activities will be performed in accordance with NFPA Codes. For the protection of all persons involved with the construction of all CCI projects, the following rules apply for use of flammable and combustible liquids:

- **"Danger"** and **"No Smoking"** signs must be posted around all flammable and combustible liquid storage areas.
- All aboveground tanks must have adequately sized concrete containment, such as slab and walls, to contain spills.

- Portable fire extinguishers on each mobile piece of equipment and must be provided at locations where needed. Fire extinguishers must be inspected after each use, monthly and annually. Records must be kept on a tag or label attached to the extinguisher, on an inspection check list maintained on file, or by an electronic method that provides a permanent record. The date the inspection was performed and the initials of the person performing the inspection must be recorded.
- Temporary heating devices will be utilized and managed in accordance with 29 CFR 1926.154 - Temporary Heating Devices. For the protection of all persons involved with the construction of all CCI projects, the following rules apply around the use of heaters:
  - All temporary heating devices must be approved prior to use on the jobsite.
  - Heaters must be kept at least 20 feet from buildings and other combustible items.
  - Job-made heaters, solid fuel salamanders, and open fires are prohibited on the jobsite.

9.19 Sanitation

9.19.1 Sanitary Facilities

CCI will provide and maintain hygienic sanitary facilities for all employees in accordance with *29* CFR 1926.51(c).

9.19.2 Drinking Water

CCI will ensure that drinking water provided to its employees is from a properly certified source.

9.20 Formwork and Shoring

All formwork, shoring, and bracing must be designed, fabricated, erected, supported, braced, and maintained in so that it will safely support all vertical and lateral loads that might be applied until such loads can be supported by the structure.

The planning and design of formwork and shoring will conform to acceptable industry provisions (*American Concrete Institute – Pub. 347*).

9.21 Lighting

Lighting will be provided for all construction activities in accordance with the requirements of*29 CFR 1926.56 – Illumination*.

Section 10

Accident Reporting

10.1 Reporting

All injuries, occupational illnesses, will be reported in accordance with 29 CFR 1904 – Recording and Reporting Occupational Injuries and Illnesses. All injuries, occupational illnesses, accidents, and unsafe conditions will be investigated by the Subcontractor's safety representative and the CCI Construction Manager. The safety representative will report any occurrences to the CCI Construction Manager. The CCI Construction Manager must complete a CCI Significant Incident Report or Client forms for recordable occupational injuries and illnesses and forward to the CCI CHSD and SHSS (refer to Appendix D - Forms).

CCI will compile a monthly report and Accident Log. The report and log will include, at a minimum, the following:

- Total number of hours worked for all employees on the Site
- Number of recordable injuries
- Number of restricted cases/days restricted
- Number of lost time cases/days lost
- Property damage
- Near miss reports
- Other OSHA requirements

The subcontractors will be responsible for the compilation of exposure data man- hours worked and the submittal of the data with their monthly invoices. Failure to report the data may result in payment being withheld until the data is submitted.

CCI Subcontractors are expected to assist the SSHO and SHSS in gathering and reporting safety data and to cooperate fully with incident report follow up.

Section 11

Medical Support

11.1 Onsite Responsible Personnel

The following personnel are responsible for onsite medical duties:

- Site Safety and Health Officer (First Aid/CPR and emergency coordination)
- Construction Manager (First Aid/CPR)
- Construction Specialist (First Aid/CPR)

CCI and its Subcontractors are responsible for providing minor first aid needs and CPR of their employees. CCI will use Work Care in the event a worker needs clinical evaluation outside of basic first aid. Subcontractor will provide a list of personnel who are trained in first aid/CPR to CCI prior to mobilization.

11.2 Offsite Medical Facilities

Emergency medical care will be provided by the hospital closest to the work location.

Site	Nearest Hospital

In the event of a medical emergency – Call "911" and the ambulance will transport to the nearest hospital capable of treating the injured person.

A complete listing of emergency phone numbers including ambulance, medical treatment clinics, hospitals, fire, and police will be conspicuously posted at the jobsite. Emergency plans to ensure employee's safety in case of fire or other emergencies will be reviewed with all Employees. A hospital/clinic route (see **Appendix I**) will be posted in jobsite trailers indicating all emergency destinations.

Accidents requiring treatment at a hospital emergency room or urgent care facility must be reported to the Client's Project Site Representative regardless of the time of day.

11.3 Emergency Medical Support

In the event of a life-threatening medical emergency, Local Medical Emergency Services must be contacted. They can be reached by dialing 911. They will transport to the closest facility.

Section 12

Personal Protective Equipment

For the protection of all persons involved with the construction of all CCI projects, application of the following personal protective equipment (PPE) is required:

12.1 Eye Protection

Safety glasses with rigid side shields must be worn while on the Project Site. Safety glasses must conform to ANSI Standard Z87.1 or other suitable standard as a minimum for all components (frames, lenses, and side shields). **Employees should be provided, both, clear and tinted safety glasses if they will be working both indoors and outdoors**. Flexible slip-on side shields are not acceptable for use. All employees must be trained on the proper procedures to follow if a foreign body enters the eye.

Tinted or photochromic (photo grey) lenses are not permitted to be worn inside building but may be worn outside where glare may present a hazard, e.g., in staging area and while working on building roof.

When working in or around areas involving grinding, needle-gunning, using a flapper wheel and/or any operation that can generate airborne particles, the hazard of an embedded eye particle is increased and additional protection beyond standard safety glasses is required. In these situations, the following additional eye protection is required:

- Goggles are to be worn (safety glasses with a face shield are unacceptable) whengrinding, needle-gunning, using a flapper wheel, chipping or any task that can generate airborne particles.
- If high wind conditions exist or equipment such as fans/air-blowers could cause wood, metal, or dust particles to become airborne, googles must be worn.

12.2 Hard Hats

Either class C, G or E hard hats, conforming to ANSI Standard Z -89.1, 1997, must be worn at all times in the construction area. All areas on this job site are hard hat areas. This does not include elevators and enclosed cabs on heavy equipment such as cranes and backhoes. For the purposes of this subsection forklift trucks are not considered enclosed vehicles.

No modification to the shell or suspension is allowed unless approved by the manufacturer in writing. Hard hats must be worn with the bill forward (except for welders wearing hoods). Hard hats must not be painted and should have an applicable company identification logo on the front of the hat. No ball caps, knit caps, or other headdress must be worn under the hard hat that could interfere with the fit or stability of the hard hat.

12.3 Safety Footwear

In the construction area, personnel must, as a minimum, wear safety-toed boots meeting *ASTM Standard Z41.1-1967*. Tennis shoes, athletic style safety shoes, and soft toed work boots are not permitted. Safety footwear is not required to be worn in administrative areas (construction trailers, etc.) but are required when traveling to the administration areas through construction service areas. Safety shoes are expected to be on all workers at the time of their attending the daily safety meeting.

12.4 Shirts and Pants

All shirts must have a minimum 4-inch sleeve. Trousers must never be tucked into boots. Tank tops and shorts are prohibited. Perforated or mesh shirts and pants are prohibited. Nylon or polyester clothing is prohibited where it may be exposed to fire or excessive heat.

12.5 Gloves

CCI will implement universal glove policy where some form of glove providing hand protection must be used for all work activities other than those activities requiring dexterity. Abrasion resistant gloves will be provided to each employee. Gloves must be carried by each employee and worn except as noted for dexterity tasks. Gloves are mandatory when handling materials that could cause hand injury.

12.6 Safety Harnesses

Full body harnesses must be worn when fall hazards exist and suitable means of fall prevention have not been implemented. Lanyards must be equipped with double locking hooks. If a wire rope lanyard is used, a deceleration device is also required. Lanyards must be tied off as short as possible above the worker but still allowing free movement (refer to Fall Protection Section 9.3 for additional clarification).

Lanyards must be inspected before each use and not show signs of wear as indicated by visible colored threads.

12.7 Hearing Protection

Hearing protection must be provided and worn when working in areas with sound levels more than 85 dBA or whenever noise levels prevent hearing someone speak in a normal tone from four feet.

12.8 Traffic Protection

High visibility vests or shirts/outerwear meeting the requirements of *ANSI Standard 107-2004 Class 2* must be worn in all active construction zones, including when:

- Workers are exposed to vehicular or equipment traffic at speeds up to 10 mph.
- There is limited visibility of workers exposed to mobile/heavy equipment operations, vehicles, load handling, or other hazardous activities.

- Reduced visibility conditions exist due to weather conditions, illumination, or visually complex backgrounds where ambient visibility is at least 50 feet (15.2 meters).
- Workers are involved in activities near vehicular traffic with no protective barriers.
- The SSHO, based on a risk assessment, must determine if Performance Class 3 high-visibility apparel is needed for higher visibility of workers.

12.9 Respiratory Protection

Respiratory protection equipment must be supplied to employees as necessary. Respiratory protection will be worn when exposed to gas, vapor, mists, or particulate contaminants in the atmosphere as defined in the AHA or as directed by the SSHO.

12.10 Vehicle Safety

Seat belts must be worn on all heavy equipment including forklifts and vehicles. No riders other than the operator must be allowed on any piece of mobile equipment. Riding in the bed of pickups is prohibited.

The SSHO and the subcontractor superintendent/foreman will perform a hazard assessment requiring the use of personal protective equipment when developing an AHA for each Definable Features of Work. Employees will review these personal protective equipment requirements during AHA review and at the weekly safety meetings.

12.11 Working at Night

CCI Subcontractors must provide and maintain appropriate lighting for all work before dawn and after dusk. The lighting must illuminate both work zones and staging areas. No crane lists, aerial assembly or aerial hot work must occur at night. Strict personnel accountability and reporting to the CCI representative must occur before and after each shift.

Section 13

Plans and Programs Required by the Health and Safety Program Manual

13.1 Emergency Response Plan

The purpose of this plan is to detail the procedures that are to be followed in the event of an emergency. In case of an emergency, refer to **Table 13-1** – Emergency Contact List below:

Table 13-1 Emergency Contact List

Emergency Service	Provider	Phone Number
Project Manager		
Construction Project Manager		
SSHO	James Conway	760-585-5142
Senior H&S Specialist		
Police Department		911/714-765-1900
Health Department		
Power Company	Pacific Gas & Electric	
EPA Spill Control	US Coast Guard	800-424-8802
CHEMTREC	Chem. Mfrs. Association	800-424-9300
24-Hour Ambulance		
Fire Dept.		
Poison Control	California Poison Control Center	1-800-222-1222
Hospital Addresses	See Section 12.3	See Section 12.3
Route to Hospitals	See Appendix I	See Appendix I

13.1.1 Emergency Coordinator

If a hazardous substance leak, fire, release, or any other emergency condition should occur, the appropriate personnel listed in this plan will be immediately notified. The list will be updated whenever changes occur.

The SSHO will be responsible for emergency coordination activities. The Construction Project Manager will be the primary emergency coordinator and will be contacted by the Construction Manager and SSHO during emergency situations. The Construction Manager and SSHO will be familiar with all aspects of the site emergency response plan, all operations and activities at the facility, the location and characteristics of hazardous substances handled, the location of all records, and the site layout. The Construction Manager and SSHO will have designated alternates that have the authority to commit all the necessary resources needed to implement the emergency response plan.

Personnel training will be conducted by the SHSS or a qualified representative through initial briefings and periodic review for all personnel involved in site activities. Training elements will include an overview of the facility, detailed instructions on site- specific operations, and the use of emergency equipment such as first aid kits, fire extinguishers, and two-way radios if alternate communication is needed. Emergency response plan training will be documented and filed on site.

13.1.2 Medical Emergencies

Emergency first aid treatment may only be administered by trained individuals. The purpose of treatment is to maintain life and/or prevent further injury until professional treatment can be obtained.

In the event of a life-threatening medical emergency, Marina Fire & Rescue must be contacted. They can be reached by dialing 911.

Emergency contact numbers will be posted at the job site and maps with directions to the closest hospital is in Appendix I of this HASP.

13.1.3 Evacuation and Communications

When an evacuation is necessary, all field team members will go to the designated assembly point. This area will be located upwind at the facility and will be dependent on the normal prevailing wind. The SSHO will designate any other assembly points at the morning safety meeting, as appropriate.

All emergency communications will be conducted by direct vocal communication. If Employees work on multiple areas concurrently, communication between employee groups will be by means of hand-held radios.

13.1.4 Fire Emergencies

Every member of the field team will be responsible for observing and reporting any fire, and conditions that could potentially lead to fires.

If an employee observes a fire, the employee may attempt to quench the fire with a fire extinguisher if one is readily available. If the fire cannot be readily extinguished by a single extinguisher, the employee will notify all personnel on site to evacuate the area immediately. All onsite personnel must convene at the reassembly point identified by the SSHO, who in turn will immediately notify the fire department and the primary emergency coordinator.

When an employee observes a condition that potentially increases the chance for a fire, the employee will immediately inform the SSHO or superintendent of the condition. The SSHO will immediately cease any field activity that increases the risk of fire until appropriate controls are in place. The SSHO, with the advice of the primary emergency coordinator, is responsible to take whatever actions are necessary, including withdrawal from the area to eliminate or reduce the hazardous condition.

13.2 Alcohol and Drug Abuse Plan

13.2.1 Substance Testing Policy

CCI is committed to providing employee health and safety for all work being performed. As such, and in recognition of the problem of illegal drug, alcohol, and controlled substance abuse in our society and their potential for adverse, negative impacts on our commitment; the use, possession, distribution, or presence in the body of illegal drugs, alcohol, controlled substances, or their metabolic products is prohibited and will not be tolerated.

CCI Employees and subcontracted Employees are therefore required to test negative during illegal drug, alcohol, and controlled substance testing in the following situations:

- Pre-employment
- Pre-placement
- Random
- Reasonable cause
- Post-incident

The objective of this policy is to provide a safe, healthy, and efficient work environment for the company's Employees, business associates, and the public. To accomplish this, management will utilize every measure available to maintain an environment that is free from the effects of illegal drugs, alcohol, and controlled substances. A copy of the CCI Substance-Free Workplace Policy will be on file at the job site.

13.3 Hazard Communication Program

OSHA 29 CFR 1910.1200, Hazard Communication Standard, requires that all employees handling or using materials which may be hazardous be advised and informed as to the hazard potential associated with those materials. The following sections outline CCI program designed for compliance with the scope and intent of the standard. The main elements of this program include a health and biological surveillance program, employee education and training program, and employee exposure determination program. It is only through the proper implementation and maintenance of such programs that maximum employee health and safety protection can be assured.

CCI CHSD has overall responsibility for implementation of the Hazard Communication Program. Subcontractors are required to submit SDSs for chemicals they bring on to a CCI job site.

13.3.1 Safety Data Sheets

A Safety Data Sheet (SDS) is an information sheet that provides specific identification information about a chemical or material. CCI Subcontractors will be required to submit SDSs to CCI prior to bringing any substances, materials, or chemicals onsite. SDS information may include:

- Ingredients and hazards

- Physical data
- Fire and explosion information
- Reactivity data
- Health hazard information
- Spill risk and disposal procedures
- Special protection information
- Special precautions required for use

It is the manufacturer's responsibility to provide this information for any materials containing hazardous or potentially hazardous ingredients.

A comprehensive collection of SDSs exists and is maintained at all CCI projects. Prior to project startup, it is the SSHO's responsibility to ensure that SDSs are available for any material expected to be utilized or encountered during project work that represents a potential health and safety hazard to CCI employees through possible exposure. SDSs that are not available from CCI office collections should be secured from the manufacturer prior to receipt of the material onsite.

Copies of all SDSs for materials expected to be utilized or encountered during project work are required to be electronically available at the CCI project trailer, and each employee is to be made aware that these exist and are available.

13.3.2 Labels

It is the responsibility of the subcontractor to ensure that all potentially hazardous materials brought to a project site are labeled as to the contents of each container and the appropriate usage of hazard warnings. All secondary containers must be properly labeled.

13.3.3 Non-routine Tasks

When employees are required to perform hazardous non-routine tasks, including confined space entry, line breaking, or tank cleaning, a special training session will be conducted to inform those employees as to the hazardous materials to which they may be exposed and the proper procedures and personal protective equipment to be utilized to minimize exposure potential.

13.3.4 Education and Training

Prior to any field project startup, a pre-project training session must be conducted with all employees involved in project work. Included in this training session are the following:

- An overview of the hazard communication requirement
- A review of the chemicals being used and anticipated to be encountered during the course of the project

- Identification of the location and availability of the written hazard communication program, the inventory of chemicals expected to be utilized or encountered, and the SDSs for those materials
- Discussion of the methods and observation techniques that may be used to detect the presence of a release of hazardous chemicals in the work area
- Discussion of how to lessen or prevent exposure to hazardous workplace chemicals
- Instruction in emergency procedures to follow if employees are exposed to hazardous chemicals
- An explanation of the hazard communication program, including how to read labels and SDSs to obtain appropriate hazard information
- An explanation of the proper use of personal protective equipment

13.3.5 Informing Other Employees

To ensure that the employees of subcontractors and clients have access to information on the hazardous chemicals at a project site, it is the responsibility of the SHSO to provide the following information:

- The location of the SDSs
- The name and location of the hazardous chemicals to which employees may be exposed and the appropriate protective measures
- An explanation of the labeling system

13.4 Respiratory Protection

To protect the health and safety of CCI employees and subcontractors, an awareness of the proper selection, use, and maintenance of respiratory protective devices is needed. These guidelines are applicable to all Employees performing duties requiring the use of respiratory protection.

The standards governing the development of this program include but are not limited to the following:

- *American National Standard Institute (ANSI), Practices for Respiratory Protection, Z88.2-1992*
- *OSHA, Respiratory Protection, 29 CFR 1910.134 and 42 CFR84.*

Refer to **Appendix G** for additional information concerning Respiratory Protection.

13.5 Confined Space Entry Guidelines

All confined space entry activities will be performed in accordance with *29 CFR 1910.146*. Welding in confined spaces must be in accordance with *29 CFR 1926.353* and Title 8 Sections 5157 and 5158. Permit Required Confined Spaces (PRCS) must not be entered unless a permit is

signed by the CCI SSHO or the designated Competent Person. A PRCS can be reclassified to a Non-Permit Required Confined Space (NPRCS) if the Competent Person determines that all the conditions are met that satisfy *29 CFR 1910.146* to reclassify a PRCS to a NPRCS. Most confined spaces are expected to be Non-Permit-Required.

Refer to Appendix G for Confined Space Entry Procedures.

13.6 Hazardous Energy Control Plan (Lockout/Tagout)

13.6.1 Purpose

The purpose of the lockout and tagout system is to protect personnel from injury caused by unexpected startup or release of stored energy, gases, or liquids. This is accomplished by establishing procedures for appropriate lockout and tagout of equipment that is capable of storing hazardous energy including, but not limited to, electrical, chemical, mechanical, hydraulic, pneumatic, or thermal energies. All procedures will be performed in accordance with *29 CFR 1910.147-The Control of Hazardous Energy (Lockout/Tagout)*. These procedures must be followed before any work begins that would place any employee in danger such as servicing, maintenance, demolition, or installation of equipment or systems. The Lockout/Tagout Plan form provides a detailed description of the system (refer to Appendix D -Forms).

13.6.2 Objectives

CCI promotes the following objectives regarding the lockout and tagout plan:

- Preventing inadvertent operation of the equipment or process to protect personnel
- Establishing methods for achieving zero energy state
- Complying with applicable regulatory standards

13.6.3 Scope

This procedure covers the installation, inspection, servicing, and maintenance of machines and equipment in which the unexpected activation or startup of the machines or equipment, or release of stored energy could cause injury to personnel.

This procedure is for the lockout/tagout of circuits, tools, equipment, and machines. Under this procedure, employers will establish a program and utilize procedures for affixing appropriate lockout or tagout devices to energy isolating devices and to otherwise disable machines or equipment prior to working on these systems.

13.6.4 Procedures

This procedure establishes minimum performance requirements for the control of such hazardous energy as required by regulatory agencies.

No employee must attempt to work on any circuit, equipment, or machine until:

- The employee has been trained and specifically authorized for the task to be performed
- All sources of potential hazardous energy have been identified

- The circuit of equipment is completely isolated from each source of energy. Each isolating device is locked out to prevent the unexpected activation on startup of the circuit or machine that could cause injury.

13.6.5 Equipment, Material, and Hardware

CCI's lockout and tagout plan includes guidelines for use of associated equipment material and hardware. Each employee working on or using lockout equipment or locking devices must:

- Have a uniquely keyed, individualized lock installed on the isolating device, with the employee retaining the only key.
- Assure lockout locks will not be used for other purposes and all keys will be properly "controlled".
- Use locking devices of durable construction capable of withstanding exposure to the atmosphere in which they are to be installed.
- Use locking devices of substantial construction capable of preventing removal without the use of excess force or special tools.

Use locking devices identified with a hazard warning tag with a legend, such as "do not start," or "do not operate". The tag must also contain the employee's name, company name, foreman contact, pager number or phone number, and date.

13.6.6 Requirements and Responsibilities

Any CCI employee or subcontractor is responsible for following the requirements and responsibilities noted below before proceeding with work on any machine. The foreman supervising the worker (who will perform the work) must utilize the following safety measures in the order they are listed.

Note: "Hot Work" on electrical circuits should be performed only as a last resort.

13.6.7 Application of Lockout Device

When initiating application of the lockout device:

- Identify and locate the specific circuit tool or equipment on which work is to be performed.
- Become familiar with the types and magnitudes of energy, the hazards of the energy, and the means to control the energy of the circuit, tool, or equipment.
- Notify all affected personnel before shutting down, and ensure the proper shutdown procedure is used.
- Isolate and operate the machine away from all energy sources to control the energy to the machine or equipment.
- Affix lockout devices in a manner that will hold the energy-isolating device in the open (OFF) position. Place a hazard warning identification tag on the lockout device.

- Relieve, disconnect, and restrain all potentially hazardous stored energy following application of locking devices until rendered safe.
- Verify that isolation and deactivation of the equipment have been accomplished effectively prior to starting work on any circuit tool or equipment that has been locked out. Check electrical circuits with a voltmeter.
- Equip each circuit breaker with a lockout device and hazard tag, as described above, when installing circuit breakers in distribution boards for constructing circuits.
- Equip each bus plug with a hazard tag, as described above, when installing bus plug circuit breakers into power bus for construction, or circuits to new tools or equipment.
- De-install existing tools, lighting, or equipment by disconnecting or breaker- serving the tool, fixture, or equipment with a hazard tag as described above.
- Lock out circuits that are to be installed or worked on that are powered from a breaker located in sub-panels with lockable door fronts by installing a breaker handle locking clamp and hazard tag on the breaker involved.

13.6.8 Removal of Lockout Device

When the work is completed and the circuit, tool, or equipment is ready to return to normal operating condition, the following steps must be taken:

- Check the machine and the immediate area to ensure all tools, equipment, and nonessential items have been removed and the machine components are operational.
- Check the work area to ensure all personnel have been safely positioned and informed that the machine is about to become operational.
- Verify the controls are in neutral.
- Remove the lockout devices from the equipment. The locking device must be removed **ONLY** by the employee who installed it.
- Notify affected personnel that the equipment is energized and ready to operate.

13.6.9 Removal of Locks

Each lock must be removed from energy-isolating devices, only by the employee who installed it. When the employee is not available to remove his/her locks, the locks may be removed under the direct supervision of the field supervisor and a client Environmental Health and Safety (EHS) representative, provided the field supervisor has:

- Positively verified that the employee who applied the lock is not at the facility.
- Thoroughly examined the machine and surrounding area to ensure removal of work tools, materials, and equipment and that the machine components are operational.

- Made every reasonable effort to contact and inform the employee that the lock is being removed.
- Taken positive steps to ensure the employee is made aware of the lock removal before returning to work.
- Inspected all work that was performed to ensure completion and that the equipment can be re-energized.

13.6.10 Shift Changes

In cases where equipment must remain locked out between shifts for the protection of other personnel, the field supervisor will assure that the lockout remains in place on the isolating device.

When equipment will be out of service for an extended period of time, there will be multiple shifts working or other extenuating circumstances, the field supervisor in charge may develop an alternate lockout procedure for that equipment. The alternate lockout procedure must be approved by the safety department, discussed fully with each crew member, and documented prior to the beginning of work.

13.6.11 Employee Training Information and Compliance

CCI is responsible for informing and training employees of the appropriate section of this program. Employees must be trained on the following:

- Sources, types, and magnitudes of hazardous energy available at the equipment where work will take place.
- Purpose, means, methods, and procedures of energy isolation and control.
- Work of other trades nearby may also require lockouts and tag outs; attempts to restart or re-organize machines locked or tagged by others in strictly prohibited.
- Training must take place at the following times:
    - Repeated bi-annually or at the weekly safety meetings.
    - Whenever starting a job on new equipment that will require lockout and tagout

Training of each employee must be documented and kept on file. Employees failing to comply with the requirements of this and other safety programs and rules are subject to disciplinary action, including termination.

The CCI Electrical Superintendent must conduct a periodic review of the program to ensure that all requirements and responsibilities are being followed and that all Employees are trained and informed. When necessary, the program will be revised to correct deficiencies and to enhance its effectiveness.

13.7 Electrical Hot Work Safety Policy

The purpose of the Electrical Hot Work Safety policy is to prohibit an employee from working in such proximity to any part of an electric power circuit that the employee could contact the electric power circuit in the course of work, unless the employee is protected against electric shock by de-energizing the circuit and grounding it or guarding it effectively by insulation or by other means.

All electrical work will be performed in accordance with *29 CFR 1910.147*. Energized work may never be performed without prior authorization. If it is determined that equipment must be worked on in an energized condition, an energized work permit must be submitted for acceptance. All energized work will be conducted in accordance with *NFPA 70E*. Permits must be prepared in advance. The Electrical Hot Work plan provides a detailed description (refer to Appendix D - Forms).

13.7.1 Qualified Workers

This electrical safety program makes different provisions for "unqualified" and "qualified" personnel. Most personnel are "unqualified" to work on electrical devices or circuits except in an "electrically safe work condition" (an area that is reliably free of electrical charge and current).

"Unqualified" personnel may perform work:

- Where electrical hazards are effectively absent.
- When all electrical parts and devices present are in closed enclosures approved for site conditions.
- Within the limits of their abilities on systems that are in an "electrically safe work condition."
- ***Outside*** the "limited approach boundary" that qualified persons may work inside.

Personnel in the following job classifications ***may*** be "qualified" to perform work on live electrical devices and circuits as described in this section if their division approves the qualification and they have also completed an acceptable electrical safety course. The limits of each person's qualification will be stated in a qualification letter.

Personnel who may be qualified may include:

- Electricians
- Electrical engineers
- Instrument & control (I & C) engineers
- Others approved by operating personnel

The following electrical safety topics will be incorporated into the APP as the design plans and subcontractors are finalized:

- Training
- Electrically Safe Work Condition
- Lock-Out/Tag Out
- Energized Circuit Work Condition
- Shock Hazard Analysis
- Flash Hazard Analysis
- Personal Protective Equipment
- Safe Practices for Work with Electrical Equipment
- Installation and Maintenance of Electrical Equipment
- Electrical Emergencies
- Permits for Work on Energized Circuits
- 13.7.1 Qualified Workers

13.7.2 Procedures

Safety-related work practices must be employed to prevent electrical shock or other injuries resulting from either direct or indirect electrical contacts when work is performed near or on equipment or circuits which are or may be energized. The specific safety-related work practices will be consistent with the nature and extent of the associated electrical hazards.

The primary means of protection are de-energizing the circuit in conformance with the project lockout/tagout policy and procedure.

No person must work on energized circuits or work inside or penetrate a hot panel without prior written authorization from the designated client and CCI representatives.

If energized circuits must be worked, then only qualified and trained journeymen must perform the installation. Another employee with current CPR and First Aid certification must be standing by at all times. The written electrical hot work request/plan must include the means of insulation and personal protection. A means of contacting client security must be readily available.

Live parts to which an employee may be exposed must be de-energized before the employee works on or near them, unless the employer can demonstrate that de- energizing introduces additional or increased hazards or is unfeasible due to the equipment design or operational limitations. Live parts that operate at less than 50 volts to ground need not be de-energized if there will be no increased exposure to electrical burns or to explosion due to electric arcs.

Examples of increased or additional hazards include interruption of life support equipment, deactivation of emergency alarm systems, and shutdown of hazardous location ventilation equipment.

Examples of work that may be performed on or near energized circuit parts, because of unfeasibility due to equipment design or operational limitations, include testing for electrical circuits that can only be performed with the circuit energized; and work on circuits that form an integral part of a continuous process that would otherwise need to be completely shut down in order to permit work on one circuit or piece of equipment.

13.7.3 Energized Parts

If exposed live parts are not de-energized (i.e., for reasons of increased or additional hazards or unfeasibility) other safety-related work practices will be used to protect Employees who may be exposed to the electrical hazards involved. Such work practices must protect Employees against contact with energized circuit parts directly with any part of their body or indirectly through some other conductive object. The work practices that are used must be suitable for the conditions under which the work is to be performed and for the voltage level of the exposed electric conductors or circuit parts. Hot panel procedures are listed, as follows:

- All panel hot work will require a hot work permit.
- No hot panel will be left open and unattended unless an evacuation takes place.
- When hot work is performed, there will be a minimum of two journeymen assigned.
- All panel hot work will require pylons and chain in place to properly secure the work area.
- Proper signage must be in place.
- Procedures for penetrating hot panels are as follows
- When the panel cover is removed, all hot sections of the panel will be properly isolated.
- All penetrations will be made by step bits and knockout cutters; the drilled hole should be no larger than ½ inch to minimize metal filings. Hole saws must not be used.

When the penetrations are made, the connectors will be installed and sealed by means of a bushing with either a cardboard or plastic insert. This insert will not be removed until the wire is pulled. Once the connectors and seals have been installed and the cover replaced, a hot work permit will not be required to install the conduit.

Procedures for pulling wire into hot panels include:

- Isolating all hot sections of the panel when the panel cover is removed.
- Prohibition of metal fish tapes when pulling wire into hot

panels. Procedures for terminating hot panels include:

- Properly isolating all hot sections of the panel when the panel cover and dead front are removed to prevent the accidental contact by personnel or materials.

13.7.4 De-energized Parts

Conductors and parts of electric equipment that have been de-energized, but have not been locked out or tagged, must be treated as energized parts.

While any employee is exposed to contact with parts of fixed electric equipment or circuits which have been de-energized, the circuits energizing the parts must be locked out and tagged in accordance with the project lookout and tagout procedures.

13.8 Respirable Crystalline Silica Policy

Exposure to respirable crystalline silica can cause silicosis, lung cancer, other respiratory diseases, and kidney disease. Exposure can occur during common construction tasks such as using masonry saws, grinders, drills, jackhammers and handheld powered chipping tools; operating vehicle-mounted drilling rigs; milling; operating crushing machines; and using heavy equipment for demolition or certain other tasks.

Personnel exposures must be limited to a permissible exposure limit (PEL) of 50 micrograms of respirable crystalline silica per cubic meter of air ($\mu g/m^3$), averaged over an 8-hour day.

This CDM Constructors policy does not apply where exposures will remain low under any foreseeable conditions; for example, when only performing tasks such as mixing mortar; pouring concrete footers, slab foundation and foundation walls; and removing concrete formwork.

Under the new rule, workers' exposures must be limited to a new permissible exposure limit (PEL) of 50 micrograms of respirable crystalline silica per cubic meter of air ($\mu g/m^3$), averaged over an 8-hour day.

13.8.1 Procedures

Regardless of exposure control method used, the following measures must be followed:

- Establish and implement a **written exposure control plan** that identifies tasks that involve exposure and methods used to protect workers, including procedures to restrict access to work areas where high exposures may occur.
- Designate a **competent** person to implement the written exposure control plan.
- Restrict **housekeeping**practices that expose workers to silica where feasible alternatives are available.
- Offer **medical exams**—including chest X-rays and lung function tests—every three years for workers who are required by the standard to wear a respirator for 30 or more days per year.
- **Train workers** on work operations that result in silica exposure and ways to limit exposure.
- **Keep records** of workers' silica exposure and medical exams.

Table 1 (refer to **Appendix H**) matches common construction tasks with dust control methods, so employers know exactly what they need to do to limit worker exposures to silica. The dust control measures listed in the table include methods known to be effective, like using water to keep dust from getting into the air or using ventilation to capture dust. In some operations, respirators may also be needed.

Appendix A

Definable Features of Work

The following are the initial Definable Features of Work (DFOW) for the project:

- Demolition
- Concrete Formwork
- Reinforcing
- Place & Finish

- Pre Engineered Metal Buildings
- Structural Steel & Decking
- Misc. Metals
- Doors Windows & Glazing
- OH Coiling Doors
- Metal Studs & Drywall
- Tile
- Acoustical Ceilings
- Flooring
- Paintings & Coatings
- Signage
- Restroom Specialties

- Fire Sprinklers
- Clean Agent
- Duct Installation
- HVAC Equipment Installation
- SCADA Equipment & Panels
- Loop Check & Testing
- Access Control & Security
- Underground Conduit & Ductbanks
- Conduit & Raceways
- Switchboards, MCC and Gear
- Energizing & Testing
- Mass Earthwork & Rough Grading
- Fine Grading
- AC Paving
- Concrete Paving
- Curb, Gutter & Sidewalks

- Chain Link Fence
- Irrigation & Planting
- Underground Pipelines
- HDPE & Appurtenances
- FRP & Appurtenances
- PVC Pipe & Appurtenances
- Monorail Crane & Hoist
- Equipment Installation
- Chemical Feed System

Appendix B

Preliminary Hazard Analysis

Preliminary Hazard Analysis

Nov. 2019

Project:	MPWSP Project	Job Duration:		to	
Location:		Specific Area:			
Who will Perform the Work?					
Supervisor Responsible for Safety:					

Required PPE:							
☒	Hard Hat	☒	Safety Shoes	☒	Safety Glasses	☐	Goggles
☐	Ear Plugs	☐	Respirator	☐	High Voltage	☐	Fall Protection
☐	Level A	☐	Level B	☐	Level C	☐	Level D
☐	Other:						

General Housekeeping required?	☒	Yes	☐	No	☐	N/A		
Are Emergency procedures established?	☒	Yes	☐	No	☐	N/A		
Will spark/flame producing devices be used?	☒	Yes	☐	No	☐	N/A	If yes, fire watch training required?	
Will confined space entry be required?	☒	Yes	☐	No	☐	N/A	If yes, confined space training req.?	
Is a hazardous atmosphere possible?	☒	Yes	☐	No	☐	N/A		
Is an oxygen deficient atmosphere possible?	☒	Yes	☐	No	☐	N/A		
Will chemicals be used? (List)	☒	Yes	☐	No	☐	N/A		
Is asbestos present?	☒	Yes	☐	No	☐	N/A		
Will respirable crystalline silica dust be generated?	☒	Yes	☐	No	☐	N/A	If yes, silica dust training required.	
Will excavation be more than 5 feet in depth?	☒	Yes	☐	No	☐	N/A	If yes, excavation training required.	
Will walls, ceiling, or floor be penetrated?	☒	Yes	☐	No	☐	N/A		
Will work above 6 feet be required?	☒	Yes	☐	No	☐	N/A	If yes, fall protection training req.	
Will ladders be used?	☒	Yes	☐	No	☐	N/A		
Will scaffolds be used?	☒	Yes	☐	No	☐	N/A	If yes, scaffolding training required.	
Will work platforms or man lifts be used?	☒	Yes	☐	No	☐	N/A	If yes, MEWP training required.	
Will roof work be required?	☒	Yes	☐	No	☐	N/A		
Will a crane be required?	☒	Yes	☐	No	☐	N/A	If yes, operator license required.	
Will a forklift be required?	☒	Yes	☐	No	☐	N/A	If yes, operator training required.	
Will lockout/tagout be required?	☒	Yes	☐	No	☐	N/A	If yes, LOTO training required.	
Will energized electrical work be required?	☐	Yes	☒	No	☐	N/A		
Will pneumatic power tools be used?	☒	Yes	☐	No	☐	N/A		
Natural gas/high pressure systems work required?	☐	Yes	☒	No	☐	N/A	**If yes, develop an activity hazard analysis**	
Will explosives be used or present?	☐	Yes	☐	No	☐	N/A		
Will biohazards be present?	☒	Yes	☐	No	☐	N/A		
Will machine tools be used?	☐	Yes	☐	No	☐	N/A		
Will vehicle/pedestrian traffic be disrupted?	☒	Yes	☐	No	☐	N/A		
Will barricades/access control required?	☐	Yes	☒	No	☐	N/A		
Will lasers be used?	☐	Yes	☒	No	☐	N/A		
Is project located on a hazardous waste site?	☐	Yes	☒	No	☐	N/A	If yes HAZWOPER training req.	
Will work be in a radiological area?	☐	Yes	☒	No	☐	N/A	If yes, RAD training required,	
Will the contractor be on site more than 30 days?	☒	Yes	☐	No	☐	N/A		
Are new or unique hazards or processes involved?	☐	Yes	☒	No	☐	N/A	**PM/Superintendent to complete**	
Will hazardous tools or equipment be used?	☐	Yes	☐	No	☐	N/A		
Have employees received adequate training?	☒	Yes	☐	No	☐	N/A		
OTHER HAZARDS?	☒	Yes	☐	No	☐	N/A		

Note: Items in **Bold** Need a Permit.

Need HASP/APP?	☒	Yes	☐	No	☐	N/A	Need Task HASP?			Yes		No		N/A

Completed by:	Ken Meyer	Title:	RHSM	Date:	07/08/2021
Approved by:		Title:		Date:	

Attach Additional Comments, if any.

Appendix C

Activity Hazard Analyses

Activity Hazard Analysis (AHA)

Activity/Work Task **Aerial Lift Operations**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Name/Location: MPWSP Project, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 12 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by (Name/Title): Ken Meyer, CSP/Corporate H&S Director	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities	1. General Jobsite Hazards	1. Refer to Steps 1, 2, 4, 5, 7 and 9 in General Jobsite Hazards AHA.	L
2. Training.	2. Injuries due to operators not being trained.	2. Only trained persons can operate an aerial lift.	M
3. Operation of aerial lift	3. Pinch points 3a. Slips, trips & falls.	3. Identify pinch points. • Keep body parts out of the line of fire and inside the aerial lift gage during operation. 3a.Wear lifeline/harness and make sure it is securely attached to the aerial lift cage attachment points to prevent injury during fall. • Perform an area 360 inspection to identify hazards in the immediate area.	M
4. Re-positioning of aerial lift.	4. Rollover	4. During travel keep the boom lowered in the travel position. • Approach slopes head on.	M

		• Select least hazardous path of travel. • Clear the travel path of debris to prevent aerial lift tip over or employee injury. • Never tie the lift off to any structure while in operation. • Never exceed the aerial lift manufactures weight limit. • Never use the aerial lift as a crane for lifting. • Read the owner's manual for these specifications.	
	4a. Falling objects	4a. Keep tools secure and inside aerial lift cage. • Put cones, caution tape and signage around aerial lift to keep employees away from contact zone. • Do not throw or drop tools from an elevated aerial lift gage or from any other elevation.	
	4b. Electrocution	4b. Use spotters and maintain eye contact with operator. • Maintain a minimum ten-foot clearance with overhead power lines. • Use SPSA during operations for changing conditions while traveling and or operating out of boom basket.	
5. Operation of scissor lift	5. Pinch points	5. Keep fingers and body parts clear of scissor lift pinch points and inside the lift when in operation. • Never tie off the scissor lift to any structure during operation.	**M**
	5a. Slips, trips & falls	5a. Wear lifeline/harness and make sure it is securely attached to the lift attachment point to prevent injury during falls. • Maintain good housekeeping on the floor of the lift and at ground level of the scissor lift location during work to eliminate tripping and tip over hazards.	
6. Re-positioning of scissor lift	6. Rollover	6. Operate on level solid surfaces. • Lock into place all outriggers prior to use. • Use mats if needed.	**M**
	6a. Falling objects	6a. Keep tools inside and secure to scissor lift cage.	

		• Put cones/caution tape/signage around scissor lift to keep employees away from contact zone.	
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1.Aerial Lift Equipment	1. Operator must have documented training by competent person or manufacturer rep for employees operating machine. 1a. Review AHA prior to commencing work activity.	1. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. 1a. Document inspection on CDM equipment inspection form.	
2. PPE such as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, Fall Protection or Restraint, and Class II high visibility vest.	2. AHA review by all personnel involved. Fall protection training must be document.	2. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Concrete Placement and Finish**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Name/Location: MPWSP, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 12 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by (Name/Title): Ken Meyer, CSP/Corporate H&S Director	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities.	1. General Jobsite Hazards	1. Refer to Steps 1, 2, 7, 9 and 10 in General Jobsite Hazards AHA.	L
2. Check preparations for pour of slabs and walls casting. Layout, communication, and preparatory instructions.	2. Hazardous release of energy from form failure. 2a. Impalement from falls on rebar. 2b. Mistakes from lack of coordination and/or communication between pump truck and finishers. 2c. Fall from wall formwork.	2. Check forms and bracing to ensure there are no missing or weak sections. Review approved shop drawings and confirm/check the forms are built according to these approved shop drawings. 2a. All rebar that is below the level where concrete placement will be ongoing must be protected with "California Caps". 2b. Before beginning each phase of work the supervisor will explain to the workers what needs to be done and how the work will proceed. 2c. Use designed platform for casting and work on top of wall formwork.	M
3. Set screed pins and lumber. Apply form oil. Stage concrete trucks and pump trucks.	3. Struck by injury. 3a. Chemical exposure. 3b. Struck or crushed by moving vehicles.	3. Keep hand away from hammer impact area. 3a. Familiarize workers with SDS prior to work. 3b. Stay clear of moving machinery, heed backup alarms.	M

	3c. Trench collapse. 3d. Overhead electric contact.	3c. Keep concrete trucks several feet back from open trench edge. 3d. Pump trucks should be staged in a location where the operator has an unobstructed view of the pour and where the boom cannot come in contact with high voltage electrical lines.	
4. Lift equipment (Cranes and Manitou)	4. Struck or crushed by equipment.	4. Ensure proper crane positioning so there is no conflict with power lines. • Plan bucket routes so no workers are exposed to hazards associated with falling concrete buckets. 4a. Ensure safe distance between multiple cranes working simultaneously. 4b. Use rope to secure formwork or other equipment when lifting during windy weather.	**M**
5. Rigging	5. Struck or crushed by equipment due to failed rigging.	5. Inspect rigging to ensure rigging integrity and that rigging is rated to lift the intended load.	**M**
6. Concrete bucket for small castings / small elements.	6. Accidental dumping	6. Bucket must be equipped with operational hydraulic or pneumatic gates with positive safety latches. • Bucket must be designed so that concrete will not that hang up on the top or sides • Use tag lines on equipment and ensure personnel are not allowed to be under the load at any time.	**M**
7. Place concrete. Shovel, vibrate concrete.	7. Pulls or strains. 7a. Losing control of the material hose. 7b. Striking and injuring co-workers. 7c. Hazardous noise. 7d. Chemical contact injuries.	7. Wait for the boom operator to move the boom. 7a. Do not try to pull hose too far away from the boom 7b. Be aware of surrounding activities. • Let others know prior to starting power equipment. 7c. Wear hearing protection devices. 7d. Avoid wet concrete contacting skin by using rubber boots and gloves.	**M**
8. Screed, float, trowel concrete. Clean-up.	8. Tripping, falling. 8a. Crushed or pinched. 8b. Striking and injuring co-workers.	8. When walking on rebar mat, watch your step and move deliberately to avoid tripping and falling. 8a. Keep fingers, hands and other body parts away from pinch points, especially when using power screed with moving parts. • Power scree must be equipped with automatic kill switch	**M**

		8b. Be aware of the location of other workers, especially when using long handled tools. • Wash out concrete trucks in designated area only.	
9. Cutting expansion joints	9. Injury from flying blade fragments	9. Masonry saws must be guarded with semicircular enclosure over the blade and must be designed to retaining blade fragments.	M
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Concrete and pump trucks, and concrete bucket.	1. All employees that operate equipment will be trained according to manufacturers' recommendations and authorized by their employer.	1. All equipment will be inspected daily prior to use. Inspect for control zone when operating crane with concrete bucket.	
2. PPE when pouring concrete: Long sleeves and pants (duct taped around gloves or boots), boots, safety glasses or goggles, well-fitting gloves (specifically butyl or nitrile for Portland cement; not cotton or leather) and Class II high visibility vest.	2. Competent persons for signaling and rigging appropriately certified and authorized by the employer.	2. Equipment requiring annual certifications or permits shall have current copies with the equipment.	
3.Crane	3. Crane Operator must have current NCCCO cert.	3. Inspect the Crane operator for NCCCO/ Cert, Crane for Annual inspection, and Critical Lift Plan if applicable.	
4. Hand and power tools.	4. All persons will review this AHA before start of work.	4. All equipment will be inspected daily prior to use.	
5. Forklift	5. Forklift operators appropriately certified. 5a. Personnel must demonstrate proficiency of operation and maintenance of equipment.	5. Equipment requiring annual certifications or permits shall have current copies with the equipment.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Duct Bank Installation**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Name/Location: MPWSP, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 12 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by (Name/Title): Ken Meyer, CSP/Corporate H&S Director	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task:

1. **Excavate Trench**
2. **Place bedding materials**
3. **Install manholes and conduit**
4. **Pour concrete/backfill trench**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities	1. General Jobsite Hazards	1. Refer to Steps 1, 4, 7 and 9 in General Jobsite Hazards AHA.	L
2. Excavate Trench	2. Engulfment. 2a. Hazardous atmosphere. 2b. Crushed by cave-in.	2. Complete an excavation permit. 2a. Do not park running equipment, i.e. trucks and generator near the trench. • Periodically or routinely, if necessary, monitor the atmosphere in the trench. 2b. Trenches greater than 5 feet/1.5 meters in depth will be protected by sloping, benching, shoring or shielding. • Spoil will be placed 2 feet/0.6 meters back from the edge of the trench. • Trenches greater than 4 feet/1.2 meters in depth will be provided with an access ramps or ladders to allow no more than 25 feet/7.6 meters of lateral travel by occupants. • Competent person to complete a daily excavation inspection form prior to entry.	M

	2c. Fall and struck by hazards. 2d. Underground utility damage. .	2c. Where a trench is left open, and a fall hazard potential exists, the trench will be covered or barricaded. 2d. Utilize a spotter with a probe when nearing underground utilities. • Hand dig when proximity to utilities necessitates. • Stay out of swing radius of excavator boom.	
3. Place Sand/Gravel	3. Struck by heavy equipment or materials. 3a. Sprains and strains	3. Do not stand in front of excavator/loader while approaching the dump location or during offload. 3a. Use equipment to spread the sand/gravel to minimize use of hand tools.	M
4. Install Manhole/conduit	4. Overexertion 4a. Struck by 4b. Crush by suspended loads 4c. Slips/Trips/Falls	4. Break out manhole knockout with a sledgehammer that is appropriately sized. • Maintain good body position. • Use equipment to move manhole. 4a. Clear the area before swinging sledgehammer. 4b. Check the excavator lifting chart to ensure the safe lifting capacity is not exceeded. • Attach rigging to excavator boom according to manufacturer specifications for safe lifting. • Inspect the manhole lifter, rigging equipment and precast concrete to ensure good condition before lift. • Faulty equipment or materials are not to be used. • Use a tagline to control load during installation. • Never place any part of the body under a suspended load. 4c. Use a ladder to enter and exit manhole. • Do not jump into or climb out of manhole. • Cover open manholes at the end of the shift or enclose area with construction fence.	M
5. Place primer and glue pipe.	5. Exposure to organic vapors. 5a. Eye exposure	5. Work in a well-ventilated area. • Keep visitors away. • All visitors should be kept a safe distance away from the work area. 5a. Utilize SDS recommendations for PPE and ventilation or any other procedures to ensure workers safety. • Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.	

	5b. Fire/explosion 5c. Skin contact with solvent cement	5b. Ensure that there is proper ventilation. • Avoid sources of heat or open flame. 5c. Wear PVA-coated protective gloves. • Use a waterless, abrasive soap to remove all residue.	
6. Pour Concrete	Refer to Concrete Placement and Finish AHA	Refer to Concrete Placement and Finish AHA	**M**
7. Install pipe.	7. Struck by material. 7a. Pinch/crush points. 7b. Overhead loads. 7c. Falls	7. Keep work areas well lit. • For longer lengths of pipe use two people. 7a. Allow sufficient space for measuring and dryfitting the system. 7b. Employees must stay clear of material as it is staged to avoid overhead loads. 7c. Where possible, use platform lift with proper personal fall protection.	**M**
8. Backfill/Compact Trench	8a. Stuck by/crushed by 8b. Slips/trips/Falls	8a. Stay out of swing radius of excavator and out of travel path of loader. Clear trench of personnel before operating remote roller. 8b. Cover open trenches by the end of the shift or barricade danger area with construction fence.	**M**
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Electromagnetic or Sonic Scanning Equipment.	1. Competent person to be identified through educational training and experience.	1. Refer to any available as-built drawings to assist in the location of utilities. 1a. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. If equipment is deemed unserviceable it must be tagged and removed from service. Make sure the competent and/or qualified person is named and documented.	
2. Excavator, Backhoe, Loader.	2. Subcontractor will provide a list of authorized and competent equipment operators based on training and experience.	2. Daily inspection of excavations, the adjacent areas, and protective systems shall be made by a competent person for any hazardous conditions. Maintain inspection documentation onsite. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. These inspections will be documented and maintained on the jobsite with the supervisor.	
3. Hand Tools.	3. Ensure all personnel are trained on all hand tools, safety and operation.	3. All tools are to be inspected prior to use to ensure serviceability and all required guards or safety features are in place.	
4. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest.	4. AHA review by and acknowledged all personnel involved will take place prior to the work being conducted.	4. AHA must be available for review. Ensure it is accurate and current.	

Competent/Qualified Person Signature:		**Date:**	**Anticipated Finish Date:**
Workers' Signatures Verifying Review of Potential Hazards			
Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Electric Cable Tray/Conduit Installation**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Name/Location: MPWSP Project, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity** / **Probability**	
Date Prepared: 12 July 2021		
Prepared by (Name/Title): Ken Meyer, CSP/Corporate H&S Director		
Reviewed by (Name/Title):		

Severity	Frequent 1 per mo.	Likely 1 per yr.	Occasional 1 per 5 yrs.	Seldom 1 per 20 yrs.	Unlikely 1 per100 yrs.
Catastrophic (Death/Extensive Injuries)	E	E	H	H	M
Critical (Lost Time)	E	H	H	M	L
Marginal (Medical Treatment)	H	M	M	L	L
Negligible (First Aid)	M	L	L	L	L

Activity/Work Task:

1. **Electrical cable trays/conduit with MEWPs/work stands/mobile scaffolds.**

Many of these activities will be performed at height using Mobile Elevating Work Platforms.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities.	1. General Jobsite Hazards.	1. Refer to Steps 1, 2, 3, 4, 5, 7, 9, 10, 11, and 12 in General Jobsite Hazards.	L
2. Train Employees Obtain Hot Work Permit if task includes soldering or other hot work.	2. Injuries due to staff not being trained in the safe execution of their tasks.	2. In accordance with 29 CFR 1910.252 to .255, staff should receive training in the safe use of equipment and the process, maintenance of equipment, the handling of tanks, the operation and repair of regulators and/or gauges, the use of proper PPE, and the use of fire extinguishing equipment.	M
3. Bending Conduit	3. Injury from defective/broken tools 3a. Pinch point hazards 3b. Strains	3. Tag defective tools as out of service and remove from site 3a. Keep hands and feet clear of pinch point • Set up equipment in a well-lit area 3b. Stage material as close to the installation destination as possible • Handheld power tools must be equipped with a constant pressure switch	L

	3c. Lacerations 3d. Electric shock 3e. Burns from hot pipe	3c. All saws must have properly functioning manufacturer installed guards 3d. Tool cords and flexible cord sets are to be checked daily to ensure insulation is intact and cords are grounded 3e. When using conduit heater/bender wear gloves to prevent burns from hot pipe	
4. Threading Conduit	4. Loose clothing and hair caught in rotating equipment 4a. Struck by rotating equipment 4b. Contact with cutting oil	4. Do not wear clothing or jewelry that could easily get snagged or caught by equipment or machinery • Ensure long hair is tied up and not able to get caught. 4a. Support conduit to be threaded and delineate/barricade area to prevent workers from being struck by rotating conduit 4b. Review Safety Data Sheet to determine appropriate protection when contact with cutting oil is possible	L
5. Install electrical cable trays/conduit accessories from a work stand/mobile scaffold. **Ladders are not permitted since 3 points of contact cannot be maintained while installing cable trays/conduit.**	5. Injuries from using hand and power tools. Electrocution. 5a. Overhead work falling debris – eye and respiratory hazard. 5b. Falls from work stands/mobile scaffolds 5c. Hand injuries from wire and sharp edges and hand/power tool usage.	5. Inspect tools before use. Use GFCI protected cords or battery-powered tools. 5a. Wear eye protection – face shield/glasses/goggles. Wear N-95 dust masks, or equivalent. 5b. Mobile scaffolding shall be full planked with proper guardrails to prevent workers for inadvertently walking off the edge. Work stands shall not exceed 4 ft. (1.2 m). All work stands, and scaffolds shall be inspected before use. 5c. Wear gloves. Inspect tools before use.	M
6. Install cable trays/conduit from a MEWP.	6. Work from Mobile Elevating Work Platforms (MEWPs) – Falls. 6a. Hand injuries from wire and sharp edges and hand/power tool usage. 6b. Hazards to personnel working below from falling objects.	6. Operators and occupants to be trained in MEWP usage. Wear PFAS harnesses and lanyards. Attach lanyard to approved anchorage point in MEWP. Review MEWP AHA for additional requirements. Boom/basket weight limit must not be exceeded. Operate lift on stable ground. Never use guardrails as a step – stand flat on platform. Lower basket/boom before traveling. Do not overload MEWP. 6a. Wear gloves. Inspect tools before use. 6b. Cordon off are below MEWP/restrict access.	M
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	

1. Hand tools, cutting tools, grinding tools Conduit heater/bender, portable band saw, Sawzall, hand saws, hammer drill, other power drills handheld and electric conduit benders, pipe threader	1. Competent person to be identified through educational training and experience. 1a. All personnel involved will review the AHA prior to performing work.	1. Daily inspection of equipment and tools shall be made by the user. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
2. Welder, torch, compressed gases / cylinders.	2. Subcontractor will provide a list of authorized/competent equipment operators based on training/experience.	2. AHAs must be prepared and submitted to the General Contractor for review and acceptance the day before the work is to be performed. 2a. Hot work permit must be turned in and approved.	
3. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, PFAS equipment, gloves, and Class II high visibility vest.	3. AHA review by all personnel involved. Operators and occupant shall be trained in PFAS usage and inspection.	3. All PPE will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
4. MEWPs/aerial lifts, scissor lifts.	4. Operators and occupants must be trained in MEWP usage.	4. MEWPs shall be inspected daily before use.	
5. Cranes and rigging	5. Riggers and operators must be licensed.	5. Inspect rigging before each use and crane daily.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Electrical Equipment (Remove/Install)**	**Overall Risk Assessment Code (RAC) (Use highest code)** →					**M**
Project Name/Location: MPWSP, Marina, CA	**Risk Assessment Code (RAC) Matrix**					
Contract Number:	**Severity**	**Probability**				
Date Prepared: 12 July 2021		Frequent 1 per mo.	Likely 1 per yr.	Occasional 1 per 5 yrs.	Seldom 1 per 20 yrs.	Unlikely 1 per100 yrs.
Prepared by (Name/Title): Ken Meyer, CSP/Corporate H&S Director	Catastrophic (Death/Extensive Injuries)	E	E	H	H	M
	Critical (Lost Time)	E	H	H	M	L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H	M	M	L	L
	Negligible (First Aid)	M	L	L	L	L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities	1. General Jobsite Hazards	1. Refer to Steps 1, 5, 6 and 7 in General Jobsite Hazards AHA.	L
2. Training.	2. Injuries due to employees not trained in the safe execution of their tasks.	2. Train to make employees familiar with safety-related work practices concerning their work assignments, including techniques to recognize exposed live parts, make voltage determinations, and recognize safe clearance distances.	L
3. Secure electric equipment supply.	3. Electric shock.	3. De-energize all electric equipment to be removed. Install locks and tag circuits that are turned off. • Test all circuits with a multi-meter to ensure circuits are de-energized.	L
4. Remove/install equipment.	4. Struck-by equipment or material.	4. Coordinate with other crafts when doing work and always communicate intentions with other members of the removal/installation crew to avoid conflicts.	L

5. Stage Electrical Equipment	5. Struck by and crushing injuries.	5. When moving equipment with a forklift, plan the route to avoid rough terrain which could dislodge the equipment. • Workers to stay clear of load to avoid being caught between or crushed by equipment.	M
6. Rig equipment for lift.	6. Struck or crushed by equipment due to failed rigging.	6. Inspect rigging to ensure rigging integrity and that rigging is rated to lift the intended load.	M
7. Lift equipment	7. Struck or crushed by equipment.	7. Ensure proper crane positioning so there is no conflict with power lines. • Use tag lines on equipment and ensure personnel are not allowed to be under the load at any time.	M
8. Anchor equipment to pad.	8. Electrical shock.	8. Electric power tools and cords inspected prior drilling anchor bolt holes.	M
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Forklift	1., Forklift operator must have documented training.	1. Inspect all equipment and rigging prior to using.	
2. Crane and rigging equipment.	2. Certified NCCCO operator, or Israeli equivalent, to be identified through educational training and experience. 2a. All personnel involved including will review the AHA prior to performing work. 2b. NCCCO cert. or Israeli equivalent, must be present and current for operator to qualify. 2c. Signalmen and Qualified Riggers, as required; and control zones.	2. Daily inspection of crane, the adjacent areas, and protective control zones shall be established and maintained by a competent person for any hazardous conditions. 2a. Maintain inspection documentation onsite to include the Cranes Current Annual Inspection. 2b. All operators will be trained and have current NCCCO cert. or Israeli equivalent. 2c. A minimum of 20 ft./6 meters from overhead power lines. 2d. Control Zones, Signal men, and Qualified Riggers shall be present as required and demonstrate proficiency.	
3. Aerial lifts	3. Operators of aerial lifts must have documented training. Documented Fall protection training is required.	3. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
4. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest.	4. AHA review by all personnel involved.	4. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards			
Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Electrical Wiring Pulling**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Name/Location: MPWSP, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 12 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by (Name/Title): Ken Meyer, CSP/Corporate H&S Director	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Periodical Review of this AHA is required, by law, to ensure accuracy.

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities	1. General Jobsite Hazards	1. Refer to Steps 1, 4, 7 and 9 in General Jobsite Hazards AHA.	L
2. Training.	2. Injuries due to not being trained in safe execution of tasks.	2. Train to make employees familiar with safety-related work practices concerning their work assignments, including techniques to recognize exposed live parts, make voltage determinations, and recognize safe clearance distances.	M
3. Setting up cable reels.	3. Strains. 3a. Pinch points/caught between. 3b. Overhead loads.	3. Use proper lifting technique when material handling equipment cannot be utilized. • If required, get assistance from a co-worker. 3a. Employees should be positioned so that they are not between material and other firm surfaces when setting up reels to avoid crushing injuries. 3b. Never allow yourself to be directly under an overhead load and use tag lines to control those loads.	M
4. Pulling cable.	4. Strains.	4. Allow the machine to do the work. If pulling by hand, move slowly and position body correctly so as not to overstrain arms and back.	M

	4a. Electrical shock 4b. Pinch points. 4c. Moving machinery. 4d. Struck by snapped rope. 4e. Hazardous atmospheres in the manholes (confined space)	4a. Ensure all wires in the manhole are de-energized before beginning work. Utilize Hazardous Energy Control Procedures (HECP) if needed to de-energize previously installed wires and cables. 4b. Keep hands clear to avoid pinch points. 4c. Loose fitting clothes should be avoided when working with machinery. • Do not wrap pulling rope around hands or fingers to gain more pulling. 4d. Employees should position themselves so that if a rope snaps back they will not be struck. • Delineate area and deny entry of non-essential personnel. 4e. Monitor atmosphere to determine if the manhole is a permit or non-permit required confined space. If the manhole is a permit-required confined space, complete permit and mitigate hazards (ventilate the space). If the manhole is classified as a non-permit required confined space ventilate to maintain safe atmosphere and continuously monitor atmosphere. All entrants shall be confined space trained.	
5. Housekeeping	5. Slip, trips and falls.	5. Keep area clear of debris or empty cable reels that might cause trips during tugging operations. • Clear paths for lift equipment to avoid tipping and rolling of reels. If ground is sloped ensure that reels are secure from rolling and striking employees with blocks or shims.	**M**
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Handheld and electric conduit bender.	1. As part of the AHA review, safe use and inspection requirements for power tools will be discussed.	1. All equipment will be inspected prior to each use to ensure serviceability. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
2. Pipe Threader.	2. Personnel must demonstrate proficiency of operation and maintenance of equipment.	2. Containment for threading oil is in place to prevent spills. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
3. Ladders, Scaffolding and Aerial lifts.	3. If operating aerial lifts, or other types of lifts, forklifts and/or erecting scaffolding, there must have documented training in operating (lifts and forklifts) and/or a qualified erector in the case of scaffolding. The competent person must be present when building and inspecting scaffolding.	3. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	

4. Power tools (Hammer drill, drill motor, portable band saw.	4. Only trained employees can operate tools. Must demonstrate competency with operation and maintenance.	4. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
5. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest.	5. AHA review by all personnel involved.	5. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
6. Confined Space air monitoring and ventilation equipment	All entrants and supervisors must be trained in confined space entry..	Ensure air monitoring equipment is properly calibrated before use	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Excavation and Backfill**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Name/Location: MPWSP, MPWSP, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 12 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by (Name/Title): Ken Meyer, CSP/Corporate H&S Director	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities.	1. General Jobsite Hazards.	1. Refer to Job Steps 1, 2, 3, 5, 7, 9, 10, 11,12, and 13 in General Jobsite Hazards AHA.	L
2. Mobilization / Site Preparation.	2. Mobilization/Site Preparation Hazards.	2. Refer to steps on Site Preparation AHA.	M
3. Locate and mark-out for underground and overhead utilities.	3. Environmental and traffic exposure. 3a. Potential fire/explosion/electrocution.	3. All employees in the vicinity of traffic will wear high visibility vests/clothing. 3a. When within 50 feet/15 meters of gas lines or direct buried high voltage lines notify the appropriate agency that activities will be performed near their utility and take their direction on how to proceed with efforts to protect against contact with said utilities. Refer to the Potholing AHA. Identify any overhead lines within 20 feet/6 meters of equipment. Use a spotter to help guide the operator when working within 20ft./6m of overhead power lines. Never allow equipment to operate within 10 feet/3m of live overhead power lines.	M

4. Excavation / Trenching/Protective Systems	4. Crushed by cave-in. Engulfment.	4. Trenches greater than 5 feet in depth will be protected by sloping, benching, shoring or shielding. Native soils in the project area expected to be “Type B”. The Competent Person determine the soil type and document it on the Daily Excavation Inspection form. shall determine the appropriate protective systems to be used. Excavations shall be inspected daily by a designated Competent Person. Employees not able to witness the daily inspection may review the inspection form by contacting their supervisor. • Spoil will be placed 2 feet/0.6m back from the edge of the trench. • Trenches greater than 4 feet/1.2m in depth will be provide with access ramps or ladders to allow no more than 25 feet/7.6m of lateral travel by workers.	**M**
	4a. Hazardous atmosphere.	4a. Keep running generators and equipment away from and downwind of the trench.	
	4b. Fall hazards.	4b. Where a trench is left open, and fall hazard potential exists, the trench will be covered or barricaded using Class II perimeter Protection (fencing or warning tape). • Employees will wear a harness and lifeline when entering trenches classified as a confined space or that otherwise presents the potential for emergency rescue.	
	4c. Underground utility damage.	4c. Utilize a spotter with a probe when nearing underground utilities. Underground utilities were located before any excavations were opened. Utilities installed since the project began are marked on as built drawings and/or protected as the design calls for and/or CLSM. Hand dig when proximity to utilities necessitates.	
	4d. Crushed by equipment falling into the excavation	4d. Spotters will observe equipment and vehicles working on the top of excavations. If equipment/vehicles breach the 6 ft. (1.8 m) warning boundary, the spotters will use a portable air horn to warn workers in the excavation.	
5. Installation of shoring/Working in close proximity to the excavation.	5. Falls.	5. When working at the edge of a trench greater than 6 feet in depth, fall protection measures will be implemented. Warning fencing or tape will be	**M**

	5a. Strains. 5b. Pinch points.	place at least 6 ft. (1.8 m) from the edge to keep workers back from the fall hazard. 5a. When possible, install shoring using equipment to avoid back strains. 5b. Use caution to avoid hydraulic shoring from folding up and pinching fingers.	
6. Working in trenches.	6. Exposure to overhead loads.	6. Workers shall not be permitted underneath loads handled by lifting or digging equipment. • Workers shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. • Workers are not allowed in trenches when material or soil is dumped into the trench.	**M**
7. Backfill and compact.	7. Struck by equipment. 7a. Struck or engulfed by material. 7b. Back strain. 7c. Foot injuries.	7. Stay clear of equipment swing radius. 7a. Remove protective systems from the bottom up to minimize cave-in potential. 7b. Place and remove compactors with machinery to prevent strains. 7c. Utilize tarsal protection unless compaction equipment is operated by remote control.	**M**
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Electromagnetic or Sonic Scanning Equipment.	1. Competent person to be identified through educational training and experience.	1. Refer to any available as-built drawings to assist in the location of utilities.	
2. Excavator, Backhoe, Loader, Dozer and dump trucks.	2. Subcontractor will provide a list of authorized and competent equipment operators based on training and experience. 2a. Personnel must demonstrate proficiency of operation and maintenance of equipment.	2. Daily inspection of excavations, the adjacent areas, and protective systems shall be made by a competent person for any hazardous conditions. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. These inspections will be documented and maintained on the jobsite with the supervisor.	
3. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest.	3. AHA review by all personnel involved will take place prior to the task.	3. PPE must be inspected daily of before each use.	
Competent/Qualified Person Signature:		**Date:**	**Anticipated Finish Date:**
Workers' Signatures Verifying Review of Potential Hazards			

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Forklift Operations**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Name/Location: MPWSP, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 12 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by (Name/Title): Ken Meyer, CSP/Corporate H&S Director	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities	1. General Jobsite Hazards	1. Refer to Steps 1 and 2 in General Jobsite Hazards AHA.	L
2. Training.	2. Injuries due to not being trained in the operation of forklifts and/or the safe execution of tasks.	2. Train potential operators in forklift operation. • Training must include formal instruction, hands-on demonstration, and evaluation of performance. • Re-train every 3 years; or when an employee operates unsafely, has an accident or near-miss, is assigned to drive a different kind of truck, or there are changes in workplace conditions that could affect safe operation.	M
3. Pre-use Inspection	3. Slips, Trips and Falls. 3a. Pinch points 3b. Obstructions	3. Park in level area without obstructions. 3a. Identify pinch point locations and mark • Keep hands and fingers out of potential pinch points.	M

	3c. Emergency Brakes	3b. Check mirrors for cracks, dirt and other obstruction that may limit visibility. Maintain housekeeping in equipment cab. 3c. Prior to operating, while stopped on an incline, set emergency break, put transmission in neutral, let off foot pedal break and check for movement. • If emergency brake does not work, do not operate the equipment. • Tag for repair.	
4. Forklift Use.	4. Personal injury due to malfunctioning equipment. 4a. Rollover/Speed 4b. Struck by 4c. Load handling	4. Complete pre-operational checklist. • If the pre-task inspection identifies a faulty component, do not operate fork truck and contact supervisor. 4a. Carry loads centered on forks and close to the ground. • Travel slowly over rough, uneven ground. • Max 10 mph/6kmh speed limit. • Do not travel too fast for conditions. • Cross railroad tracks in reverse. 4b. Use spotter when vision is limited. • Review hand signals with spotter. • Only one (1) person communicating with operator. 4c. Check for obstruction before lifting a load. • Do not load forks with items that obstruct visibility of operator. • Never exceed the manufacturers weight limits for the fork truck.	M
5. Use of forklift as a crane	5. Electric shock/electrocution 5a. Tipping/rollover,	5. Look for overhead power lines the mast could contact. • Stay at least 10-feet/3 meters from power lines and other electrical equipment. 5a. Have competent person plan the lift. • Refer to “load handling hazard” discussion above.	M

	5b. Struck by or crushed by material being moved. 5c. Rigging equipment failure	5b. Use tag lines when moving load. • Alert other workers in the area of the lift. 5c. Competent person must check the integrity of the rigging equipment prior to the lift. • Lift should be made in accordance with 1926 Subpart CC-Cranes and Derricks in Construction	
6. Parking forklift.	6. Vehicle movement.	6. Set emergency brake, ground load or forks, chock wheels. • Park on level ground. • Place traffic cones around fork truck if parked in high traffic area.	M
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1.Forklift	1. Qualified operator certified on fork truck and certification less than 3 years old.	1. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
2. Rigging equipment if used as a crane.	2. Competent person if forklift is configured as a crane as defined in 1926 Subpart CC-Cranes and Derricks in Construction.	2 All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
3. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest.	3. AHA review by all personnel involved.	3. All PPE will be inspected prior to the start of the workday to ensure safe and reliable functioning.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **General Jobsite Hazards**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Name/Location: MPWSP, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 12 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by (Name/Title): Ken Meyer, CSP/Corporate H&S Director	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

INSTRUCTIONS: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. Required Baseline PPE	1. Head and foot.	1. Review Safety Data Sheets (SDS) for handling of materials and proper PPE. Hard hats and safety toed work shoes are required at all times.	L
	1a. Eye injury	1a. Face shields or goggles in conjunction with safety glasses when flying particles are generated.	
	1b. Hearing loss.	1b. Hearing protection is required when noise level is above 85 dB TWA.	
	1c. Hand Injuries.	1c. The appropriate gloves required when hands are subject to sharp materials or equipment. All personnel will have gloves on their person at all times.	
	1d. Vehicle traffic exposure.	1d. All personnel will wear ANSI approved ANSI/ISEA 207 Class II High visibility traffic vests.	

2. Traffic Control (Onsite).	2. Environmental and traffic exposure. 2a. Environmental and traffic exposure. 2b. Workers struck by heavy equipment. 2c. Potential roll over incidents. 2d. Property struck by heavy equipment.	2. Set up support, laydown and parking areas so traffic from deliveries, company vehicles, privately owned vehicles, heavy and hauling equipment are segregated to the extent possible. • Establish and enforce speed limits. Stop signs, caution signs, etc., as situation dictates should be posted. 2a. Set up support, laydown and parking areas so traffic from deliveries, company vehicles, privately owned vehicles and heavy and hauling equipment are segregated to the extent possible. • Establish and enforce speed limits. Stop signs, caution signs, etc., as situation dictates should be posted. 2b. All heavy equipment to be equipped with back up warning devices. Audible enough for the environment. • Employees on foot in operations area or on or near roadways must wear high visibility vests complying with ANSI/ISEA 207 Class II and maintain positive eye contact with the operator. 2c. Seat belt use is mandatory when operating machinery. 2d. Operators will be briefed on the locations of monitor wells, survey markers, restricted areas and other sensitive features in or in close proximity to heavy equipment areas of operation. • Features must be marked so easily spotted.	**M**
3. Traffic Control (Public Roads/Active Facilities)	3. Struck by or striking public or active facility traffic vehicles.	3. Determine and adhere to local/Base requirements when working in or near roadways. • Before the start of work each day a briefing will be held to discuss traffic control set up per the approved traffic control plan. • If there is a disruption of two-way traffic flow the flag persons will also be briefed on appropriate means of communication between flaggers. • Provide trained flag persons when operations create a traffic hazard. • Unless traffic is stopped in both directions heavy equipment will maintain the flow pattern dictated by the flaggers.	**M**

		• Flaggers will position themselves on the outside edge of traffic and will not leave their positions for any reason unless relieved by a briefed relief flag person. • Emergency vehicles traveling under emergency strobes and/or sirens will have the right-of-way. • Periodic drive through inspections will be conducted to replace knocked over cones or signs.	
4. Material Handling/Deliveries (Manual Lifting).	4. Crushing or pinching hands or feet. 4a. Excessive material handling. 4b. Strains from lifting.	4. Gloves are required when hands are subject to sharp materials or equipment. • Wear sturdy safety capped work boots. • Use a mechanical lift such as a dolly or hand truck when moving heavy materials. 4a. Know how much you can safely lift. • Get help with heavy objects. 4b. Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. • Keep the weight close to your body. • Be aware of your surroundings while moving long or bulky materials, watch where you are going.	**M**
5. Material Handling/Deliveries (Using Equipment/Crane for Lifting)	5. Struck by or crushed by material being moved. 5a. Electric shock/ electrocution from overhead power lines. 5b. Struck by overhead loads. 5c. Refer to Crane Operations AHA	5. When moving loads keep hands and feet clear of pinch points. • Use dunnage to keep materials off of floor. • Stay clear of equipment's swing radius. 5a. Crane to be set-up to ensure no capability of contacting overhead power lines. 5b. Check integrity of rigging material prior to flying in material. • Utilize tag lines in order to control the load. 5c. Refer to Crane Operations AHA	**M** **M**
6. Material Handling/Deliveries (Using Forklift)	6. Refer to Forklift Operations AHA	6. Refer to Forklift Operations AHA	**M**

7. Battery/electric tools and flexible cord sets	7. Shocks.	7. All electric tools will be GFCI protected. • Electric cords will be inspected daily. • Cords will be rolled out daily for task and put away at the end of the day. • Any defective cord will be tagged and removed from service immediately. • All tools will be inspected daily for cord condition and that guards are in place and in good working order. • All tools will be used according to the manufacturer's recommendations.	M
8. Cleanup/Housekeeping	8. Road contaminated/built up with mud. 8a. Roll-over potential with end-dump trailers. 8b. Slips, trips and falls. 8c. Lacerations/cuts. 8d. Burns 8e. Struck by 8f. Dust inhalation during sweeping 8g. Hazardous noise while vacuuming	8. Ensure that tractors and trailers are not leaving the site and tracking mud down the road. • Sweep or hose off tailgates and tires. Make sure tarps are in place over the incoming and/or outbound loads. • Check road surface periodically. • Cleanup as necessary. 8a. Grade off and compact haul roads to maintain stable flat surface. 8b. Clean up work area at the end of each shift. 8c. Wear appropriate work gloves to protect hands from sharp objects. 8d. When housekeeping around hot work areas warn workers that some material could be hot and a potential burn or fire hazard. 8e. Lower waste material from above. DO NOT THROW from elevated work areas unless there is a properly installed chute. • Clear paths for lift equipment to avoid tipping and stockpiled materials. 8f. Use of a sweeping agent to help control dust is recommended. 8g. Wear foam ear plugs when working with noisy equipment or in noisy areas.	M

9. Using Solvents, Adhesives and Cleaners	9. Exposure to potentially caustic chemicals with inhalation skin/eye irritation hazards.	9. Utilize SDS recommendations for PPE and ventilation or any other procedures to ensure workers safety. • Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.	M
10. Heat illnesses	10. Heat stroke/exhaustion/rash. 10a.Sunburn.	10. Make sure you always have an adequate supply of cold water available. Train employees in the signs, symptoms, and prevention of heat illnesses. • If your water supply is running low, talk to your supervisor. • Take scheduled cool down breaks. • Provide ventilation or air-cooling equipment for enclosed work areas. • Provide shade for workers that work in the sun. 10a. Use sunscreen, wear long sleeved shirts and Hard Hat shades.	M
11. Inclement Weather	11. Struck by wind-blown debris. 11a. Lightning strikes and wind damage.	11. Along with continuous field observations, weather shall be computer monitored periodically throughout the day for the possibility of severe thunder and lightning storms or tornados in the region. • If there is enough forewarning of significant a storm cell, secure materials and outbuildings. • Pick up debris and secure. 11a. All crane lifts and aerial steel erection work shall cease when there is a threatening storm or visible lightning on the horizon. Work shall not commence until one half hour after the last strike. • Crane booms and aerial lift equipment shall be lowered in the event of lightning and also at the end of each work shift (Refer to SSHASP for specific instructions).	L
12. Biological Hazards	12. Poisonous Plants	12. Know the range and identity of poisonous plants. • Wear long sleeve shirts, long pants, boots and gloves. • Use barrier cream. • Decontaminate tools with alcohol or soap. • Don’t burn vegetation piles if poisonous plants are suspected to be in the pile.	M

	12a. Poisonous Snakes 12b. Poisonous Insects and Spiders 12c. Vector borne diseases	12a. Never pick up any snake. • Know how to identify poisonous snakes. • Stay away from tall grass or loose leaf piles as much as possible. • Avoid rock piles and piles of wood. 12b. Wear light-colored, smooth-finished clothing. • Avoid perfumed soaps, shampoos, and deodorants. • Wear clean clothing and bathe daily. • Avoid flowering plants when possible. • Keep work areas clean. • Keep your tetanus boosters up to date (every 10 years). • Spider bites can become infected with tetanus spores. 12c.Use repellents on skin and/or clothing. • Avoid walking in tall grass, keep grass and weeds on the site trimmed down. • Try not to work during the early morning or at dusk as these are the most active times of day for mosquitoes.	
13. COVID-19	13. Risk of infection	13. The Coronavirus has become a pandemic. Follow local rules and procedures: • Stay a minimum of 5-6 feet/1.5-2 meters away from other people. • Do not shake hands • Wash your hands frequently with soap and water, for a minimum of 20 seconds. Use hand sanitizer (containing at least 60% alcohol) after contacting common surfaces, when soap and water are not available. • Do not use common coffee pots or water coolers. • Minimize time in shared office spaces, trailers, etc. • Wipe down common surfaces frequently with disinfectant wipes. • Stay home if you are sick. • Replace in-person meeting with virtual meetings where possible.	M

Equipment to be Used	**Training Requirements/Competent or Qualified Personnel Name(s)**	**Inspection Requirements**	
1. Heavy Equipment.	1. In house training and experience is required on all heavy equipment.	1. Daily Safety inspections: seat belt, back up alarm, etc.	
2. Aerial lift with full body harness (FBH)	2. Aerial lift certification for operator, with familiarization of specific lift used. Proper use and how to wear FBH SHALL BE reviewed by competent person.	2. Permit required. Daily inspection per CCI Aerial Lift Inspection sheet.	
3. Hand tools.	3. On the job training.	3. Work shift inspections.	
4. Power tools.	4. Operational, safety and hands on training.	4. Work shift inspections.	
5. Crew size First Aid Kit.	5. First Aid/CPR training.	5. Certification on site. Inspect kit monthly.	
6. Fuel container.	6. Experienced operator with hazard communications training.	6. Metal can with ground screen, labeled, with Safety Data Sheet (SDS) for fuel onsite.	
7. Compressed gas cylinders and torches.	7. Compressed gas cylinder and handling training.	7. Daily inspection of cutting tips, regulators and gauges, hose connections. SDS onsite.	
8. Fire extinguishers.	8. Knowledge of how to operate (in house training).	8. Visual inspection monthly. An annual maintenance check by an authorized fire extinguisher maintenance provider. And hydrostatic testing as required by 29 CFR 1910.157(f).	
9. Activity Hazard Analysis (AHA).	9. AHA review, by all personnel involved in executing the Work, will take place during a Preparatory meeting and Initial Phases of the Work.	9. AHA's must be updated and then reviewed by the affected crew when changes in the execution of Work or its Scope or location occur.	
10. Excavations.	10. Appointed competent person required for inspections.	10. Daily inspection of excavations, the adjacent areas, and protective systems shall be made by a competent person for any hazardous conditions.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards			
Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Grinding/Cutting/ Welding**	**Overall Risk Assessment Code (RAC) (Use highest code)** →					**M**
Project Name/Location: MPWSP, Marina, CA	**Risk Assessment Code (RAC) Matrix**					
Contract Number:	**Severity**	**Probability**				
Date Prepared: 12 July 2021		Frequent 1 per mo.	Likely 1 per yr.	Occasional 1 per 5 yrs.	Seldom 1 per 20 yrs.	Unlikely 1 per100 yrs.
Prepared by (Name/Title): Ken Meyer, CSP/Corporate H&S Director	Catastrophic (Death/Extensive Injuries)	E	E	H	H	M
	Critical (Lost Time)	E	H	H	M	L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H	M	M	L	L
	Negligible (First Aid)	M	L	L	L	L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities.	1. General Jobsite Hazards.	1. Refer to Steps 1, 2, 3, 4, 5, 7, 9, 10, 11, and 12 in AHA 1. 2. Refer to for PPE requirements within Chapter 5 EM385-1-1 3. Refer to Welding and Cutting in Chapter 10 of EM385-1-1	L
2. Train Employees Obtain Hot Work Permit	2. Injuries due to staff not being trained in the safe execution of their tasks.	2. In accordance with 29 CFR 1910.252 to .255, staff should receive training in the safe use of equipment and the process, maintenance of equipment, the handling of tanks, the operation and repair of regulators and/or gauges, the use of proper PPE, and the use of fire extinguishing equipment.	M
3. Welding, Grinding, and Cutting	3. General welding, grinding, and cutting hazards. 3a. Potential Confined Space	3. Obtain a hot work permit (H&S Form 0007). • Have valid permit for specific day of work. • Conduct Toolbox meeting and review appropriate activities and hazards. 3a. Contact your regional or corporate health and safety manager. • Follow CDM confined space entry program requirements.	L M

	3b. Slips, Trips and Falls	3b. Keep clear from debris and keep area organized.	L
	3c. Electrocution	3c. Check cords, plugs, and power source. • Do not use electrical tools in wet conditions.	M
	3d. Fire/Explosion	3d. Follow requirements in hot work permit. • Perform air monitoring and notify site health and safety manager before beginning task. • Inspect cylinders and hoses (if applicable) before welding.	L
	3e. Burns	3e. Wear leather gloves and cover arms. • Identify emergency shut offs with labels. • Shut off equipment before refueling. • Have a fire extinguisher present during hot work activity. • Use trained fire watch during the activity and for NLT 20 minutes afterwards.	L
	3f. Shock / Electrical	3f. Inspect fuel lines for cracks or wear. • Assure proper grounding. • Make sure no water is within the area. • Perform welding in a dry area.	M
	3g. Eye Exposure (UV rays/sparks)	3g. Wear proper eye and/or face protection (i.e. welding goggles if welding, face shield if grinding). • Do not look directly at the arc (Welder's Flash Arc). • Use spark containment such as a welding hood/fire blanket.	L
	3h. Flying Debris	3h. Wear proper eye protection. • If not part of the operation, stay back and give the operator room to work. • Make sure guards are in place. • If grinding, inspect grinding disc prior to work (ring test).	L
	3i. Cuts / Lacerations	3i. Wear leather gloves, chaps and long sleeve shirts or coveralls. • Ensure guards are in place over moving parts.	L
	3j. Noise	3j. Wear hearing protection when air chipping and grinding.	L
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Hand tools, cutting tools, grinding tools.	1. Competent person to be identified through educational training and experience.	1. Daily inspection of equipment and tanks shall be made by a competent person for any hazardous conditions. All equipment will be	

	1a. All personnel involved will review the AHA prior to performing work.	inspected prior to the start of the workday to ensure safe and reliable functioning. These inspections will be documented and maintained on the jobsite with the supervisor.	
2. Welder, torch, compressed gases / cylinders.	2. Subcontractor will provide a list of authorized/competent equipment operators based on training/experience.	2. AHAs must be prepared and submitted to the General Contractor for review and acceptance the day before the work is to be performed. 2a.Hot work permit must turned in and approved.	
3. PPE includes as a minimum protective clothing, hard hats, safety glasses, Face Shield, work boots, gloves, and Class II high visibility vest.	3. AHA review by all personnel involved.	3. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. These inspections will be documented and maintained on the jobsite with the supervisor.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Mobilization/Site Preparation**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Name/Location: MPWSP, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 12 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by (Name/Title): Ken Meyer, CSP/Corporate H&S Director	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities	1. General Jobsite Hazards	1. Refer to Steps 1, 2, 3, 4, 5, 6, 10, 11 & 12 in General Jobsite Hazards AHA.	L
1A. Comply with EM385-1-1 a. PPE b. APP signs c. Hand and Power Tools d. LHE e. Vehicles, Machinery, & Equip	1A. Not being visible; struck by vehicle Near miss/incidents Body injuries Body injuries Body injuries	1A. Morning safety orientation/Prep Phase meetings Self checks	M
2. Site Access 2a. Temporary Parking	2. Vehicle accidents during movement of equipment and trailers onto the site. 2a. Vehicle accidents during movement of equipment on the site or at the beginning and end of the day. .	2. Position flaggers a suitable, safe distance from site access point[s] to warn and stop traffic. • Develop a site traffic plan 2a. Designate an area away from the daily site activities and equipment, truck and service vehicle activities.	M

3. Locate and mark-out for underground utilities, trailer locations and other support area and project features.	3. Potential fire/explosion/electrocution.	3a. When within 50 feet/15 meters of gas lines or direct buried high voltage lines notify the appropriate agency that activities will be performed near their utility and take their direction on how to proceed with efforts to protect against contact with said utilities. • Trailers should be grounded. • Temporary overhead power lines should be placed to prevent contact by trucks, cranes or heavy equipment. • Establishing electrical service shall be performed using a licensed electrical contractor.	M
4. Excavate Shallow Trenches for Silt Fence.	4. Struck by vehicular traffic or heavy equipment. 4a. Damage to existing site structures/features.	4. Walk behind trenching machine. • Let it advance under its own momentum, don't force it. • Be cautious of natural underground obstructions such as rocks that may cause machine to buck or kick. • If hand digging, inspect shovel and other hand tools for defects such as cracks or splintering in the handles. 4a. Have area cleared of utilities before beginning penetrations. • Pot hole for utilities for positive location. • Refer to the Erosion Control AHA for steps associated with installing erosion control fencing. • Lift rolls of silt fence using your legs, get help if necessary. Wear appropriate gloves.	M
5. Clearing and Grubbing	5. Struck by vehicular traffic or heavy equipment. 5a. Damage to existing site structures/features.	5. All heavy equipment to be equipped with "back up" warning devices audible enough for the environment. • Employees on foot in operations area to wear high visibility garments and maintain eye contact with the operator. Do not walk behind a vehicle with the backup alarm activated. 5a. Operators must be briefed on monitor wells, survey markers, restricted areas and other sensitive features in close proximity to heavy equipment areas of operation.	M
6. Setting Trailer(s)	6. Placing trailers in close proximity to the work area[s] could cause equipment, vehicle damage or employee injuries.	6. Place trailers so they allow safe, adequate access and egress for workers. • Do not place so doors open into traffic. Do not create blind spots for operators or drivers.	M

	6a. Trailer[s] being overturned during high wind events.	6a. Depending on the geographic location, each trailer should be anchored against overturning prior to occupancy.	
7. Utility Hookups	7. Electrocution	7. Where possible, temporary overhead power lines should be placed to prevent contact by trucks, cranes or heavy equipment.	M
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Electromagnetic or sonic scanning equipment.	1. Competent person(s) to be identified through educational training and experience.	1. Refer to any available as-built drawings to assist in the location of utilities.	
2. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest.	2. AHA review, by all personnel involved.	2. AHAs must be prepared and submitted to the General Contractor for review and acceptance the day before the work is to be performed. AHA's must be updated and then reviewed by the affected crew when changes in the execution of Work or its Scope or location occur.	
3. Excavator, backhoe, loader, dump, concrete, and delivery trucks and forklifts.	3. Subcontractor will provide a list of authorized and qualified or competent equipment operators based on training and experience. 3a. If operating aerial lifts, or other types of lifts, forklifts and/or erecting scaffolding, there must have documented training in operating (lifts and forklifts) and/or a qualified erector in the case of scaffolding. The competent person must be present when building and inspecting scaffolding.	3. Daily inspection of excavations, the adjacent areas, and protective systems shall be made by a competent person for any hazardous conditions. • Maintain inspection documentation onsite. • All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. • These inspections will be documented and maintained on the jobsite with the supervisor. • All equipment operators will be trained and certified (when required). • These inspections will be documented and maintained	
4. Hand and power tools for cutting, driving, etc.	4. Trained and authorized personnel only using hand and power tools.	4. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. If equipment is deemed unserviceable it must be tagged and removed from service. Make sure the competent and/or qualified person is named and documented.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **HDPE Pipe Underground Installation**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Name/Location: MPWSP, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 12 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by (Name/Title): Ken Meyer, CSP/Corporate H&S Director	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task:

1. **Cut and weld HDPE pipe) including potable water and sewage and related fixtures i.e., valves, backflow preventors, etc.**
2. **Excavate trench for pipe.**
3. **Install HDPE pipe in trench.**
4. **Backfill trench.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities.	1. General Jobsite Hazards.	1. Refer to Steps 1, 2, 3, 4, 5, 7, 9, 10, 11, and 12 in General Jobsite Hazards.	L
2. Train Employees Obtain Hot Work Permit	2. Injuries due to staff not being trained in the safe execution of their tasks.	2. In accordance with 29 CFR 1910.252 to .255, staff should receive training in the safe use of equipment and the process, maintenance of equipment, the handling of tanks, the operation and repair of regulators and/or gauges, the use of proper PPE, and the use of fire extinguishing equipment.	M
3. HDPE pipe cutting and welding. a) Cut HDPE pipe.	3. Overhead loads. 3a. Cuts, slashes, crushed/caught between.	3. Non-essential personnel stay clear of pipe lifting and positioning operations. 3a. Wear proper PPE, Keep hands clear of blade.	M
b) Place pipe in fuser jaws.			M

	3b. Overhead loads, Pinch, and crush points during placement of pipe and while operating hydraulic jaws.	3b. Check all hydraulic lines prior to operating equipment to prevent injuries from high pressure hydraulic fluid from being injected into the eyes or skin. Use full PPE required during all operations. Wear high visibility vest. Always stay within visual contact area of operator.	
c) Position facer and begin facing. After facing check for slippage.	3c. Lacerations from facing blades. Pinched crushed by moving machine parts.	3c. Do not attempt to remove shavings while the facer is rotating or is in the facing position between the jaws. Jaws, heater, and facer pivot rapidly and can cause severe bodily injury if standing too close. All personnel must stand clear of machine when in operation. Wear proper work boots with good treads.	**M**
d) Check alignment, position heater, heat pipe, and fuse joint.	3d. Burns to clothing and skin.	3d. Keep the heater in its insulated heater stand or blanket when not in use and use care when heating the pipe. Use only a clean non-synthetic cloth such as a cotton cloth to clean the heater plates. Use oven mitt or similar glove to insulate hands from heater plate.	**M**
e) Opening movable/fixed jaws. Move and position pipe for next joint fuse. Lift and install next pipe.	3e. Overhead loads. Moving machine parts. Hot heater and sharp facing blades.	3e. Do not allow personnel under overhead loads. Personnel to stay clear of moving machine parts and facing blades during fusing operation. .	
4. Excavate for HDPE piping	4a. Trench Collapse 4b. Cave In – Struck by Caught between 4c. Trapped in trench 4d. Stuck by pipe	4a. Obtain excavation permit. Daily Excavation inspection by a Competent Person. 4b. Install protective systems – benching, sloping, or shoring as directed by the CP. Soils are expected to by Type “B” (to be validated by an excavation CP periodically) and can be sloped at 1:1. 4c. Install ladders to allow workers to evacuate the trench – there must be a ladder within 25 feet (7.8 m) of workers. Ladders must extend 3 ft. (0.9 m) above the top of the excavation. 4d. Remove all non-essential personnel from the trench. Use a tagline to control loads. Keep out from underneath suspended loads.	**M**
5. Install surface-welded HDPE piping in Trench.	5. Struck by pipe as it is lifted.	5. Do not allow workers between the pipe and the excavation. Stay away from suspended loads.	**M**
6. Backfill Trench/compact fill.	6. Struck by backfilling/compaction equipment	6. Wear high-visibility vests, use spotters as require. Ensure workers are trained in the safe operation of the equipment.	**M**
7. COVID-19.	7. Risk of infection	7. The Coronavirus has become a pandemic. Follow local rules and procedures: • Stay a minimum of 5-6 feet away from other people. • Do not shake hands • Wash your hands frequently with soap and water, for a minimum of 20 seconds. Use hand sanitizer (containing at	**M**

		least 60% alcohol) after contacting common surfaces, when soap and water are not available. • Do not use common coffee pots or water coolers. • Minimize time in shared office spaces, trailers, etc. • Wipe down common surfaces frequently with disinfectant wipes. • Stay home if you are sick. • Replace in-person meeting with virtual meetings where possible.	
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Hand tools, cutting tools, grinding tools.	1. Competent person to be identified through educational training and experience. 1a. All personnel involved will review the AHA prior to performing work.	1. Daily inspection of equipment and tanks shall be made by the user. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
2. HDPE facing and welding equipment.	2. All HDPE welding shall be performed by authorized/competent equipment operators based on training/experience.	2. All HDPE facing/welding equipment shall be inspected daily.	
3. PPE includes as a minimum protective clothing, hard hats, safety glasses, Face Shield, work boots, gloves, and Class II high visibility vest.	3. AHA review by all personnel involved.	3. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
4. Excavation and Compaction Equipment	4.Operators must be trained in safe operation.	4.Inspect equipment daily before use.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Asphaltic Concrete Paving/Repairs**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Location: MPWSP Project, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 15 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by(Name/Title): Damon Repine, CSP	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities.	1. General Jobsite Hazards.	1. Refer to Steps 1, 2, 3, 9 and 10 in General Jobsite Hazards AHA.	L
2. Clean and prep edges	2. Hazardous dust inhalation.	2. Stand up wind from your broom so that dust is blown away from you. • When sweeping produces significant quantities of airborne dust, that is not blown away, wear a dust mask or respirator.	M
	2a. Impact injuries.	2a. Whenever you are using a jack hammer the following additional PPE is required: metatarsal protection,	
	2b. Hazardous noise.	2b. Wear double hearing protection,	
	2c. Flying particles.	2c. Wear safety glasses with side shields and a face shield.	
3. Saw cut edges of asphaltic concrete (AC) pavements	3. Hazardous dust.	3. Prior to using an abrasive cut-off saw, review the site-specific silica exposure monitoring plan for hazard mitigation. Wet sawing is	M

	3a. Noise. 3b. Flying particles.	preferred. 3a. Use double hearing protection, 3b. Use safety glasses with side shields and a face shield.	
4. Apply tack coat	4. Burns- hot oil. 4a. Twisted ankle or knee. 4b. Fire or explosion- burns.	4. Wear rubber gloves and never point the wand at yourself or other workers. 4a. At all times when walking in and around the work area watch your step! Be careful of changes in elevation from one grade to another. 4b. Before using a propane torch inspect the cylinder for leaks or damage. Never use matches or butane lighters to light the torch.	M
5. Stage dump trucks, and unload AC	5. Crushed by material or moving equipment.	5. Stand away from equipment that is unloading material. • At all times when working around equipment, heed back up alarms and get out of the way. • This is especially true for rollers, dump trucks, and loaders because they are frequently backing up.	M
6. Spread AC by hand or wheelbarrow	6. Strained or pulled muscles. 6a. Crushed by moving equipment. 6b. Burns. 6c. Inhalation	6. Don't be too aggressive when moving heavy material. • Make sure that wooden handles for tools are secured tightly in the tool and are free of cracks and splinters. 6a. When on foot, never enter the operation area of any piece of equipment without first making hand/eye contact with the operator and waiting for him to acknowledge your presence. 6b. Don't touch hot asphalt or allow it to touch you. 6c. When all possible avoid breathing of asphalt materials/ fumes.	M
7. Operate paving machine	7. Crushed or pinched injuries. 7a. Burns.	7. Keep and hands and other body parts away from pinch points on the machine. 7a. Don't touch the screed, heaters or other hot surfaces.	M
8. Roll/compact AC, or operate other equipment (skip loader).	8. Hazardous noise, hearing loss.	8. Wear foam ear plugs when working on equipment where sound pressure levels are between 85 dB(A) and 115 dB(A) time-weighted average over 8 hrs. • When sound levels exceed 115 dB(A) foam ear plugs and ear muffs shall be worn.	M

	8a. Inability to see clearly. 8b. Falling from the machine. 8c. Struck by falling material.	8a. Keep the windshield and other glazing clean so that your view is unobstructed. • Know the blind spots of the equipment you are operating. • Make sure the windshield wipers work and all mirrors are properly adjusted. • Look in the direction of travel. 8b. Wear your seat belt while operating the machine. • Employees shall not ride in buckets or on any part of the machine other than the seat. • Use three points of contact when mounting/dismounting the equipment. 8c. Do not allow workers to stand or walk under the elevated portion of the machine.	
9. Changing attachments, blades or making repairs	9. Crush or pinch injuries from moving parts. 9a. Burns.	9. Never make repairs or change attachments without first setting the brake, neutralizing controls, and shutting down the engine. • Do not place body parts near pinch points on the machine. 9a. Do not touch hot pipes/surfaces or electric contacts	L
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Paving Machine, Dump Truck, Rollers (Vibratory and Static), Tack Truck, Skip Loader, and Street sweeper.	1. Make sure the competent and/or qualified person is named and documented.	1. Daily inspection of equipment and tanks shall be made by a competent person for any hazardous conditions. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. These inspections will be documented and maintained on the jobsite with the supervisor.	
2. Propane Torch	2. Personnel operating torches must be familiar with operations and maintenance.	2. A serviceable and current Class A Fire Extinguisher must be in the immediate area.	
3. Jack hammer	3. Personnel operating hand and power tools must be familiar with operations and maintenance.	3. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
4. Hand tools	4. Personnel operating hand and power tools must be familiar with operations and maintenance.	4. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
5. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest.	5. AHA review by all personnel involved.	5. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
Competent/Qualified Person Signature:		**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards			
Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Building Finish (Ext-Doors-Windows-Siding)**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Location: MPWSP Project, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: July 15, 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by(Name/Title): Damon Repine, CSP	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities.	1. General Jobsite Hazards.	1. Refer to steps 1, 2, 3, 4, 5, 6, 7, 9, 10, 11 and 12 on General Jobsite Hazards AHA.	L
2. Spread doors, frames, windows and siding, move material, and equipment	2. Pulls and strains from lifting,	2. Get help when moving heavy doors or equipment; use a mechanical lift when possible. • Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. • Have right materials delivered to the right location.	M
	2a. Dropping the materials.	2a. Keep the weight close to your body.	
	2b. Crushed or pinched body parts.	2b. Be aware of your surroundings while carrying materials, watch where you are going.	
	2c. Striking/injuring co-workers.	2c. Never move material over or above workers.	

	2d. Struck by falling materials. 2e. Falling through a wall or floor opening.	2d. Place the materials near the location in such a way so that it will not be blown or knocked over. 2e. When receiving/stocking materials through a wall or floor opening, do not stand in front or above the opening where you could fall to a lower level.	
3. Roll out tools and set up workplace	3. Slipping, tripping, or falling, and delayed egress. 3a. Strains from bending or kneeling. 3b. Electrocution-faulty electrical cords. 3c. Injures from defective or broken tools. 3d. Electric shock from defective tools.	3. Keep corridors and high traffic areas free of cords, hoses, & other equipment. • Completely unroll all cords to avoid tangles. • Clean up scrap materials and debris before and after working in an area. 3a. Set up saw horses or use a door stand to make the materials easier to work on. 3b. Do not use electrical cords with cuts, worn insulation, or visible conductors. • Use cords rated for hard or extra-hard usage. • Use factory-assembled cord sets as much as possible. • Repairs must preserve the original electrical and mechanical integrity of the cord. • Electrical tape fixes are prohibited and replacement plugs must be properly sized and provided with strain relief clamps. • Check that the ground prong is intact. 3c. Remove defective tools from the jobsite. • Wooden handles for tools are secured tightly in the tool and free of cracks and splinters. • All saws and grinders have properly functioning manufacture installed guards. • Hand held power tools (saws, drills, and grinders) are equipped only with a constant pressure switch. 3d. Use only GFCI protected outlets. • Always use the right tool for the job.	**M**

		• If you know the right tool to use ask your supervisor.	
4. Install door hinges and prep jamb to receive door, hang the door and make adjustments.	4. Pulls and strains. 4a. Hearing loss. 4b. Crushed or pinched body parts. 4c. Flying particles- eye injury. 4d. Burns. 4e. Cut by utility knife.	4. Avoid binding the drill bit, causing the drill body to spin. • Hold the drill steady; don't try to drill too quickly. • Install stability handle if drill is not equipped. 4a. Wear foam ear plugs when working in noisy areas or with loud tools such as a hammer drill, or grinder. 4b. Get sufficient help to lift and hold heavy doors in position. • Use a pry bar or other mechanical means to help position the door to prevent the door from falling. • Get at least one screw in the top hinge as soon as possible. • Keep fingers and hands clear of pinch points. • Communicate clearly with co-workers. 4c. Wear safety goggles or a face shield for work involving hammers, hammer drills, grinders, saws, or pneumatic tools. 4d. Be careful not to touch a hot bit, grinding wheel, or saw blade. 4e. Cut away from your body. • The blade should always be pointed in a direction opposite any body parts.	M
5. Working from a ladder to install windows or siding and apply caulking.	5. Ladders tipping. 5a. Shifting while in use causing the worker to fall. 5b. Falling from ladder. 5c. Electric shock.	5. Set up ladders on firm level footing. 5a. Choose the correct size ladder for the job. • All step and extension ladders are equipped with ladder shoes. 5b. Don't work from the top two steps of a step ladder. • Don't work from a step ladder leaned against a wall. • Step ladders used only in full open position. 5c. Use nonconductive ladders only.	M
6. Prep and clean surfaces prior to caulking. Apply caulking	6. Burns, dizziness, nausea, sickness, or cumulative damage due to long term	6. Read through the SDS for every chemical/material that you will be using.	M

	occupational exposure. 6a. Cut by utility knife	• Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects. 6a. Cut away from your body. • The blade should always be pointed in a direction away from any body parts.	
7. Remove old glazing (for remodel work only).	7. Shattered glass- cuts, eye injury.	7. Before breaking glass for removal apply strips of duct tape, spray adhesive and visqueen, or some other membrane to catch and hold most of the shattered glass. • Use a drop cloth to catch loose shards of glass. • Clean up all broken glass in the work area as soon as possible. • Wear safety goggles or a face shield, gloves, and gauntlets.	M
8. Installing siding.	8. Cuts. 8a. Falls. 8b. Struck by falling objects.	8. Wear gloves to protect hands. 8a. Use fall protection if exposed to a fall of greater than six feet. 8b. Barricade area beneath work zone to prevent unauthorized entry.	M
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Aerial Lifts	1. If operating aerial lifts, or other types of lifts, forklifts and/or erecting scaffolding, there must be a trained operator (lifts and forklifts) and/or a qualified erector in the case of scaffolding.	1. Daily inspection of equipment and tanks shall be made by a competent person for any hazardous conditions. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. These inspections will be documented and maintained on the jobsite with the supervisor.	
2. Hand tools, Power tools	2. Personnel operating hand and power tools must be familiar with operations and maintenance.	2. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
3. Ladders	3. Make sure the competent and/or qualified person is named and documented.	3. Inspect prior to use.	
4. Forklift	4. All operators must be trained and proficient on forklift operations and maintenance.	4. These inspections will be documented and maintained on the jobsite with the supervisor.	
5. PPE - minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest.	5. AHA review by all personnel involved.	5. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. These inspections will be documented and maintained on the jobsite with the supervisor.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**
Workers' Signatures Verifying Review of Potential Hazards		

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Building Finish (Interior)**	**Overall Risk Assessment Code (RAC) (Use highest code)** →					**M**
Project Location: MPWSP Project, Marina, CA	**Risk Assessment Code (RAC) Matrix**					
Contract Number:	**Severity**	**Probability**				
Date Prepared: 16 July 2021		Frequent 1 per mo.	Likely 1 per yr.	Occasional 1 per 5 yrs.	Seldom 1 per 20 yrs.	Unlikely 1 per100 yrs.
Prepared by(Name/Title): Damon Repine, CSP	Catastrophic (Death/Extensive Injuries)	**E**	**E**	**H**	**H**	**M**
	Critical (Lost Time)	**E**	**H**	**H**	**M**	**L**
Reviewed by (Name/Title):	Marginal (Medical Treatment)	**H**	**M**	**M**	**L**	**L**
	Negligible (First Aid)	**M**	**L**	**L**	**L**	**L**

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities	1. General Jobsite Hazards	1. Refer to Steps 1, 2, 3, 4, 5, 6, 7, 9, 10, 11 and 12 in General Jobsite Hazards AHA.	**L**
2. Receiving equipment and material.	2. Crush/pinch point hazards.	2. Gloves are recommended when hands are subject to sharp materials or equipment. • Use dunnage to keep materials off of floor.	**M**
3. Cut metal studs.	3. Eye injury from flying particles. 3a. Hazardous noise. 3b. Cuts to hands/fingers.	3. Wear a face shield or goggles in conjunction with safety glasses. 3a. Wear foam ear plugs when using saw or other noisy power tools or when working in noisy areas. 3b. Cut short pieces from long stock and hold the long end of the piece. • Make sure the piece you are cutting is properly supported and secure.	**M**

	3c. Burns, fire.	• Don't try to cut too quickly. 3c. Watch where you are throwing sparks. • Do not cut where sparks will land on other workers or on combustible materials. • Keep fingers at least 8 inches from the blade.	
4. Moving studs/drywall.	4. Strains from lifting. 4a. Cuts and scrapes. 4b. Striking and injuring co-workers with steel.	4. Get help when moving/lifting heavy materials. 4a. Use a mechanical lift if necessary. Don't touch the sharp edges of studs that have been cut. • Wear gloves as needed. 4b. Know the location of nearby workers when carrying and turning with long pieces of material to avoid striking them.	M
5. Install metal studs.	5. Falls. 5a. Penetrating injury from ricocheting fastener.	5. Ensure workers are tied off when using aerial lift apparatus and that scaffold is erected and used under the supervision of a competent person. • Scaffold requires daily inspection and results tagged to indicate serviceability. 5a. Never use a powder actuated tool unless trained and certified in its use. Wear PPE (eye, ear, and hand protection). • Hold the tool firmly (bend elbow slightly), and perpendicular to the surface. • Non-essential personnel to stay clear of area.	M
6. Apply adhesive (when specified)	6. Dizziness and nausea. 6a. Cumulative damage due to long term occupational exposure.	6. Read through the SDS for every chemical/material that you will be using. 6a. Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects.	M
7. Cut and fasten drywall to framing members.	7. Cut by razor knife 7a. Eye injury. 7b. Struck by falling material. 7c. Pinch points.	7. Cut in a direction away from the body. 7a. Ensure safety glasses with side shields are worn when using a screw gun or hammer. 7b. Make sure the piece is adequately supported until it is permanently fastened into place. 7c. Keep fingers away from area you are striking with a hammer.	M

	7d. Falls.	• Use same procedures and controls mentioned previously for installing metal studs. 7d. Use fall protection when exposed to a fall hazard greater than six feet.	
8. Tape and mud drywall joints.	8. Falls. 8a. Eye injury.	8. Use caution when using stilts. 8a. Wear eye protection.	M
9. Sand and spray texture.	9. Dust inhalation. 9a. Injection of foreign material. 9b. Impact injuries. 9c. Slips, trips and falls.	9. Review the project silica exposure plan. Refer to Cal/OSHA title 8 article 4 for additional information. Wear a dusk mask or respirator when sanding drywall joints. • Wear a dust mask when sweeping up drywall dust. 9a. Never point the spray gun at yourself or at any worker in your vicinity. • Never use compressed air to blow dust from hands, face or clothing. 9b. Ensure that hose controlling devices (whip checks) are provided on air power tools and hoses. 9c. Clean up spilled mud or water that might create a slip hazard. • Remove equipment from hallways or stairs.	M
10. Take measurements and other work from a ladder, moving ladders	10. Ladder tipping, shifting, or sliding causing the worker to fall. 10a. Falling from ladder. 10b. Ladder failure.	10. Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. • The top of the ladder is tied off and the side rails extend 36" above the landing. • Step ladders used only in full open position. • Set up ladders on firm level footing. • Don't work from a step ladder leaned against a wall. • All step and extension ladders are equipped with ladder shoes. 10a. Don't work from the top two steps of a step ladder. • Do not move a ladder while you are on it. 10b. Choose the correct size of ladder for the job.	M M

	10c. Tools or materials falling from ladders	• Ladders must be inspected regularly and tagged “do not use” if defective. • Remove defective ladders from the jobsite. 10c. Do not move ladder with tools on it.	
11. Cut lumber	11. Saw kicking back. 11a. Cuts. 11b. Eye injury. 11c. Work moving unexpectedly. 11d. Splinters. 11e. Hazardous noise- hearing loss.	11. Hold the saw steady (parallel with the direction of the cut). • Do not cut a radius in a sheet with a circular saw. • Do not cut too fast. 11a. Keep fingers at least 6" from the blade. 11b. Use a clamp to hold small pieces. 11c. Never cut pieces from stock which is shorter than 8". • Never pin back the guard on a saw. • Make sure the piece you are cutting is properly supported and secured. 11d. Wear gloves when handling rough cut lumber 11e. Wear foam ear plugs when using saw or other noisy power tools or when working in noisy areas.	M
12. Cutting treated lumber	12. Airway irritation or sickness. 12a. Splinters.	12. Wear a dust mask and wear goggles or safety glasses with side shields when cutting lumber treated with hazardous chemicals. 12a. Wear gloves when handling treated lumber.	M
13. Move lumber into position	13. Pulls and strains from lifting. 13a. Striking and injuring co-workers with materials.	13. Get help when moving heavy materials; use a mechanical lift when possible. • Convert lifting and lowering tasks to pulling and pushing. • Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. • Keep the weight close to your body. 13a. Be aware of your surroundings while moving materials, watch where you are going.	M M

		• Never move materials over or above workers.	
14. Position and fit lumber	14. Crushing or pinching body parts	14. Keep fingers, hands, and feet clear of all pinch points.	M
15. Fasten lumber in place	15. Nailing fingers/hands.	15. Fire nail and staple guns by depressing the trigger not by banging the muzzle of the gun against the work piece. • Keep hands clear of gun, do not disable safety trigger.	M
	15a. Fastener ricochet.	15a. Check lumber surfaces before nailing. Look for knots, nails, straps, hangers, etc. that could cause recoil or ricochet.	
	15b. Flying particles- eye injury.	15b. Wear goggles or safety glasses with side shields when using hammers and pneumatic tools.	
	15c. Pinch points.	15c. Keep hand several inches away from whatever you are hitting with a hammer.	
	15d. Dropping lumber, scraps or tools on workers.	15d. Do not allow workers below the level from which you are working unless they are protected from falling objects.	
	15e. Tripping, slipping, and falling.	15e. Keep hoses and cords that are draped across the roof to a minimum.	
16. Set larger beams and other structural elements	16. Unexpected movements.	16. Before moving a beam, make sure that all workers are in a secure position, are aware of the move, and are tied off. • See Crane Operation AHA.	M
	16a. Strains from lifting.	16a. Know how much you can safely lift.	
	16b. Materials striking and injuring workers.	16b. Ensure that there is good communication between workers and the lift operator.	
	16c. Crushed by falling material.	16c. Never walk under a raised load.	
17. Working from an elevated position	17. Falling	17. Whenever you are working from an elevated location that is 6' or more above the lower level you must be protected by either a guardrail system or a personal fall arrest system. • Workers must wear a full body harness and lanyard secured to a safe anchorage point. • This may be a bracket specifically designed for fall protection or a structural member. • Lines shall be checked after each move to ensure correct length.	M

18. Working in hot weather	18. Heat stroke. 18a. Sunburn.	18. Make sure you always have an adequate supply of cold water available. • If your water supply is running low, talk to your supervisor. • Take scheduled cool down breaks. • Provide ventilation or air cooling equipment for enclosed work areas. 18a. Use sunscreen	M
19. Clean up	19. Slips, trips and falls. 19a. Cuts. 19b. Eye.	19. Clean up work area at the end of each shift. 19a. Wear work glove to protect hands from sharp objects. 19b. Wear safety glasses or goggles.	M
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Aerial Lifts	1. If operating aerial lifts, or other types of lifts, forklifts and/or erecting scaffolding, there must have documented training in operating (lifts and forklifts) and/or a qualified erector in the case of scaffolding. The competent person must be present when building and inspecting scaffolding.	1. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. 1a. If equipment is deemed unserviceable it must be tagged and removed from service. 1b. Make sure the competent and/or qualified person is named and documented.	
2. Hand and Powder actuated tools	2. Personnel must demonstrate proficiency of operation and maintenance of equipment.	2. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
3. Ladders	3. Personnel must demonstrate proficiency of operation and maintenance of equipment.	3. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
4. Forklift	4. Personnel must demonstrate proficiency of operation and maintenance of equipment.	4. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
5. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest.	5. AHA review by all personnel involved.	5. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Building Painting (Interior/Exterior)**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Location: MPWSP Project, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity** / **Probability**	
Date Prepared: July 15, 2021		
Prepared by(Name/Title): Damon Repine, CSP		
Reviewed by (Name/Title):		

Severity	Frequent 1 per mo.	Likely 1 per yr.	Occasional 1 per 5 yrs.	Seldom 1 per 20 yrs.	Unlikely 1 per100 yrs.
Catastrophic (Death/Extensive Injuries)	E	E	H	H	M
Critical (Lost Time)	E	H	H	M	L
Marginal (Medical Treatment)	H	M	M	L	L
Negligible (First Aid)	M	L	L	L	L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities	1. General Jobsite Hazards	1. Refer to Steps 1, 2, 4, 7, 8,9,10 and11 in General Jobsite Hazards AHA.	L
2. Painting (Interior and/or Exterior) and/or surface preparation	2. Inhalation of vapors/respiratory system irritation and/or damage, dizziness, nausea. 2a. Inhalation of dust or particles (containing lead-based or containing paint or asbestos).	2. Wear proper respirator and/or SCBA as recommended on the product SDS. Refer to Site Health and Safety Plan, Cal OSHA title 8 article 4 and OSHA 29 CFR 1926.103 /1910.134 for more detail. 2a. Never cut, sand, scrape, or grind any lead or asbestos containing material. • Familiarize yourself with common lead or asbestos containing materials so that they can be avoided. • Wear proper respirator. • Refer to Site Health and Safety Plan, Cal OSHA title 8 article 4 and OSHA 29 CFR 1926.103 /1910.134 for more	M

		detail.	
	2b. Electrical shock or electrocution.	2b. Inspect equipment (for example, power paint sprayer), cords and prongs for cuts or worn areas. • Do not use equipment that is defective or have broken or missing parts. • Use only GFCI protected circuits.	
	2c. Potential Confined Space / inadequate ventilation (typically associated with interior painting).	2c. Contact you regional or corporate health and safety manager. Follow CDM Confined Space Entry Program requirements. Refer to Site Health and Safety Plan for more detail.	
	2d. Eye Exposure/Splashes/Debris	2d. Wear proper eye protection (i.e. safety glasses, goggles, face shield, etc.) to protect eyes from paint splatter and/or paint or other surface particles when prepping painting surfaces.	
	2e. Skin Irritation.	2e. Wear proper PPE as described in the product SDS. • This typically includes gloves, long sleeves and other clothing that covers exposed skin. • Wash hands thoroughly with hand cleaner after painting activities. • Do not use gasoline, paint thinner, lacquer thinner, or other solvent based cleanser not meant for skin contact. • Wash work clothes separately as to not cross contaminate non-work clothing.	
	2f. Fall /Slip from ladder	2f. Use man lift or aerial lift instead, if possible. • Inspect ladder before use. • Use ladder of proper height. • Ensure ladder is properly assembled, locked and on level surface. • Do not exceed weight limit for ladder. • Do not stand on top of ladder or on top rung. • Refer to Site Health and Safety Plan, Cal OSHA title 8 article 25. Ladders and OSHA 29 CFR 1926.1053 for more detail.	

	2g. Fall hazard.	2g. Fall protection or prevention (i.e. guard rails) is required 100% of the time when working or walking on a surface with unprotected sides and edges 6 feet or more above a lower level. • Refer to Site Health and Safety Plan, Cal OSHA title 8 article 21, 22&24 and OSHA 29 CFR 1926.500-503 and Subpart M for Fall Protection for more detail.	
	2h. Fall/Slip from Scaffolding Scaffolding collapse (typically exterior painting).	2h. Use fall protection and/or safety rails properly.	
	2i. Fall from scissor or aerial lifts (exterior painting).	2i. Use fall restraint or fall arrest system to help keep yourself inside bucket. • Do not climb or lean over guardrails.	
	2j. Shock or electrocution (from contact with power lines) Hit, pinch, or crushing injury	2j. Do not use near power lines. • Refer to AHA #28 “Aerial Lifts” Cal OSHA tittle 8 article 24 and OSHA CFR 1910.67 for more detail.	
	2k. Sprains, strains, and other ergonomic hazards.	2k. Position work between waist and shoulder when possible Use proper lifting methods – or team lift. • Switch between other tasks to give body a rest from monotonous or repetitive motion.	
	2l. Fire.	2l. Properly store potentially combustible paints away from ignition sources. • Properly dispose of used rags in airtight container. • Clean up spills and leaks promptly. • Do not smoke around painting areas or where paint is stored. • Keep fire extinguisher nearby during painting and near storage area.	
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Power Paint Sprayer	1. Competent person to be identified through educational training and experience. 1a. Operator of aerial lifts must have received appropriate training.	1. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. 1a. If equipment is deemed unserviceable it must be tagged and removed from service. 1b. Make sure the competent and/or qualified person is named and	

		documented.	
2. Paint	2. Subcontractor will provide a list of authorized/competent operators based on training and experience.	2. Ensure SDS is available for paint information and any solvents to be used for cleanup. 2a. Solvents and Paints must remain in user's possession until consumed or returned if borrowed from original labeled container.	
3. PPE includes as a minimum protective clothing, hard hats, safety glasses or goggles, work boots, gloves, and Class II high visibility vest. Respirator/SCBA.	3. AHA review by all personnel involved. Personnel must demonstrate proficiency of operation and maintenance of equipment.	3. Ensure worker has had a physical and Fit test prior to using Fitted Respirator. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning	
4. Ladder	4. Personnel must demonstrate proficiency of operation and maintenance of equipment.	4. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
5. Scaffolding	5. Personnel must demonstrate proficiency of operation and maintenance of equipment.	5. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
6. Scissor or Aerial lift	6. Personnel must demonstrate proficiency of operation and maintenance of equipment.	6. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Concrete Formwork/Reinforcing**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Name/Location: MPWSP, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 12 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by (Name/Title): Ken Meyer, CSP/Corporate H&S Director	Catastrophic (Death/Extensive Injuries)	**E** / **E** / **H** / **H** / **M**
	Critical (Lost Time)	**E** / **H** / **H** / **M** / **L**
Reviewed by (Name/Title):	Marginal (Medical Treatment)	**H** / **M** / **M** / **L** / **L**
	Negligible (First Aid)	**M** / **L** / **L** / **L** / **L**

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities	1. General Jobsite Hazards	1. Refer to Steps 1, 2, 4, 9 and 10 in General Jobsite Hazards AHA.	L

2. Cut lumber or form material	2. Work piece moving unexpectedly. 2a. Saw kicking back. 2b. Cutting fingers/legs. 2c. Form collapse and falling debris. 2d. Nailing fingers/hands.	2. Make sure the piece you are cutting is properly supported and secure. 2a. Never cut pieces from stock that is shorter than 8". Do not cut too fast. • Do not cut a radius with a worm drive saw. 2b. Keep fingers at least 6" from the blade. 2c. Use a clamp to hold small pieces. 2d. Never depress the trigger of a nail or staple guns except with the muzzle of the gun against the work surface. • Do not fire the guns by holding the trigger and striking the muzzle of the gun.	**M**

	2e. Flying material/fastener ricochets.	• Keep hands clear of gun, do not disable safety trigger. • Keep opposite hand several inches away from whatever you are hitting with a hammer, or a hammer tacker. • Use safety glasses or goggles. 2e. Do not attempt to nail hard or brittle surfaces.	
3. Erect forms. Fasten forms and/or lumber in place.	3. Impalement on rebar. 3a. Struck by. 3b. Crush/pinch hands/fingers. 3c. Tripping, slipping, and falling.	3. Follow manufacturer's installation procedures for forming systems. • All rebar which workers could fall upon or bump into must be protected with rebar caps with steel reinforcement. This means that both vertical and horizontal rebar must be capped. • Mushroom type caps are not allowed. 3a. Never leave structural elements unbraced where they could fall on workers. • Keep hands clear of nail guns, do not disable safety trigger. • Always wear safety glasses when using hammers or pneumatic tools. 3b. Keep free hand several inches away from whatever you are hitting with a hammer. 3c. Keep work area beneath feet clear of hoses, cords, scrap and equipment.	M
4. Install or remove forms	4. Crush/pinch hands and feet. 4a. Strains from lifting. 4b. Struck by or crushed by moving material. 4c. Struck by overhead loads. 4d. Electric shock/electrocution from overhead power lines.	4. When moving forms or lumber keep hands and feet clear of pinch points. 4a. Stack lumber on dunnage. • Lift with your legs. • Get help if load is heavier than your capacity. 4b. Check integrity of rigging material prior to flying in material. 4c. Utilize tag lines in order to control the load. 4d. Crane to be set-up to ensure no capability of contacting overhead power lines.	M
Equipment to be Used	**Training Requirements/ Competent or Qualified Personnel name(s)**	**Inspection Requirements**	

1. Hand tools.	1. Competent person to be identified through educational training and experience. 1a. All personnel involved will review the AHA prior to performing work.	1. Daily inspection of equipment and tanks shall be made by a competent person for any hazardous conditions. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. These inspections will be documented and maintained on the jobsite with the supervisor.	
2. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest.	2. Personnel must demonstrate proficiency of operation and maintenance of equipment.	2. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. These inspections will be documented and maintained on the jobsite with the supervisor.	
3. Hoisting equipment	3. Personnel must demonstrate proficiency of operation and maintenance of equipment.	3. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
4. Rigging	4. Personnel must demonstrate proficiency of operation and maintenance of equipment. 4a. Riggers must have documented training and display competency in operations and maintenance.	4. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Cranes (Mobile)**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Name/Location: MPWSP Project, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 16 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by (Name/Title): Ken Meyer, CSP/Corporate H&S Director	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities	1. General Jobsite Hazards.	1. Refer to Steps 1, 2, 3, 4, 5, 9 and 10 in General Jobsite Hazards AHA.	L
2. Training.	2. Workers not trained in the safe execution of the activity.	2. Use this Activity Hazard Analysis, and other formal and informal training to train Workers. • Operators and Signalmen require certification through an agency such as the National Commission for the Certification of Crane Operators (NCCCO).	L
3. Obtain Lift Plan	3. Injuries due to poor planning.	3. Obtain and review lift plan prior to mobilization.	L
4. Credentials check	4. Non-qualified operator, rigger and signalman.	4. Check license and qualification from riggers, signal man and assembler/disassembler. • Call certifying agency to confirm. • Cards can be copied and/or certification lapsed/rescinded. • These details will not be known by looking at the card.	L

5. Annual Inspection Check	5. Faulty crane.	5. Crane company must provide current annual crane inspection and/or certification plate on crane. • Do not allow crane onsite until this is provided ahead of time.	L
6. Set up work area/ crane	6. Electrocution. 6a. Slips trip falls from ground conditions. 6b. Unauthorized personnel in lifting zone.	6. No crane work within 20 feet of energized overhead power lines. • Refer to 1926 Subpart CC for exact details and requirements on operating a crane near power lines. 6a. Ensure housekeeping is adequate. • Remove obstructions and mark unmovable object. • Use 3 points of contact when mounting and dismounting. 6b. Competent person to set up lift zone with cones and flags. • If windy, conditions don't use flags.	M
7. Placing outriggers	7. Caught in between. 7a. Rollover. 7b. Sprained/strains from carrying blocks.	7. Crane operator to ensure clear work area before extending outriggers. • Allow outriggers to be fully extended and make eye contact with operator before approaching. • Barricade swing radius between outriggers 7a. Crane must be positioned on level ground. Use leveling pads under outriggers if necessary. • Extend outriggers fully for stability. • Ensure wood/plastic blocks/dunnage is in good condition. • Assess soil conditions and stability to prevent rollover. 7b. Bend with legs and keep back straight during manual material handling. If lifting wood, carry on at a time. • Move bundles with a heavy equipment if available.	M
8. Crane and rigging inspection	8. Equipment failure/Safe working capacities.	8. Complete visual inspection of operating mechanisms before beginning use and daily when in use.	M

		• Ensure crane has annual inspection within the last calendar year and included in the project file. • Inspector to perform pre-operational crane and rigging inspection. If the inspection identifies a faulty component, cease operation and contact superintendent immediately. • Ensure crane inspection form is completed. • Ensure spill kit is readily available. • If required, implement Emergency Spill Response Procedure. • Conduct walk-around inspection after lunch and any other time you may enter or exit cab.	
9. Install rigging bridle on crane hook, shackles, etc.	9. Pinch points when connecting rigging to load. 9a. Struck by crane headache ball.	9. Keep hands clear of joints in rigging and protective gloves. 9a. Use hand signals to guide operator. • Ensure operator has stopped moving before attempting to attach bridle. • Qualified Riggers to wear personal fall arrest system. • If conditions exist, contact supervisor before proceeding with rigging.	**M**
10. Install straight ladder against trailer/box/equipment.	10. Fall hazard from connecting to a pick location >6' above the lower level.	10. Inspect ladder and fall protection equipment prior to use. • Defective equipment must be disposed of. • Use 3 points of contact when ascending and descending ladder. • Tie off ladder and extend 3 feet above landing. • If that ladder cannot be tied off, a second person must hold (or foot) the ladder when manned. • Verify onboard load chart and scale are within load limits/capacity. • Verify load weight before lift.	**M**
11. Lift and transport load	11. Overload.	11. Establish a safe lifting zone and keep personnel from entering the area during operations.	**M**

		• Riggers and signalman should walk behind load travel path. • Use tag lines when load is suspended.	
	11a. Caught in/crushed by suspended load. 11b. Slip trip and fall when traveling load with tag line. 11c. Struck by or against moving parts and nearby structures. 11d. Rollover from side loading. 11e. Hydraulic fluid leak from hydraulic components.	11a. Never place body under suspended load. 11b.Inspect load travel path, remove obstructions and avoid trip hazards. • Visibly mark unmovable objects. 11c. Check mirrors prior to operating for cracks, dirt, dust, debris or any other obstructions that might limit visibility. • Hard hat can be removed to improve visibility while in cab. 11d. Crane booms are designed for vertical lifts only. • Never side load the crane. 11e. Ensure spill kit is readily available and workers have been trained in its use. • If required, implement Emergency Spill Response Procedure. • Conduct walk- around inspection after lunch and any other time you may enter or exit cab. • Never run finger or hand over hydraulic leak in hose – it can inject oil into body.	
12. Prepare crane for leaving site	12. Unsecured accessories.	12. Pull in outriggers, remove dunnage from area, secure hoist line to crane boom.	**M**
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1.Crane	1. Certified NCCCO operator to be identified through educational training and experience. 1a. All personnel involved including will review the AHA prior to performing work. 1b. NCCCO cert must be present and current for operator to qualify.	1. Refer to any available as-built drawings to assist in the location of utilities. Review and ensure understanding by all personnel of the contents of the AHA.	

	1c. Must have signalmen and Qualified Riggers and control zones.		
2. Crane	2. All operators will be trained and have current NCCCO/CIA cert.	2. Daily inspection of crane, the adjacent areas, and protective control zones shall be established and maintained by a competent person for any hazardous conditions. 2a. Maintain inspection documentation onsite to include the Cranes Current Annual Inspection. 2b. A minimum of 20 Ft. from overhead power lines. 2c. Control Zones, Signal men, and Qualified Riggers must be present and demonstrate proficiency.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Demolition**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Location: MPWSP Project, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 14 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by(Name/Title): Damon Repine, CSP	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Periodical Review of this AHA is required, by law, to ensure accuracy.

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities	1. General Jobsite Hazards	1. Refer to Pages 1, 2, 4, 5, 7, 9 and 10 in General Jobsite Hazards AHA	L
2. Qualified person inspection of building structure components and assemblies. 2a. Prepare Engineer's Report listing hazards.	2. Collapse of structural elements, or weakened or loosened materials, falls through holes or openings. 2a. Identifies hazards within demolition target.	2. Never enter a building that has not been deemed safe by a structural engineer or is not listed as safe by the demo plan. 2a. Once prepared, the Engineer's Report must be readily accessible at the jobsite per 29 CFR 1926.850 (a).	L
3. Cap, blank, and/or lock out utilities	3. Release of hazardous energy. 3a. Explosion or fire- burns.	3. Prior to work lockout & tag out all utility lines. • Positively verify utilities are locked out of service. 3a. Shut off, cap, or otherwise control all electric, gas, water, sewer, and other service lines, before demolition start.	M

		• Bleed gas lines and vent workspace.	
4. Entering and exiting the building.	4. Delayed egress. 4a. Injuries from falling through holes.	4. All designated entries to the building must be protected from falling objects by sidewalk sheds or canopies. • Use only exits or entrances designated in the demolition plan. • During demolition, all workers especially the job supervisor should be constantly inspecting building components and assemblies for structural integrity. • If a hazardous condition is observed, leave the area immediately and tell your supervisor. • If it looks or feels unsafe stop, leave the area and notify your supervisor. 4a. Cover holes or openings in floors as soon as it is feasible to do so. • The cover must be sufficient to prevent workers or equipment from falling through the opening. • Mark the cover, "Danger, Hole"	**M**
5. Remove windows and glazing	5. Cuts from shattered glass. 5a. Eye injury. 5b. Hand injury.	5. When possible remove windows with glass intact. • Before breaking glass for removal apply strips of duct tape, spray adhesive and visqueen, or some other membrane to catch and hold most of the shattered glass. • Use a drop cloth to catch loose shards of glass. • Clean up all broken glass in the work area as soon as possible. 5a. Wear safety glasses with side shields, a face shield 5b. Wear gloves.	**M**
6. Use of aerial lifts/JLG's and Working Platforms	6. Falls, overturns, crushed by	6. Refer to Aerial Lift Operations AHA.	**M**
7. Set up a debris chute	7. Struck, or crushed by falling material or debris.	7. Fully enclose all chutes set up at an angle of more than 45 degrees from horizontal.	**M**

	7a. Workers falling into the chute. 7b. Debris chute failure.	• Close off the area surrounding the discharge end of the chute when it is not in use. • Attach a 4" x 6" bumper to the floor directly in front of the chute opening. • Install a cover (plywood or similar) to protect any gap between the floor and the opening to the chute. 7a. Protect all chute openings into which debris is dumped by a guardrail (42" high). • Close all openings to chutes when not in use. 7b. Construct the chute out of a strong, durable material.	
8. Remove debris from the building.	8. Collapse of structural elements 8a. Pulls and Strains from lifting 8b. Striking and injuring co-workers with material or debris	8. Remove debris at regular intervals. • Do not allow stockpiled debris to exceed the allowable floor loads. 8a. Get help when moving heavy materials, use a wheelbarrow, wheeled-container, or similar when possible. • Convert lifting and lowering tasks to pulling and pushing. (Use ramp or conveyor). • Use safe lifting techniques: bend knees and lift the bulk of the weight with leg strength. • Keep the weight close to your body. 8b. Be aware of your surroundings while moving materials, watch where you are going. Alert workers in the area.	M
9. Drop debris through openings in the floor (no chute)	9. Falling through the floor opening 9a. Being struck or crushed by falling debris	9. The floor opening must be protected by a guardrail so as not to create a fall hazard. 9a. The area onto which the material is dropped shall be enclosed with barricades at least 42" high and 6' back from the projected edge of the opening. • Post warning signs on the barricades that read, "Danger, Falling Debris Hazard" • Alert workers in the drop area.	M

		• Remove all debris from upper levels before removal in lower levels.	
10. Working from or moving a ladder	10. Ladder tipping, shifting, or sliding causing the worker to fall. 10a. Falling from ladder. 10b. Ladder failure. 10c. Tools or materials falling from ladders.	10. Extension ladders are set up so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. • The top of the ladder is tied off and the side rails extend 36" above the landing. • Step ladders used only in full open position. • Set up ladders on firm level footing. • Don't work from a step ladder leaned against a wall. • All step and extension ladders are equipped with ladder shoes. 10a. Don't work from the top two steps of a step ladder. • Do not move a ladder while you are on it. 10b. Choose the correct size of ladder for the job. • Ladders must be inspected regularly and tagged “do not use” if defective. • Remove defective ladders from the jobsite. 10c. Do not move ladder with tools on it	**M**
11. Working in noisy areas or using noisy equipment.	11. Hazardous noise, hearing loss.	11. Wear foam ear plugs when working in an area where sound pressure levels are between 85 dB(A) and 115 dB(A) time-weighted average over 8 hrs. • When sound levels exceed 115 dB(A) foam ear plugs and ear muffs shall be worn.	**M**
12. Confined Spaces	12. Failure to abate a hazard Asphyxiation, incapacitation, or impairment of ability to self-rescue.	12. Never enter a confined space i.e. man-holes, vats, silos, vaults, tunnels, ductwork, etc. except as directed by your supervisor and in accordance with the requirements of the Site-Specific Health and Safety Plan concerning Confined Spaces and the use of a Confined Space Permit (as required). • You must be confined space trained to enter a confined space. • Always heed warning conditions for confined spaces.	**M**

		• Never enter a confined space without the proper training.	
13. Hazardous Materials/Wastes	13. Exposure to health hazards associated with hazardous materials/wastes.	13. Absolutely no one shall work with hazardous materials/wastes unless they are properly trained and can provide certifications. • Due diligence investigations of buildings must be performed to identify hazardous materials/wastes before demolition work is initiated.	**M**
14. Working around asbestos-containing materials	14. Asbestos Inhalation	14. Never grind, sand, scrape, drill, break, or cut any asbestos-containing material unless you are a certified asbestos worker. • Heed all asbestos warning signs and stay out of areas that are under containment for the purpose of asbestos abatement. • Familiarize yourself with common asbestos containing materials, so that these can be avoided. Examples: ceiling tiles, insulation, fire proofing, floor tile, and vinyl flooring and mastic installed before 1980. • Check with your supervisor before working with any material to ascertain if it is asbestos-free.	**M**
15. Working around materials that contain lead	15. Lead poisoning, and/or cumulative damage from long term occupational exposure.	15. Familiarize yourself with common lead-containing materials, so that these can be avoided. Examples: old paints, solder, flashing material, joint packing. • Never grind, sand, scrape, cut, or burn any Lead-containing material. • You must be trained in lead removal.	**M**
16. Working with Hazardous Chemicals	16. Short and long term illness from exposure to chemicals.	16. Read through the SDS for every chemical/material that you will be using. • Don't assume that a material is not hazardous, just because it doesn't produce any immediate effects. • Know where to find SDS sheet at the job site. If you do not know ask your supervisor. • Wear the personal protective equipment (PPE) required by the SDS when handling the chemical. • You should be trained in the correct use of PPE. • If not, notify your supervisor. • Use the appropriate signage and warning labels.	**M**

17. Working with combustible materials	17. Fires and explosions- burns	17. Ensure that a portable 20 lbs. ABC rated fire extinguisher is always within 20 ft. of your working area. • Know how to operate the fire extinguisher. • If you are not trained to use a fire extinguisher, notify your supervisor. • Always heed “No Smoking or Open Flame” warning signs. • Use approved marked containers for handling and storage of flammable liquids.	**M**
18. Using compressed air/Cleaning surfaces with compressed air	18. Injection of foreign material into the body through the skin. 18a. Airway irritation. Silicosis.	18. Never use compressed air to blow dirt from hands, face, or clothing. 18a. Wear a dust mask and goggles in addition to the standard PPE when cleaning with compressed air at 30 psi or lower only. • Stand up wind from the air nozzle.	**M**
19. Demolish finish assemblies and surfaces	19. Struck, or crushed by falling material or debris. .	19. Begin demolition on the upper most floor and proceed downward. • Never demolish anything with workers at a lower level that may be injured by falling debris. • Be aware of the location of other workers. • Never disable the built in safety features on a tool. • Use tools for their intended use.	**M**
20. Crane set up and rigging	20. Crane tipping or shifting, 20a. Crushed or pinched injuries. 20b. Crane or component failure rigging failure, shifting, or coming loose.	20. Ensure that the outriggers are supported on a firm foundation capable of supporting the intended load. • Use lumber to increase the surface area to which the load is applied when setting up on soil. 20a. Stay clear of all pinch points while extending and lowering outriggers. 20b. Check that: Each control is operating properly and is clearly identified and that there is sufficient cable to allow two full wraps of cable on drums at all working positions. • Make sure the following are operating properly: boom hoist disconnect (boom stop), transmission; is not slipping or noisy, boom hoist kick out, parking brake, swing brake, outriggers.	**M**

	20c. Accidents due to not being able to see clearly	• Accurately estimate the weight of the pick, and use yoke, slings, or other rigging that can safely support the load. 20c. Make sure operator's view of the pick is unobstructed or a signal person is used as an aid.	
21. Demo structural members.	21. Demo structural members.	21. Install shoring and other protective support in accordance with the demolition plan. • Make sure that all structural members are adequately supported before cutting for removal.	M
22. Cut steel with an abrasive saw	22. Burns, fires, explosions 22a. Cuts and abrasions. 22b. Eye injury. 22c. Hazardous noise.	22. Watch where you are throwing your sparks. • Do not cut where sparks will land on other workers or on combustible materials. 22a. Keep fingers several inches from all blades. 22b. Wear safety glasses or goggles. 22c. Wear foam ear plugs.	M
23. Cut steel with oxy-acetylene torch	23. Burns. 23a. Explosion. 23b. Eye injury. 23c. Asphyxiation. Airway irritation.	23. Install noncombustible shielding to protect combustible wall or floor assemblies from flashes, sparks, and molten metal. • Be careful not to touch or rub against hot work. • Wear long gloves for hand and arm protection. • Clean up combustible trash and debris before cutting. • Keep an ABC rated fire extinguisher ready adjacent to the work. 23a. Do not place cylinders where they could be reached by sparks, hot slag or flames. 23b. Wear goggles with the proper level of shading (3-4). 23c. Ensure that there is natural or mechanical venting of the work area when cutting.	M
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Heavy equipment with shears, grapples, hammers, etc.	1. Operator training by competent person or manufacturer rep for employees operating	1. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	

	equipment such as aerial lifts, forklifts, cranes, etc.		
2. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest.	2. Review AHA prior to commencing work activity.	2. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
3. Dump Truck	3. Personnel must demonstrate proficiency of operation and maintenance of equipment. 3a. Operator must have a valid driver's license.	3. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. 3a. Ensure audible backup alarm is suitable for environment or use guide.	
4. Hand tools and Power tools	4. Personnel must demonstrate proficiency of operation and maintenance of equipment.	4. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
5. Cutting Torch	5. Personnel must demonstrate proficiency of operation and maintenance of equipment.	5. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. 5a. Ensure Hot work permit is in place and approved.	
6. Skip Loader	6. Personnel must demonstrate proficiency of operation and maintenance of equipment.	6. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
7. Jack hammer	7. Personnel must demonstrate proficiency of operation and maintenance of equipment.	7. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. 7a. Additional layer of hearing protection required. 7b. Periodic breaks and posture are key to protect operator.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Door Installation**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**L**
Project Location: MPWSP, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:		
Date Prepared: 16 July 2021		
Prepared by(Name/Title): Damon Repine, CSP		
Reviewed by (Name/Title):		

Severity	Probability				
	Frequent 1 per mo.	Likely 1 per yr.	Occasional 1 per 5 yrs.	Seldom 1 per 20 yrs.	Unlikely 1 per100 yrs.
Catastrophic (Death/Extensive Injuries)	E	E	H	H	M
Critical (Lost Time)	E	H	H	M	L
Marginal (Medical Treatment)	H	M	M	L	L
Negligible (First Aid)	M	L	L	L	L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Periodical Review of this AHA is required, by law, to ensure accuracy.

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities.	1. General Jobsite Hazards	1. Refer to Steps 1, 2, 3, 9 and 10 in General Jobsite Hazards AHA.	L
2. Receive and unload materials	2. Struck by 2a. Pinch point hazards 2b. Crushed by	2. Utilize tag lines to assist with load control • Heed back up alarms and get out of the way • Always stay in sight of the operator 2a. Keep hands and feet clear of pinch point 2b. Stage material as close to the installation destination as possible • Never store material above 4 feet unless secured from tipping	L
3. Install door frames/doors	3. Strains 3a. Struck by	3. Place door frames and doors using good lifting technique 3a. Secure frame to CMU block while waiting to place grout around frame	L

Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Power and hand tools	1. Review manufacturers operating manuals	1. Inspect daily prior to use and verify all electric cords integrity	
2. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest	2. AHA review by all personnel involved	2. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Drop Ceiling Installation**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Location: MPWSP Project, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:		
Date Prepared: 16 July 2021		
Prepared by (Name/Title): Damon Repine CSP		
Reviewed by (Name/Title):		

Severity	Probability				
	Frequent 1 per mo.	Likely 1 per yr.	Occasional 1 per 5 yrs.	Seldom 1 per 20 yrs.	Unlikely 1 per100 yrs.
Catastrophic (Death/Extensive Injuries)	E	E	H	H	M
Critical (Lost Time)	E	H	H	M	L
Marginal (Medical Treatment)	H	M	M	L	L
Negligible (First Aid)	M	L	L	L	L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. Set up laser and lay out J-bar.	1. Step ladders tipping or shifting while in use causing the worker to fall, falling from ladder. 1a. Lasers	1. Set up ladders on firm level footing. • Use the proper size of ladder for the job. • Always maintain three points of contact with the ladder • Do not work from the top two steps of step ladders. • Do not work from a step ladder leaned against a wall. 1a. Only qualified and trained personnel may use lasers • Laser equipment must bear a label to indicate maximum output. • Areas in which lasers are used must be posted with standard laser warning placards.	**M**

		• Beam shutters or caps must be utilized, or the laser turned off, when laser transmission is not actually required. • When the laser is left unattended for a substantial period of time, such as during lunch hour, overnight, or at change of shifts, the laser must be turned off. • When laser unit is in operation should be set up above the heads of the employees, if possible. • The laser beam must never be directed at employees.	
2. Install J-bar using a powder actuated nail gun.	2. Cuts and scrapes. 2a. Stapling or nailing fingers. 2b. Fastener ricochet-eye injury.	2. Don't touch the sharp edges of lath or wire that have been cut. • Keep fingers as far away from the blade as practical. 2a. Never depress the trigger of a nail or staple guns except with the muzzle of the gun against the work surface. • Do not fire the guns by holding the trigger and striking the muzzle of the gun • Keep hands clear of gun, do not disable safety trigger. • Keep opposite hand several inches away from whatever you are hitting with a hammer, or a hammer tacker. 2b. Wear appropriate eye protection	**M**
3. Fasten hanger wires to deck or roof structure	3. Puncture wounds, scrapes, and cuts.	3. Be careful when working around hanging wires. • Wear gloves.	**M**
4. Working from a rolling scaffold	4. Falling from scaffold, crushed by tipping scaffold.	4. Never ride on the scaffold except under the following conditions: • All diagonal & horizontal bracing is in place to square the scaffold & prevent racking. • The floor across which the scaffold is moved is within 3 degrees of level, and is clean and free of all obstacles, such as cords, debris, holes, and depressions. • Height to width ratio is 2 to 1 or less. (I.e. a 10' high scaffold is 5' wide). • Employee must never ride on any part of the scaffold that extends beyond the wheels. • Castor stems are pinned/secured to the scaffold legs.	**M**

	4a. Scaffold tipping or shifting while in use causing the worker to fall.	• Before the scaffold is moved all riders are made aware of the move. • Wheel brakes are set whenever the scaffold is stationary. 4a. All mobile scaffolds must have guard rails, toe boards, and full width planking.	
5. Cut T-bar with tinsnips	5. Cuts and abrasions. 5a. Falling from ladders/scaffolds.	5. Be careful with sharp edges; do not grab a cut metal edge. 5a. Set up extension ladders so that the horizontal distance from the top support to the ladder base is 1/4 the working length of the ladder. • The top of the ladder is tied off and the side rails extend 36" above the landing.	M
6. Install T-bar ceiling in a stairwell	6. Falling from ladders/scaffolds.	6. Set up a properly designed scaffold in the stairwell.	M
7. Install ceiling tiles	7. Cuts- utility knife, razor blades. 7a. Fall from ladder.	7. Wear work gloves. 7a. Set up ladders at the correct distance from work and at proper height. • Refer to ladder safety controls in Step 1 of this AHA.	M
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Scissor Lift.	1. If operating scissor lifts, or other types of lifts, forklifts and/or erecting scaffolding, there must be a trained operator (lifts and forklifts) and/or a qualified erector in the case of scaffolding.	1. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. These inspections will be documented and maintained on the jobsite with the supervisor.	
2. Ladders.	2. Make sure the competent and/or qualified person is named and documented.	2. Inspect prior to use.	
3. Power tools, Powder Actuated Tools.	3. Subcontractor will provide a list of authorized/qualified equipment operators based on training/experience. All operators must have a valid operator's card for tools being used. Additional information can be found at Cal/OSHA Title 8 article 27.	3. AHAs must be prepared and submitted to the General Contractor for review and acceptance the day before the work is to be performed.	
4. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest.	4. AHA review by all personnel involved.	4. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. These inspections will be documented and maintained on the jobsite with the supervisor.	
Competent/Qualified Person Signature:		**Date:**	**Anticipated Finish Date:**
Employee Signatures Verifying Review of Potential Hazards			

Printed Name	**Signature**	**Printed Name**	**Signature**

Activity Hazard Analysis (AHA)

Activity/Work Task: **Electrical Conduit Installation**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**L**
Project Location: MPWSP Project, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: July 14, 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by (Name/Title): Damon Repine, CSP	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Periodical Review of this AHA is required, by law, to ensure accuracy.

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities.	1. General Jobsite Hazards	1. Refer to Steps 1, 2, 3, 9 and 10 in General Jobsite Hazards AHA.	L
2. Bending Conduit	2. Injury from defective/broken tools 2a. Pinch point hazards 2b. Strains 2c. Lacerations 2d. Electric shock	2. Tag defective tools as out of service and remove from site 2a. Keep hands and feet clear of pinch point • Set up equipment in a well-lit area 2b. Stage material as close to the installation destination as possible • Hand held power tools must equipped with a constant pressure switch 2c. All saws must have properly functioning manufacturer installed guards 2d. Tool cords and flexible cord sets are to be checked daily to insure insulation is intact and cords are grounded	L

	2e. Burns from hot pipe	2e. When using conduit heater/bender wear gloves to prevent burns from hot pipe	
3. Threading Conduit	3. Loose clothing and hair caught in rotating equipment 3a. Struck by rotating equipment 3b. Contact with cutting oil	3. Do not wear clothing or jewelry that could easily get snagged or caught by equipment or machinery • Ensure long hair is tied up and not able to get caught. 3a. Support conduit to be threaded and delineate/barricade area to prevent workers from being struck by rotating conduit 3b. Review Safety Data Sheet to determine appropriate protection when contact with cutting oil is possible	L
4. Installing Conduit	4. Falls 4a. Pinch points 4b. Strains 4c. Eye injury	4. Ensure ladders are at least 300 lbs. capacity • Set up properly per manufacturer's recommendations • When necessary position coworker at foot of the ladder to ensure against displacement • Do not use the top two steps of a step ladder and ensure it is fully open and locked • Use aerial lift if possible 4a. Use recommended procedures when operating power tools • Insect tools daily for integrity of the cords and tool body 4b. Get assistance from co-worker if materials are heavy or awkward 4c. Use a face shield in conjunction with safety glasses during any overhead work to avoid dust or metal filing from entering eyes	L
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Conduit heater/bender, portable band saw, Sawzall, hand saws, hammer drill, other power drills hand held and electric conduit benders, pipe threader, ladders	1. Review manufacturers operating manuals	1. Inspect daily prior to use	
2. Aerial lift	2. Receive training on the particular make and model lift	2. Inspected each day at the beginning of the work shift	
3. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest	3. AHA review by all personnel involved	3. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning	
Competent/Qualified Person Signature:		**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards			
Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Housekeeping**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Location: MPWSP Project, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:		
Date Prepared: 14 July 2021		
Prepared by (Name/Title): Damon Repine, CSP		
Reviewed by (Name/Title):		

Severity	**Probability**				
	Frequent 1 per mo.	Likely 1 per yr.	Occasional 1 per 5 yrs.	Seldom 1 per 20 yrs.	Unlikely 1 per100 yrs.
Catastrophic (Death/Extensive Injuries)	E	E	H	H	M
Critical (Lost Time)	E	H	H	M	L
Marginal (Medical Treatment)	H	M	M	L	L
Negligible (First Aid)	M	L	L	L	L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Periodical Review of this AHA is required, by law, to ensure accuracy.

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Safety (Check work area for hazards).	1. General jobsite hazards.	1. Refer to General Jobsite Hazards AHA Steps 1, 2, 4, 6, 7, 8, 9, and 10.	L
2. Train employees	2. Employees not trained in the safe execution of their tasks.	2. Use this Activity Hazard Analysis, and other formal and informal training to train employees.	L
3. Moving materials, equipment, and/or debris to storage or waste locations.	3. Crushing or pinching hands, fingers, and/or feet between loads or equipment. 3a. Sprains and/or strains from lifting or moving materials.	3. Use mechanical lifting (i.e. wheelbarrow, hand truck, bobcat, backhoe, forklift, etc.) Instead of manual lifting to move materials. Refer to Forklift AHA for more detail on use of a forklift. • Keep body parts clear of pinch points. • Use gloves appropriate to the task. • Wear steel toe boots. 3a. Use mechanical lifting methods instead of manual lifting to move materials that are too heavy or bulky. • Use proper lifting techniques (i.e. lift with legs).	M

		• Team lift • Attach a red flag or other warning device to the draw works clutch lever as a reminder to the driller whenever the crown safety device is moved or deactivated to allow the traveling block to be raised above the preset stopping point.	
	3b. Stuck by or crushed by equipment or moving machinery or loads.	3b. Stay clear of moving machinery. • Heed back up alarms. • Wear high visibility vests. • Be aware of surroundings while moving materials or debris. • Watch where you are going.	
	3c. Struck by falling material.	3c. Stack materials in designated lay down areas. • Stack properly so that they don't tip or blow over. • Move material in multiple loads if necessary to prevent dropping • Wear hard hat.	
	3d. Cuts, scrapes, or abrasions.	3d. Use caution when handling sharp objects, twisted or cut light gauge steel or splintered or broken plastic. • Use protective gloves and safety glasses.	
	3e. Fire, explosion, burns.	3e. Use approved safety cans for storage of flammable and/or combustible materials. • Place flammable and/or combustible materials in approved storage areas. • Do not dispose of combustibles in the regular garbage dumpster. • Know the location of fire extinguishers in your work area.	
	3f. Being struck by debris being thrown down from a higher level or through floor opening.	3f. Wear hard hat. • Do not allow for waste or other materials to be thrown or tossed down to a lower level without precautions.	

	3g. Falling through opening in floor or down chute when throwing out debris or trash. 3h. Weather Conditions	• Enclose and barricade around landing zone below floor opening (at least 42" high) and back 6 feet. 3g. Protect floor opening with guardrails. • Protect area in front of chute with guardrail. 3h. Always check local forecasts and weather conditions, either on computer or smart phone. • Work should stop for lightning storms 10 miles from the jobsite and not resume for 30 minutes after the last lightning observed strike in the area.	
4. Cleaning surfaces by sweeping or using compressed air or water.	4. Inhaling dust or silica while sweeping or using compressed air. 4a. Getting debris in eyes while sweeping, shoveling, or using compressed air. 4b. Splinters from handling shovel or broom handle. 4c. Getting foreign material injected into body through skin by compressed air. 4d. Being struck by fire hose nozzle if used for washing down walks and pavements.	4. Use a vacuum or mop instead of sweeping or blowing dirt and/or dust. • Use a sweeping compound which reduces the inhalation hazard. • Wear proper respiratory protection if dust cannot be reduced or eliminated through the above engineering controls. See 29 CFR 1910.12 and CDM Constructors safety manual for more detail. 4a. Wear goggles. • Stand upwind from the air nozzle. • Never use compressed air to clean clothing or persons 4b. Inspect handle for splinters or cracks before using. • Wear proper gloves to protect hands. 4c. Never use compressed air to blow dirt off hands, face, or clothing. 4d. Hold the hose and nozzle securely before turning on water.	L
5. Cleaning from ladder.	5. Falls from ladder from ladder tipping, shifting, or sliding.	5. Refer to Ladder Use AHA.	L
6. Cleaning floors or surfaces with vacuum, and/or floor buffer.	6. Exposure to excessive levels of noise. 6a. Shock or electrocution from faulty equipment and/or cords.	6. Wear appropriate hearing protection. 6a. Use only GFCI protected outlets. • Inspect equipment prior to use. • Do not use equipment or cords with cuts, worn insulation, or visible conductors.	L

		• Use cords rated for hard or extra-hard usage. • Check that the ground prong is intact. • Tag any defective equipment as unsafe and remove from service.	
	6b. Struck by a rotating floor buffer	6b. Make sure floor buffer is equipped with a constant pressure (deadman) switch.	
7. Scraping or cutting with a razor blade (for example, scraping paint from windows or other glass surfaces)	7. Cuts from using razor blade to scrape paint.	7. Use caution when handling razor blades. • Wear cut-proof gloves. • Do not pull the blade towards you; point it away from body parts	L
	7a. Exposure to blood borne pathogens if a cut does occur.	7a. Use appropriate PPE when administering first aid. • Wash after contact with blood or other body fluids. • Dispose of soiled materials in a labeled leak proof container.	
8. Using solvents or other strong cleaning solutions	8. Burns, dizziness, nausea, sickness, or long-term damage due to occupational Exposure.	8. Read SDS before using material. • Prepare yourself by donning the proper PPE as directed in the SDS. • Label containers.	L
	8a. Injury to skin or eyes from contact with cleaning solution.	8a. Wear appropriate PPE as described in the SDS. • This may include the use of chemical resistant gloves, goggles, and a respirator.	
	8b. Cuts, scrapes, or abrasions.	8b. Avoid sharp edges and abrasive surfaces. • Wear appropriate gloves.	
9. Performing cleaning in a confined space	9. Asphyxiation, incapacitation, or impairment of ability to self-rescue.	9. Contact you regional or corporate health and safety manager. • Follow CDM confined space entry program requirements. • Refer to Site Health and Safety Plan and Confined Space AHA for more detail.	M
10. Working or cleaning around asbestos-containing materials	10. Inhalation of asbestos fibers	10. Never grind, sand, scrape, drill, break, or cut any asbestos containing materials. • Heed all asbestos warning signs and stay out of areas that are under containment for purposes of abatement.	M

		• Familiarize yourself with common asbestos containing materials so that they can be avoided. Examples are of materials installed before 1980 such as ceiling tiles, floor tile, insulation, fire proofing, vinyl flooring, and mastic. • Refer to 29 CFR 1926.1101 for more detail on occupational exposure to asbestos. • If you suspect that a product contains asbestos, immediately notify your supervisor.	
11. Working or cleaning around lead-containing materials	11. Lead poisoning due to inhalation of dust or other materials containing lead.	11. Familiarize yourself with common lead containing materials - such as old paints, solder, flashing material, and joint packing – so these can be avoided. • Never grind, sand, scrape, cut, or burn any lead-containing materials. • Refer to 29 CFR 1926.62 for more detail on occupational exposure to lead.	M
12. Performing cleaning tasks around other trades and/or construction activities	12. All hazards described above – specifically struck by, inhalation, and noise hazards.	12. Be aware of activities and of others working in the area. • Wear appropriate PPE.	L
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Ladders, compressors, hoses, backhoe or bobcat, forklift, hand truck, shovels brooms, cleaning chemicals, shop-vac or vacuum, floor buffer, carpet cleaner.	1. Competent person to be identified through educational training and experience.	1. Daily inspection of tools and equipment and machinery shall be made daily and/or before use.	
2. PPE may include hard hats, safety glasses or goggles, high visibility vest, safety footwear, gloves, hearing and/or respiratory protection.	2. Subcontractor will provide a list of trained equipment operators based on training and experience.	2. Maintain inspection documentation onsite.	
	3. AHA review by all personnel involved will take place during the Preparatory and Initial Phase Meetings.	3. These inspections will be documented and maintained on the jobsite with the supervisor.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Ladders** **Use only 300 lbs. capacity or above**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Location: MPWSP Project, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number: 200000191	**Severity**	**Probability**
Date Prepared: 14 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by(Name/Title): Damon Repine, CSP	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.** **Updated Versions must be reviewed with workers if conditions change.**	Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)	**RAC Chart**
	"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	
	"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**E = Extremely High Risk** **H = High Risk**
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk** **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities	1. General Jobsite Hazards	1. Refer to Steps 1, 2, 4, 7, 8, 9, 10 and 11 in General Jobsite Hazards AHA.	L
2. Training.	2. Employees not trained in the safe execution of their tasks	2. Use this Activity Hazard Analysis, and other formal and informal training to train employees. • Use tailgate meeting as an opportunity to train in the safe use of ladders.	L
3. Inspect Ladder	3. Falls from ladder or ladder tipping over	3. Inspect ladder for defects before use • Do not use defective ladder; mark "Do Not Use" and remove from service. • Make sure step ladders have locking spreader bars. • Rungs, cleats, and steps must be parallel, uniform, and uniformly spaced.	L

		• Make sure ladder is tall enough to reach at least 36" beyond the landing. • If harness is required (fixed ladders 24 feet or more without cage), inspect lanyard and harness for defects prior to use. • Do not use defective or damaged harness/lanyard. • Establish tie off point. • Use aerial lift instead of ladder if possible. • Ensure the selected ladder does not exceed maximum lengths. Refence https://www.dir.ca.gov/title8/3276.html	
4. Setting up ladder	4. Slipping, tripping, or falling 4a. Strains or sprains 4b. Electrical shock or electrocution	4. Keep work area clear of tripping hazards and organized. • Remove obstructions and protect unmovable obstructions. • Establish a level work area. • Make sure the ground is sturdy enough to support ladder legs. • Set up extension ladder at 4:1 angle. • Lock spreader bars into place. 4a. Utilize two-person team for moving and setting up large ladders. 4b. Use non-conductive side rails where they could contact energized electrical circuits (i.e. fiberglass ladder).	**M**
5. Climbing up and down ladder	5. Falls	5. Maintain three points of contact when ascending and descending ladder. • Do not reach out from ladder. • Do not stand on the top two steps of ladder. • Do not carry equipment up ladder; use a hoist bucket. • When using a folding ladder, utilize two-person team to stabilize the ladder. • If climbing 6' or more, a harness must be worn and connected to a secure tie off point.	**M**

6. Working from ladder	6. Falls	6. Do not reach too far from ladder to cause it to tip over (i.e. keep belt buckle inside the rails of the ladder). • Move to new location is you cannot reach safely. • Do not stand or work from top three steps of ladder unless employee is wearing personal fall protection system.	**M**
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Various types of ladders, Bucket/pulley system for moving equipment, tags to remove a ladder from service.	1. Competent person to be identified through educational training and experience.	1. All ladders will be inspected prior to the start of the task or workday to ensure safe and reliable functioning.	
2. Depending on the task being performed, PPE may include hard hat, protective gloves, face shield and/or safety glasses, high visibility vest, safety or steel toe boots, hearing and/or respiratory protection.	2. All personnel involved will review the AHA prior to performing work.	2. No ladder should be used if it has been altered or is damaged. Inspections will be documented (if necessary) and maintained on the jobsite with the supervisor.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Mechanical Equipment Installation**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**L**
Project Location: MPWSP Project, Anaheim, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 14 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by(Name/Title): Damon Repine, CSP	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Periodical Review of this AHA is required, by law, to ensure accuracy.

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities.	1. General Jobsite Hazards	1. Refer to Steps 1, 2, 3, 9 and 10 in General Jobsite Hazards AHA.	L
2. Receive and unload equipment/material	2. Struck by, crushed by, pinch point hazards	2. Use appropriate material handling equipment (Forklifts, cranes, rigging equipment) • Inspect rigging equipment prior to each use to ensure serviceable	L
3. Drill anchor bolt holes	3. Injury from a release of energy 3a. Falls from height 3b. Struck by power tool torque	3. Review shop drawing to ensure drilling activities will not penetrate stored energy. • Lock out/tag out all energy sources and release stored energy. 3a. Workers working in aerial lift equipment will use personal fall arrest equipment and will not use equipment guard rails or toe board for steps	L

	3c. Electric shock 3d. Nuisance dust	3b. Worker positions himself to ensure that he is not struck by tool if the hammer drill bit gets stuck and spins the tool 3c. Tools and cords are inspected for integrity and used on a GFCI circuit 3d. If concrete dust from drilling can be inhaled a dust mask should be worn	
4. Set anchor bolts	4. Struck by hand tools 4a. Struck by falling material 4b. Inhalation hazards 4c. Skin irritation 4d. Fire hazard	4. Use caution when hammering wedge anchors in place to avoid striking hands 4a. Delineate area under work and do not allow employees in this area 4b. When using epoxy for anchor bolts keep area well ventilated 4c. Avoid contact with skin • Maintain appropriate SDS for epoxy material 4d. Keep ignition sources away from potentially flammable vapors	L
5. Grind and cut steel	5. Flying particles causing eye injuries 5a. Cuts from sharp edges or filings 5b. Hazardous noise	5. Wear protect face shield when grinding and cutting 5a. Wear gloves when handling steel members with potentially sharp edges 5b. Wear hearing protection when noise pressure levels exceed 85 dB	L
6. Set equipment, shim and bolt up	6. Struck by overhead loads 6a. Electric shock from power tools	6. Check rigging integrity daily and remove from service any rigging not meeting manufacturers recommendations for use • Don't be overly aggressive when moving heavy material 6a. Check all tool cords and extension cords for integrity prior to use and use only GFCI outlets	L
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Material and personnel handling equipment (cranes, forklifts, scissor/aerial lifts)	1. Forklift and crane operators certified to operate equipment	1. Daily inspection with documentation of all equipment • Inspect rigging prior to each shift	

	• Review fall protection requirements with all employees to be exposed to falls greater than 6 feet • Review AHA with each employee to review safe practices for performing work		
2. Power and hand tools	2. Review manufacturers operating manuals	2. Inspect daily prior to use and verify all electric cords integrity	
3. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest	3. AHA review by all personnel involved	3. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task **Inspections using a mobile elevating work platform (MEWP)**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Location: MPWSP Project, Marina, CA		
Contract Number: **200000191**		
Date Prepared: 16 July 2021		
Prepared by (Name/Title): Damon Repine CSP		
Reviewed by (Name/Title):		

Risk Assessment Code (RAC) Matrix

Severity	Probability				
	Frequent 1 per mo.	Likely 1 per yr.	Occasional 1 per 5 yrs.	Seldom 1 per 20 yrs.	Unlikely 1 per100 yrs.
Catastrophic (Death/Extensive Injuries)	E	E	H	H	M
Critical (Lost Time)	E	H	H	M	L
Marginal (Medical Treatment)	H	M	M	L	L
Negligible (First Aid)	M	L	L	L	L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities	1. General Jobsite Hazards	1. Refer to General Jobsite Safety AHA	L
2. Training.	2. Injuries due to operators not being trained.	2. Only trained persons can operate an MEWP. • Operator must be trained for the specific type of MEWP • Occupant be trained by operator on basic knowledge on working safely from the MEWPs. One occupant trained on how to operate the MEWP in the event of an emergency.	M
3. Prestart inspection	3. Injuries associated with faulty equipment	3. Ensure that the equipment is in safe working order prior to used. • Ensure operation manuals are with MEWP • If company owned ensure that the MEWP is registered with the manufacturer • Complete the prestart inspection to ensure that the MEWP is functioning correctly. If found defective, place out of service tag and do not use until MEWP is repaired.	M

4. Operation of MEWP	4. Pinch Points 4a. Slips, Trips & Falls.	4. Identify pinch points. • Keep body parts out of the line of fire and inside the MEWP gage during operation. 4a. Wear lifeline/harness and make sure it is securely attached to the MEWP cage attachment points to prevent injury during fall. • Perform an area 360 inspection to identify hazards in the immediate area.	M M
5. Re-positioning of MEWP	5. Rollover 5a. Falling objects 5b. Electrocution	5. During travel keep the boom lowered in the travel position. • Approach slopes head on. • Select least hazardous path of travel. • Clear the travel path of debris to prevent MEWP tip over or employee injury. • Never tie the lift off to any structure while in operation. • Never exceed the MEWP manufactures weight limit. • Never use the MEWP as a crane for lifting. • Read the owner's manual for these specifications. 5a. Keep tools secure and inside MEWP cage. • Put cones, caution tape and signage around MEWP to keep employees away from contact zone. • Do not throw or drop tools from an elevated MEWP gage or from any other elevation. 5b. Use spotters and maintain eye contact with operator. • Maintain a minimum of ten-feet of clearance with overhead power lines. • Have the spotter look for changing conditions while machine is traveling and raising of the man basket.	M M M
6. Operation of MEWP	5. Pinch Points	5. Keep fingers and body parts clear of scissor lift pinch points and inside the lift when in operation. • Never tie off the MEWP to any structure during operation.	M

	6a. Falling from MEWP 6.b Injuries sustained from arrested fall	6a. Wear lifeline/harness and make sure it is securely attached to the lift attachment point to prevent injury during falls. • Maintain good housekeeping on the floor of the lift and at ground level of the scissor lift location during work to eliminate tripping and tip over hazards. 6b. Fall protection competent person to completed MEWP rescue plan • MEWP users to review MEWP rescue plan and understand the type of rescue that will be used for the selected MEWP. • Ensure that personal fall arrest system is equipped with trauma straps	**M** **M**
7. Re-positioning of Scissor Lift	7. Rollover 7a. Falling Objects	7. Operate on level solid surfaces. • Lock into place all outriggers prior to use. • Use mats if needed. 7a. Keep tools inside and secure to scissor lift cage. • Put cones/caution tape/signage around scissor lift to keep employees away from contact zone.	**M** **M**
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1.MEWP Equipment	1. Operator must have documented training by competent person or manufacturer rep for employees operating machine. 1a. Review AHA prior to commencing work activity.	1. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. 1a. Document inspection on CDM Smith equipment inspection form.	
2. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, Fall Protection or Restraint, and Class II high visibility vest.	2. AHA review by all personnel involved. Fall protection training must be document.	2. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**
Workers' Signatures Verifying Review of Potential Hazards		

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Non-Permit Confined Space Entry**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Location: MPWSP Project, Marina, CA	**Risk Assessment Code (RAC) Matrix**	

Contract Number:	**Severity**	**Probability**				
Date Prepared: July 14,2021		Frequent 1 per mo.	Likely 1 per yr.	Occasional 1 per 5 yrs.	Seldom 1 per 20 yrs.	Unlikely 1 per100 yrs.
Prepared by(Name/Title): Damon Repine, CSP	Catastrophic (Death/Extensive Injuries)	E	E	H	H	M
	Critical (Lost Time)	E	H	H	M	L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H	M	M	L	L
	Negligible (First Aid)	M	L	L	L	L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Periodical Review of this AHA is required, by law, to ensure accuracy.

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities	1. General Jobsite Hazards	1. Refer to Steps 1, 4, 7, 9, 10 and 11 in General Jobsite Hazards AHA.	L
2. Training.	2. Injuries due to employees not being properly trained.	2. Train employees to gain knowledge on how to safety complete work in a non-permit confined space (confined space). Ensure employees know the following: • Identify and locate confined spaces • Recognize potential hazards • Recognize the effects of confined space hazards • Use PPE • Follow evacuation and rescue procedures Inspect for written certification of training. May need to retrain whenever permit space operations change, when there are deviations from the permit space entry procedures, or when	M

USE WITH A CONFINED SPACE ENTRY PLAN

		inadequacies in employee knowledge or use of procedures if observed.	
3. Confined Space Entry preparation and classification. Complete Confined Space Entry Permit (if required).	3. Biological hazards. 3a. Hazardous atmospheres. 3b. Stored energy/energized systems. 3c. Potential for emergency rescue.	3. Use caution when opening confined space. 3a. Have atmospheric testing equipment available. • Test atmosphere and determine if permit is required. • Complete permit if necessary. 3b. Lock out/tag out all energy sources and release stored energy. 3c. Ensure rescue provisions are in place in accordance with CDM Constructors Confined Space Entry Procedures.	**M**
4. Enter Confined Space.	4. Untrained personnel. 4a. Hazardous atmosphere. 4b. Loss of communications. 4c. New hazards introduced into space.	4. Ensure personnel entering and monitoring the confined space are properly trained. 4a. Perform routine air monitoring. • Ventilate space as necessary. 4b. Test communication systems before entering. • Have back-up method of communications. 4c. Be aware of changing conditions and potential new hazards during the entry.	**M**
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Atmospheric testing equipment	1. Entrants, attendants, and rescue personnel must have documented training in confined space entry. 1a. All personnel involved must clearly understand their duties and demonstrate competency.	1. Air monitoring must be performed to classify the confined space and periodically on permit required confined spaces. Refer to CDM Constructors forms HS-0016 and HS-0031 for documenting CS evaluation and permit. 1a. Ensure Atmospheric equipment has current calibration. 1b. AHA and CSE permit must be signed by the Entry Supervisor.	
2. Ventilation equipment	2. Personnel must demonstrate proficiency of operation and maintenance of equipment.	2. Must maintain intended air volume and free of external contaminants. Ensure attendant is monitoring entrants and situationally aware. 2a.If conditions change, and the AHA must define the change and be	

USE WITH A CONFINED SPACE ENTRY PLAN

		briefed. Entrants must adjust to appropriate PPE if applicable.	
3.Extratcion tripod with Harness	3. Personnel must demonstrate proficiency of operation and maintenance of equipment. Rescue team must be proficient with documented training. 3a. An additional force may be require, i.e. local Fire Rescue.	3. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	
4. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest. Waters or rubber boots may apply.	4. AHA and CSE permit must by reviewed by all personnel involved, Entrants and Attendant.	4. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. 4a. Add additional PPE dependent of atmospheric conditions.	
5.Barriers	5. Personnel must demonstrate proficiency of operation and maintenance of equipment. Flagmen may be required. They must have documented training and demonstrate proficiency. An approved MOT may have to be put in place to conduct safe operations.	5. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. Inspect approved MOT if applicable. Ensure Flagmen are fulfilling intended duties.	
6. Lighting	6. Personnel must demonstrate proficiency of operation and maintenance of equipment.	6. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. A GFCI must be used to avoid shock hazards.	
7. Hand/Power tools	7. Personnel must demonstrate proficiency of operation and maintenance of equipment.	7. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. A GFCI must be used to avoid shock hazards.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

USE WITH A CONFINED SPACE ENTRY PLAN

Activity Hazard Analysis (AHA)

Activity/Work Task: **Scaffolding**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Name/Location: MPWSP Project, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 12 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by (Name/Title): Ken Meyer, CSP/Corporate H&S Director	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Activities	1. General Jobsite Hazards	1. Refer to Steps 1, 2, 4, 8, 10 and 11 in General Jobsite Hazards AHA.	L
2. Scaffold Assembly	2. Being struck by or caught under collapsed scaffold.	2. Inspect scaffolding prior to erection. • Properly assemble and secure to building if possible. • Only a competent and/or qualified person shall erect scaffold. • Set up on level solid surfaces. Lock into place all wheels prior to use (if mobile). Use mats if needed.	M
	2a. Fall from scaffolding	2a. Install guardrails. • Wear proper fall protection when assembling scaffold or when outside of guard railed areas. • Climb only the designated ladders.	

		• Do not climb unbraced scaffold. • Never climb cross braces.	
	2b. Pinching hands or fingers in scaffolding joints.	2b. Identify pinch points. • Wear gloves.	
	2c. Slips or Trips	2c. Keep erection area clear of tripping hazards.	
	2d. Electrocution or shock	2d. Watch for any overhead power lines. • Do not erect scaffolding where any person or equipment can come within 10 feet of a line (or 3 feet if under 300 volts).	
3. Working from scaffolding.	3. Falls. 3a. Injury due to scaffold collapse. 3b. Falling Objects.	3. Competent people must inspect daily . 3a. All working levels must be fully planked. 3b. All working levels should have guardrails or else fall protection is required when working above 10 feet (or preferably 6 feet). • Do not ride on scaffold while it is being moved. • Do not overload scaffold with materials. • Do not install screening that does not allow wind to pass through. • Keep tools secure and on work platform. • Put cones, caution tape and signage around the scaffolding base area to keep employees away from contact zone. • Do not throw or drop tools from a scaffold or from any other elevation. • Install toe boards on scaffold.	L
	3c. Electrocution or shock	3c. Watch for any overhead power lines.	

	3d. Slips or trips.	• Do not work on scaffolding where any person or equipment can come within 10 feet of a line (or 3 feet if under 300 volts). 3d. Keep tools, equipment, and other supplies orderly and neat on scaffolding platforms.	
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Scaffolding, planking, guardrail system, fall protection, hand tools, materials, access system (i.e. ladders), mudsills, base plates.	1. Competent Person training for those erecting scaffolding. 1a. Over 125' must be designed by a registered PE. 1b. Personnel involved in this operation will review the AHA prior to work.	1. Inspect daily or before each use. 1a. Obtain certifications for records. 1b. Review AHA prior to commencing work activity 1c. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. 1d. Document inspection on CDM equipment inspection form. 1e. Ensure Competent person is present for erection, dismantling and required inspections. 1f. Ensure proper tagging of scaffolding is present with Competent Persons signature when condition dictate.	
2. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, and Class II high visibility vest. Fall Protection maybe required.	2. Fall protection training.	2. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task: **Drilling Rehabilitation/Completion/Testing**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Name/Location: MPWSP Project, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 12 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by (Name/Title): Ken Meyer, CSP/Corporate H&S Director	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task. Task includes:**

1. **Removing existing pump and piping**
2. **Video Survey**
3. **Well screen cleaning and inspection**
4. **Chemical treatment (optional)**
5. **Well development**
6. **New well screen and casing installation**
7. **New pump installation**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. General Jobsite Safety (Check work area for hazards).	1. General jobsite hazards.	1. Refer to General Jobsite Hazards AHA Steps 1, 2, 3, 4, 6, 8, 10, 11, and 12.	L
2. Rigging up (assembling equipment in preparation for drilling)	2. Being crushed or hit by crane, load, truck, or forklift tipping, or hit by swinging equipment or hammers. 2a. Getting tangled in lines or cables while raising the derrick or mast. 2b. Hit by falling tools from above.	2. Train or be instructed on procedures and hazards. • Wear high visibility vest and always stay within visual contact area of operator. 2a. Have non-essential employees keep adequate distance away from assembly area. 2b. Do not position yourself under suspended loads.	M

	2c. Injury to hands and/or fingers during assembly.	2c. Allow only the operator raising the mast to be on the rig floor. • Ensure all other employees are out of the area.	
	2d. Burns/irritation to hands or body or eyes during welding.	2d. Attach safety lines to all tools hanging from the rig. Wear hard hat. • Wear proper hand protection PPE. • Keep hands and other body parts away from pinch points. • Obtain a hot work permit. • Have valid permit for specific day of work. • Conduct Toolbox meeting and review welding procedures and hazards. • Wear long sleeves, face shield, and other appropriate PPE. • Avoid looking directly at the flame or arc when welding.	
	2e. Falling from structure during assembly.	2e. Fall protection or prevention (i.e. guard rails) is required 100% of the time when working or walking on a surface with unprotected sides and edges 6 feet or more above a lower level.	
	2f. Fall /Slip from ladder.	2f. First, If possible, use man lift or aerial lift instead. Inspect ladder before use. • Use ladder of proper height.	
	2g. Ladder collapsed/falls over.	2g. Ensure ladder is properly assembled, locked and on level surface. • Do not exceed weight limit for ladder. • Do not stand on top of ladder or on top rung.	
3. Remove existing pumping and Piping.	3. Being pinched or struck by the piping/pump during removal operations.	3. Train or be instructed on procedures and handling of special tools required during pump/piping removal. • Wear high visibility vest and other appropriate PPE. • Always stay within visual contact area of each other.	M

		• Have non-essential employees keep adequate distance away from drilling area. • Do not position yourself under suspended loads. • Keep method for always covering the hole in place. .	
4. Video Survey of well casing and screen	4. Being struck by camera or becoming entangled in cabling during survey. 4a. Strains and/or sprains 4b. Falling from stabbing board or work platform.	4. Train or be instructed on procedures and hazards of video inspection. • Use a rig hoisting system to raise and lower the camera. • Have non-essential employees keep adequate distance away. • Do not position yourself under suspended, hoisted, or moving loads. • Use proper lifting techniques (i.e. lift with knees) and stance. • Use mechanical lifting instead of manual whenever possible. 4d. Hobble high pressure lines properly. • Use proper equipment inspection techniques to include hammer unions (particularly with 602 and 1502 as they will couple but not hold beyond the lower pressure rating number).	**M**

	4c. Exposure to hazardous chemicals, especially thread lock compounds. 4d. Being struck by high-pressure lines during circulating and cementing if not secured properly.		
5. Well Screen Cleaning using a poly or wire brush. Bailing debris from the well. May include chemical injection using a double swab brush.	5. Tongs or slips pinching fingers/ hands, or getting hands or fingers pinched between the brush rod and brush head. 5a. Being struck by swinging rods and/or bailer. 5b. Chemical exposure to cleaning solutions.	5. Keep hands and fingers away from pinch points. • Avoid placing hands on the end of the brush rod. Wear appropriate gloves. • Use correct tools. Inspect tools before use. 5a. Be alert for moving equipment. • Wear proper PPE, especially hard hat. • Use coiled tubing. 5b. Review SDS and take appropriate precautions.	L
6. Well development.	6. Exposure the well water and treatment chemicals. 6a. Improper management of developed water	6. Review SDSs of chemicals. Wear appropriate PPE. Check hoses, piping, and fittings for leaks. Minimize contact with development fluids. 6a. Brief crew on developed water management requirements and protocols.	M
7. New well Screen and Casing installation, welding, lowering to place, grouting, etc.	7. Being pinched, struck, or crushed by falling or swinging parts during assembly of casing and screens. 7a. Eye and burn hazards associated with welding and grouting 7b. Fires	7. Understand the assembly procedures and hazard involved in the task. • Wear appropriate PPE. • Stay out from under suspended loads. 7a. Review SDSs for welding rods and grout. • Wear appropriate PPE – gloves, welding shields, etc. • Keep non-essential personnel away from area. 7b. Obtain Hot Work Permit. Have fire extinguisher available	L
8. Install new pumping and Piping.	8. Being pinched or struck by the piping/pump during removal operations.	8. Train or be instructed on procedures and handling of special tools required during pump/piping removal. • Wear high visibility vest and other appropriate PPE. • Always stay within visual contact area of each other. • Have non-essential employees keep adequate distance away from drilling area. • Do not position yourself under suspended loads.	L

	8a. Strains from handling pumps/piping	• Keep method for always covering the hole in place. 8a. Use rig hoists/mechanical handling methods if possible. Work within your limitations. .	
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Equipment may include: forklift, traffic cones, barricades, hand tools, service or completion rig, well testing equipment, casing, tubing, thread lock compounds, cement, grout, bentonite, grout pump, welding equipment, cleaning brushes/swabs, etc.	1. Competent person to be identified through educational training and experience. 1a. Subcontractor will provide a list of authorized and competent equipment operators based on training and experience. 1b. All personnel must have documented competency on the operation and maintenance of all equipment and vehicle operations.	1. All tools and equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. 1a. No tool should be used if it has been altered or is damaged.	
2. PPE includes hard hat, protective gloves, face shield and/or safety glasses, high visibility vest, steel toe boots, hearing protection, and fall protection.	2. All personnel involved will review the AHA prior to performing work.	2. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.	

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Printed Name	Signature

Activity Hazard Analysis (AHA)

Activity/Work Task **Working at Heights**	**Overall Risk Assessment Code (RAC) (Use highest code)** →	**M**
Project Location: MPWSP Project, Marina, CA	**Risk Assessment Code (RAC) Matrix**	
Contract Number:	**Severity**	**Probability**
Date Prepared: 16 July 2021		Frequent 1 per mo. / Likely 1 per yr. / Occasional 1 per 5 yrs. / Seldom 1 per 20 yrs. / Unlikely 1 per100 yrs.
Prepared by (Name/Title): Damon Repine CSP	Catastrophic (Death/Extensive Injuries)	E / E / H / H / M
	Critical (Lost Time)	E / H / H / M / L
Reviewed by (Name/Title):	Marginal (Medical Treatment)	H / M / M / L / L
	Negligible (First Aid)	M / L / L / L / L

Activity/Work Task: **Prior to start of work review this AHA with workers assigned to this task.**

Updated Versions must be reviewed with workers if conditions change.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- E = Extremely High Risk
- H = High Risk
- M = Moderate Risk
- L = Low Risk

Job Steps	Hazards	Controls	RAC
1. Portable and fixed ladders to inspect or access areas to complete inspection.	1. Falling off ladder while climbing ladder	1. Always maintain three points of contact while ascending and descending a ladder	M
	1a. Stuck by falling equipment	1a. Pull equipment and tools up with a handline and bucket	M
	1b. Falling off ladder while accessing work area	1b. Ensure that the ladder is 3 feet above the working area and tied off	M
	1.c Fall due to the ladder kicking out	1.c Ensure that the ladder is on a flat stable area and maintains 4 to 1 ratio.	M
	1d. Injury due to the lack of training	1d. Review section 16.9 Ladders of the CDM Smith H&S Manual	

2. Work at elevated work surfaces behind guard	2. Fall due to the swing gate being left open.	2. Once on the working platform minimize time on the unprotected side of the gate and close and lock the gate promptly before starting any other activities.	**M**
3. Aerial Lift used to complete inspections	3. Hazards associated with the use of an aerial lift.	3. Refer to Mobile Aerial Lift Operation AHA	**M**
4. Personal fall arrest system.	4. Injury due to improper selection of fall protection equipment. 4a. Injury due to improper use of fall protection equipment. 4b. Fall due to equipment failure.	4. Completion of a fall protection and prevention plan by competent person. 4a. Training • End user to complete fall protection training from fall protection competent person or health and safety manager. • Review section 4b. Equipment Inspections • Fall protection competent person to completed annual inspection of fall protection equipment and documents findings • End user to inspect all equipment every time prior to use. • Remove all defective equipment immediately.	**M** **M** **M**
Equipment to be Used	**Training Requirements/Competent or Qualified Personnel name(s)**	**Inspection Requirements**	
1. Ladders, guard rails and aerial Lift Equipment	1. Fall protection training for end user 1a. Review AHA prior to commencing work activity.	1. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning. 1a. Document inspection on CDM equipment inspection form.	

2. PPE includes as a minimum protective clothing, hard hats, safety glasses, work boots, gloves, Fall Protection or Restraint, and Class II high visibility vest.	2. AHA review by all personnel involved. Fall protection training must be document.	2. All equipment will be inspected prior to the start of the workday to ensure safe and reliable functioning.

Competent/Qualified Person Signature:	**Date:**	**Anticipated Finish Date:**

Workers' Signatures Verifying Review of Potential Hazards

Printed Name	Signature	Signature	Printed name

Appendix D

Forms

BARRICADE TAPE TAGGING PROGRAM LOG

Dec. 2019

Caution/Danger Tag #	Location	Hazard	Installed By	Install Date	Removal Date
☐ Caution ☐ Danger Tag #:					
☐ Caution ☐ Danger Tag #:					
☐ Caution ☐ Danger Tag #:					
☐ Caution ☐ Danger Tag #:					
☐ Caution ☐ Danger Tag #:					
☐ Caution ☐ Danger Tag #:					
☐ Caution ☐ Danger Tag #:					

Note: Barricade Tape placed for a duration of one (1) day or less does not require entry onto this log.
Caution Tape has a lower degree of risk, i.e. hoses on ground, equipment use, work area congestion. Personnel may enter without permission but must proceed with caution.
Danger Tape has an immediate or high Hazard risk, such as, overhead/suspended loads, overhead work, open holes, confined space entry. Access can be gained only with the permission of the installer of the Danger Tape. Anyone accessing without permission will be permanently removed from the jobsite.

Chemical Inventory List (Jobsite)

Nov. 2019

Project Name: **Subcontractor:** **Completed by:** Ken Meyer **Date Completed:**	**Instructions for completing Chemical Inventory List:** 1) Inventory all materials found on the jobsite regardless of quantity. Indicate chemical name and the specific location(s) where it is stored and used. 2) Use labels and/or SDS's to identify and indicate all physical and health hazards. Use comments section to note any additional hazard warnings indicated on the label. 3) Each time a new chemical comes on site, information about it must be added to the inventory list.

ASSURE ALL CHEMICALS NOT TO BE USED ON THIS PROJECT ARE REMOVED FROM TOOLBOXES, EQUIPMENT AND TRUCKS PRIOR TO MOBILIZATION.

		Hazardous Classifications (Check all that apply)															
		Physical Hazards					Health Hazards										
Chemical Name	**Manufacturer**	**Flammable**	**Combustible**	**Explosive**	**Reactive**	**Oxidizer**	**H2O Reactive**	**Toxic (Poison)**	**Mutagen**	**Carcinogen**	**Teratogen**	**Corrosive**	**Irritant**	**Sensitizer**	**PPE**	**First Aid**	**Location(s)**
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			

Chemical Inventory List (Jobsite)

Nov. 2019

Chemical Name	Manufacturer	Hazardous Classifications (Check all that apply)													PPE	First Aid	Location(s)
		Physical Hazards						Health Hazards									
		Flammable	Combustible	Explosive	Reactive	Oxidizer	H2O Reactive	Toxic (poison)	Mutagen	Carcinogen	Teratogen	Corrosive	Irritant	Sensitizer			
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			
		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐			

Comments:

Competent Person Designation Form Nov. 2019

Company Name:			
OSHA Standard	Standard	29 CFR	Name of Employee:
Subpart C	General Safety	1926.20	
Subpart D	Haz. Exposures	1926.53 - .59	
Subpart E	PPE	1926.101	
Subpart H	Material Handling	1926.251	
Subpart J	Welding & Cutting	1926.354	
Subpart K	Electrical	1926.404	
Subpart L	Scaffolding	1926.451	
Subpart L	(MEWPs)	1926.453	
Subpart M	Fall Protection	1926.500	
Subpart O	Motor Vehicles	1926.601	
Subpart P	Excavating	1926.651	
Subpart Q	Concrete/ Masonry	1926.703	
Subpart R	Steel Erection	1926.752	
Subpart S	Tunnels	1926.800	
Subpart T	Demolition	1926.850	
Subpart U	Blasting	1926.900	
Subpart V	Power Trans./Distr.	1926.955	
Subpart X	Stairways/Ladders	1926.1053	
Subpart X	Silica Dust	1926.1153	
Subpart AA	Confined Spaces	1926.1210	
Subpart CC	Cranes	1926.1406	
Subpart CC	Rigger	1926.1425	
Subpart CC	Signal Person	1926.1428	

Confined Space Evaluation

Nov. 2019

Project: MPWSP Project	Project #:	Date:	Time:
Confined Space Evaluated:			
Description of Work to be Performed:			

Nature of Hazards in Confined Space: (Check)	
☐	Oxygen deficiency (<19.5% at sea level) not mitigated by ventilation.
☐	Flammable gases or vapors (>10% of the lower flammable limit or >23.5% oxygen at sea level).
☐	Toxic gases or vapors (greater than the permissible exposure limit).
☐	Mechanical hazards – not mitigated by LOTO.
☐	Electrical shock – not mitigated by LOTO.
☐	Engulfment – not mitigated by LOTO and line breaking/blanking.
☐	Hazards introduced by work to be performed – fumes, vapors, etc.
☐	Other:
IF ANY OF THESE ARE CHECKED, THIS IS A PERMIT-REQUIRED CONFINED SPACE	

Atmospheric Monitoring – required if potential exists for oxygen deficiency, flammable or toxic vapors exist based on site conditions:

Test	Acceptable Limit	Date: Time: Results	Permit Required based on Results	
Oxygen - min.	>19.5%		☐ Yes	☐ No
Oxygen – max.	<23.5%		☐ Yes	☐ No
Flammability	<10% LEL		☐ Yes	☐ No
Carbon monoxide	<25 ppm		☐ Yes	☐ No
Hydrogen sulfide	<5 ppm STEL		☐ Yes	☐ No

☐ Monitoring Not Required.

Employee conducting atmospheric monitoring:	
Evaluator Authorization:	
This confined space has been evaluated and determined to be a: ☐ Non-Permit-Required Confined Space ☐ Permit-Required Confined Space	
Name:	Signature:

CDM Smith CSE Monitoring & Entrant Sign In/Out Nov. 2019

This form must be attached to the CSE Permit, which must be on display outside the confined space.

Atmospheric Testing and Conditioning **Date:**

Calibrate instruments per manufacturer's instructions.
Measure gases just inside the space and at locations workers will occupy.

Required?				Gas/Vapor	Readings Time	Time	Time	Time	Time	Time	Time	Time
☐	Y	☐	N	Oxygen (>19.5% and <23.5%)								
☐	Y	☐	N	Flammability (<10% LEL)								
☐	Y	☐	N	Carbon monoxide (<25 ppm)								
☐	Y	☐	N	Hydrogen sulfide (<5 ppm STEL)								

Initials of Attendant: _____

Observations:

CDM Smith CSE Monitoring & Entrant Sign In/Out Nov. 2019

Entry Date:		Attendant Name:	

Entrant Name	Time In	Time Out

New CSE Monitoring & Entrant Sign In/Out sheets must be used daily. The previous sheets must be filed.

Confined Space Entry Permit

Nov. 2019

Project: MPWSP Project		
Space to be entered:		
Section drawing showing material and energy inputs attached?	☐ **Yes**	☐ **No**
Nature of task(s) and what company will be responsible for executing the task(s):		

Physical injuries are always possible. Is there a potential for:

☐	Hot Work	☐	Vehicular Traffic	☐	Toxic Gases or Vapors
☐	Explosive Gases	☐	Oxygen Deficiency	☐	Exposure to Microbes
☐	Heat Stress	☐	Cold Stress	☐	Engulfment

Entry Supervisor:		**Duration of Permit:**	
Authorized Entrants:			
1.	2.	3.	4.
Attendants:			
1.	2.	3.	4.
Rescuers, if off site emergency rescuers are not to be used:			
1.	2.	3.	4.

Means of Communication:

☐ Verbal	☐ Visual	☐ Radio	☐ Secondary Attendant	☐ String Technique
☐ Other, describe:				

Safety Equipment Outside the Space:

Needed?	In Place?	To be checked by Entry Supervisor when In place.
☐	☐	Traffic cones or barriers in place
☐	☐	Ventilation system in operation
☐	☐	Rescue and retrieval equipment in place
☐	☐	Fire extinguisher outside space
☐	☐	SCBA inspected and ready (topside) for emergency use.
☐	☐	Valves locked out or made inoperable

Needed?	In Place?	Verified (X) as in place by Entry Supervisor. Equipment outside space (cont.)
☐	☐	Electrical equipment disconnected & locked out
☐	☐	Pneumatic & hydraulic equipment disconnected & locked out
☐	☐	Rescue service is currently available.
☐	☐	Radio, phone, or portable phone reaches rescue team
☐	☐	Ignition sources eliminated/isolated.
☐	☐	First aid kit
☐	☐	Other (Describe):

Safety Equipment in the Space:

Select below of needed. To be initialed by Entry Supervisor if In Place.

Respirator needed? ☐Yes ☐No				
In Place?	☐	Self-contained breathing apparatus	☐	Airline respirator
Initial:	☐	Air purifying respirator with dust cartridges	☐	Disposable dust mask
	☐	Air purifying respirator with vapor cartridges	☐	Escape mask
	☐	Airline respirator w/escape bottle		
	☐	Other		
Eyewear needed? ☐Yes ☐No				
In Place?	☐	Safety Glasses with side shields	☐	Safety glasses with face shield
Initial:	☐	Safety goggles		
	☐	Face Shield		
Gloves needed? ☐Yes ☐ No				
In Place?	☐	Surgical gloves w/outer gloves (nitrile)	☐	Kevlar-knit rubber palm
Initial:	☐	Surgical gloves w/outer gloves (neoprene)	☐	Surgical (nitrile)
	☐	Surgical gloves w/string knit rubber palm gloves	☐	Outer gloves (nitrile)
	☐	Surgical gloves w/string knit Kevlar palm gloves	☐	Outer gloves (neoprene)
	☐	String-knit rubber palm		
Safety harness and lifeline needed? ☐Yes ☐No				
In Place?	☐	Safety harness and lifeline		
Initial:	☐			

Communication needed? ☐Yes ☐No				
In Place?	☐	Handheld radio	☐	Combination phone/radio
Initial:	☐	Cell phone		
Lighting needed? ☐Yes ☐No				
Initial:	☐	Electric droplight	☐	Flashlight
	☐	High-intensity light	☐	Headlight
	☐	Flashlight and electric lamps	☐	Flashlight and headlight
	☐	Flashlight and high-intensity lamps	☐	Sealed-beam light
Protective footwear needed? ☐Yes ☐No				
Initial:	☐	Safety-toe boots w/disposable boot covers	☐	Chest waders w/safety toes
	☐	Safety-toe boots w/reusable boot covers	☐	Safety-toe boots
	☐	Hip waders w/safety toes	☐	Safety-toe shoes
	☐	Hip waders and safety toes boots	☐	Rubber safety-toe boots
	☐	Chest waders w/safety toe boots		
Ladder needed? ☐Yes ☐No				
Initial:	☐	Ladder w/minimum 300 lbs capacity		
Ear plugs needed? ☐Yes ☐No				
Initial:	☐	Ear plugs	☐	Ear plugs and ear muffs
	☐	Ear muffs		
Hardhat needed? ☐Yes ☐No				
Initial:				
Hi-vis garment needed? ☐Yes ☐No				
Initial:	☐	ANSI/ISEA 107 Type 2 Coverall	☐	ANSI/ISEA 107 Type Vest
	☐	ANSI/ISEA 107 Type 3 Coverall	☐	ANSI/ISEA 107 Type Vest
	☐	ANSI/ISEA 107 Type 4 Coverall	☐	ANSI/ISEA 107 Type Vest
Any other protective devices needed? ☐Yes ☐No				
Initial:	☐			
	☐			

All data fields within this permit must be filled in.

Emergency Services

Emergency Service	Provider	Telephone Number
CDM 24 hour Emergency		
Health and Safety Manager		
Project Manager		
Client Contact		
Off Site Emergency Rescuers		
Police Department		
Health Department		
Poison Control Center	Nationwide	800-222-1222
State Spill Number		
Emergency Medical Facility		
24-hour ambulance		
Route to Hospital (instructions or attached map)		
Special Instructions:		

PERMIT APPROVED:		
	Health and Safety Representative	Date
ENTRY APPROVED:		
	Entry Supervisor	Date

ATTACH DAILY CONFINED SPACE ATMOSPHERIC READINGS AND ENTRANT CHECK IN/CHECK OUT SHEETS TO THIS DOCUMENT.

Excavation Checklist (Daily)

Nov. 2019

Client:				Date:	
Project Name:				Job Number:	
Clear☐	P. Cloudy☐	Overcast☐	Rain☐	Approx. Temp (°F):	
Competent Person:				SSHO:	
Excavation Depth				Excavation Top Width	Excavation Bottom Width
Protective System Used:					
Activities in Excavation:					

Note: Excavations over 4 feet in depth are considered excavations. Any items marked No on this form must be remediated prior to any employees entering the excavation.

Yes	No	N/A	DESCRIPTION
			GENERAL
☐	☐	☐	Employees protected from cave-ins & loose rock/soil that could roll into the excavation.
☐	☐	☐	Spoils, materials & equipment set back at least 2 feet from the edge of the excavation.
☐	☐	☐	Engineer designs for sheeting and/or manufacturer's data on trench box capabilities on site.
☐	☐	☐	Adequate signs posted and barricades provided.
☐	☐	☐	Training (toolbox meeting) conducted w/ employees prior to entering excavation.
☐	☐	☐	Atmospheric hazards evaluated? If atmospheric hazards are present, a confined space permit may be required.
☐	☐	☐	Measures taken to keep equipment from edge of excavation?
			UTILITIES
☐	☐	☐	Utility company contacted/given 24 hours' notice and/or utilities already located & marked.
☐	☐	☐	Overhead lines located, noted and reviewed with the operator.
☐	☐	☐	Utility locations reviewed with the operator/precautions taken to ensure no contact occurs.
☐	☐	☐	Is the utility locate current?
☐	☐	☐	Has potholing been performed to positively identify utility locations?
☐	☐	☐	Utilities crossing the excavation supported and protected from falling materials.
☐	☐	☐	Underground installations protected, supported or removed when excavation is open.
			WET CONDITIONS
☐	☐	☐	Precautions taken to protect employees from water accumulation (continuous dewatering).
☐	☐	☐	Surface water or runoff diverted /controlled to prevent accumulation in the excavation.
☐	☐	☐	Inspection by CP after every rainstorm/other hazard increasing occurrence. Date:
			ENTRY AND EXIT
☐	☐	☐	Exit (i.e. ladder, ramp) no further than 25 feet from **ANY** employee.
☐	☐	☐	Ladders secured and extends 3 feet above the edge of the trench.
☐	☐	☐	Wood ramps constructed of uniform material thickness, cleated together at the bottom.
☐	☐	☐	Employees protected from cave-ins when entering or exiting the excavation.

KEEP ONE (1) COPY OF EACH DAILY INSPECTION CHECKLIST ON SITE FOR THE PROJECT DURATION

Forklift Inspection Checklist (Daily)

Nov. 2019

Key Off Procedures (check if okay)		Engine Running Procedures (check if okay)	
The vehicle inspection		***Check the gauges***	
☐	Overhead guard	☐	Oil pressure indicator lamp
☐	Hydraulic cylinders and hoses	☐	Ammeter indicator lamp
☐	Mast assembly	☐	Ammeter
☐	Boom assembly	☐	Hour meter
☐	Lift chains and rollers	☐	Water temperature gauge
☐	Forks	***Test the standard equipment***	
☐	Tires	☐	Steering
☐	Water level and Fan belt	☐	Brakes – Service/Parking
☐	Engine oil level	☐	Horn/Back-up warning device
☐	Battery	☐	Safety seats (if equipped)
☐	Hydraulic fluid level	☐	Operation of the load-handling attachments
☐	Engine coolant level	☐	Transmission fluid
Key-On Procedures (check if okay)			
☐	Front, tail, brake lights & four-way flashers	☐	Windshield wiper
☐	Fuel gauge	☐	Heater

Remarks, include deficiencies and correct actions:

Forklift Model/Make:			
Inspection Performed by:		Date:	

Forklift Inspection – Comprehensive

Nov. 2019

Project:	Date:
Forklift Make:	Forklift Model:
Inspected by:	Signature:

Overhead Guard

- Are there broken welds, missing bolts, or damaged areas?
  ☐ Yes ☐ No

Hydraulic Cylinders/Hoses

- Is there leakage or damage on the lift, tilt, and attachment functions of the cylinders or hoses?
  ☐ Yes ☐ No

Mast Assembly

- Are there broken welds, cracked or bent areas, and worn or missing stops?
  ☐ Yes ☐ No

Lift Chains and Rollers

- Is there wear, damage or kinks, signs of rust, or any sign that lubrication is required?
  ☐ Yes ☐ No

- Is there squeaking?
  ☐ Yes ☐ No

Forks

- Are the forks cracked or bent, worn, or mismatched?
  ☐ Yes ☐ No

- Is there excessive oil or water on the forks?
  ☐ Yes ☐ No

- Are the forks or attachments altered? ☐ Yes ☐ No
  - If so, did the manufacturer OK?
    ☐ Yes ☐ No

Tires

- What do the tires look like?
  ☐ Yes ☐ No

CDM Constructors Inc. Health and Safety Page 1 of 4

- Are there large cuts that go around the circumference of the tire?
  ☐ Yes ☐ No
- Are there large pieces of rubber missing or separated from the rim?
  ☐ Yes ☐ No
- Are there missing lugs?
  ☐ Yes ☐ No
- Is there bond separation that may cause slippage?
  ☐ Yes ☐ No
- Are the tire pressures equal and in the proper range?
  ☐ Yes ☐ No

Battery Check

- Are the cell caps and terminal covers in place?
  ☐ Yes ☐ No
- Are the cables missing insulation?
  ☐ Yes ☐ No
- Is the battery secured in place?
  ☐ Yes ☐ No

Hydraulic Fluid

- Check level?
  ☐ Yes ☐ No

Gauges

- Are they all properly working?
  ☐ Yes ☐ No

Steering

- Is there excessive free play?
  ☐ Yes ☐ No
- If power steering, is the pump working?
  ☐ Yes ☐ No

Forklift Inspection – Comprehensive

Nov. 2019

Brakes

- Does pedal goes all the way to the floor when you apply the service brake, that is the first indicator that the brakes are bad.

  ☐ Yes ☐ No

- Do brakes should work in reverse, also.

  ☐ Yes ☐ No

- Does the parking brake work? The truck should not be capable of movement when the parking brake is engaged.

  ☐ Yes ☐ No

Lights

- If equipped with lights, are they working properly?

  ☐ Yes ☐ No

Horn

- Does the horn and the back-up warning horn work?

  ☐ Yes ☐ No

Safety Seat

- If the truck is equipped with a safety seat is it working?

  ☐ Yes ☐ No

Load Handling Attachments

- Is there hesitation when hoisting or lowering the forks, when using the forward or backward tilt, or the lateral travel on the side shift?

  ☐ Yes ☐ No

- Is there excessive oil on the cylinders?

  ☐ Yes ☐ No

Propane Tank

- Is the tank guard bracket properly positioned and locked down?

  ☐ Yes ☐ No ☐ N/A

Propane Hose

- Is it damaged? It should not be frayed, pinched, kinked, or bound in any way.

  ☐ Yes ☐ No ☐ N/A

- Is the connector threaded on squarely and tightly?

  ☐ Yes ☐ No ☐ N/A

Propane Odor
- If you detect the presence of propane gas odor, turn off the tank valve and report the problem.

☐ Yes ☐ No ☐ N/A

Engine Oil
- Level okay?

☐ Yes ☐ No

Engine Coolant
- Level okay? Note: Never remove the radiator cap to check the coolant level when the engine is running or while the engine is hot. Stand to the side and turn your face away. Always use a glove or a rag to protect your hand.

☐ Yes ☐ No

Transmission Fluid
- Level okay?

☐ Yes ☐ No

Windshield Wipers
- Do they work properly?

☐ Yes ☐ No

Seat Belts
- Do they work?

☐ Yes ☐ No

Tow Hook
- Does it engage and release smoothly?

☐ Yes ☐ No

- Does the safety catch work properly?

☐ Yes ☐ No

Control Lever
- Does the lever operate properly?

☐ Yes ☐ No

Remarks and Corrective Actions:

Hot Work Permit

05/20

Project Name:	Date:
Entity performing work:	

Refer to the CDM Constructors Inc. H&S Manual and 29 CFR 1926.350-354 for complete procedures.

Location:	Work Area:
Equipment Name:	Model:
Type of Hot Work: ☐ Internal Combustion Engines ☐ Hot Tapping ☐ Welding/Burning ☐ Spark Producing Work ☐ Other	
Scope of Work:	
Describe how will affected employees will be notified prior to LO/TO and before system startup:	

Hot Work will occur by permit only and is considered to be any of the following:

1. Use of Internal Combustion Engines in areas with the potential for flammable atmospheres.

2. Use of Powered Tools that produce sparks in drilling, grinding, chipping, etc.

3. High temperature work, i.e. welding, burning, soldering, stress relieving and use of open flames.

4. Work on live equipment (requires supplemental documentation - see supervisor) involving any high temperature work done on equipment still in operation or known to contain flammable material.

5. Hot Tap (requires supplemental documentation - see supervisor) involving cutting into a piece of live line, vessel or other equipment known to contain flammable material or any other material which is under pressure, such as fire water, steam, etc.

List of authorized employees:		
Name	Name	Name

Yes	No	Other considerations
☐	☐	Any combustible materials within 50 feet on any level – same/above/below hot work?
If yes, describe:		
☐	☐	Fire extinguisher in close proximity and readily accessible?

Yes	No	Other considerations (Continued)
☐	☐	Is work ventilation required?
If yes, describe:		
☐	☐	Will sparks be generated? Will add'l equipment, i.e. fire blankets, water sprays be needed?
If yes, describe:		
☐	☐	Fire watch – must be present during Hot Work and 30 minutes after completion.
Fire Watch name(s):		
☐	☐	Will periodic or continuous air/gas testing be required?
If yes, describe:		
☐	☐	Will equipment isolation be required?
If yes, describe:		
☐	☐	Will additional PPE be required?
If yes, describe:		
Are there additional special precautions not noted above (i.e. chemical reactions, required cool down periods, etc.)?		
Additional recommendations or considerations:		

Completed by: Ken Meyer	**Date:**	
Reviewed by:	**Date:**	
Approvals:		
Site Supervisor:	**Date:**	
H&S Representative:	**Date:**	
Client Representative (if required):	**Date:**	
Work Completed:	**Date:**	**Time:**

Attach sketch(es) of the layout(s) and setup(s), if necessary.

Distribute, post and file necessary copies of the permit and gas monitoring results.

Jobsite Visitor Safety Briefing

Nov. 2019

ALL VISITORS* MUST:

- Sign in on the Site Visitor Log
- Be given jobsite activities briefing. (Suggestion: Use a site plan to show active areas)
- Wear appropriate PPE (Hardhat, Safety Glasses, Class 2 Safety Vest, Steel Toe Boots & Ear Plugs)
- Be accompanied by a member of site supervision at all times when in work areas
- Return borrowed PPE
- Sign out on the Site Visitor Log

IDENTIFY KEY PERSONNEL

- Project Manager
- Site Safety Officer
- Superintendent

EXPLAIN EMERGENCY PROCEDURES, INCLUDING:

- Accident Reporting
- Escape Routes
- Fire Drills
- First Aid
- Rally Points

IDENTIFY CURRENT SITE HAZARDS:

- Access (steep or wet areas)
- Biological (sewage, biota, etc.)
- Confined Spaces (training required to enter)
- Cranes
- Dust
- Electricity
- Excavations
- Heavy Equipment
- Machinery (rotating or moving parts)
- Overhead Work
- Noise
- Torch Cutting
- Traffic Routes
- Welding
- Work at Heights (fall protection required)

* **Anyone not based onsite who makes a single visit or periodic visits that include jobsite walks.**

Workplace Safety is Our Responsibility

Jobsite Visitor Safety Briefing

Nov. 2019

Jobsite:		
Date	**Individuals Briefed**	**Briefed By**

Lockout/Tagout (Electrical) Plan

Nov. 2019

This plan is used for electrical lockout/tagout only. The Lockout/Tagout (Non-Electrical) Plan must be used for all other work.
Event Information:
Project & Location:
Event Date and Time:
Description of Work:
Effected Power Equipment:
Estimated Duration of Outage:
Effected Departments or Personnel:
Power Company Requirements: If applicable-
Company Performing Work:
Qualified Person in Control (QCPIC):
Event Procedure (QCPIC must initial each activity as verified):
1. All Affected Parties Notified.
2. Safety Officers Notified.
3. PPE and Materials on Site.
4. Lockout & Tag Out all equipment not intended to be energized.
5. All Electric Room doors shall be locked and only qualified and designated personnel shall have keys.
6. All circuit breakers and switches are in there off position.
7.
8.
9.
10.
11.
Signatures of Approval & Dated:
Owner's Rep: Date:
CCI: Date:
Electrical Contractor: Date:
Other: Date:
Qualified Competent Person in Charge (QCPIC):
QCPIC must be the last signatory after verifying system is safe to proceed. **THIS IS A TWO PAGE DOCUMENT; IT IS INVALID IF EITHER PAGE IS MISSING!**

ELECTRICAL LOCKOUT/TAGOUT PERMIT

Nov. 2019

Event Information:	
Location:	
Event Date and Time:	
Description of Work:	
Procedures after Completed (QCPIC must initial each activity as verified):	
1. Notify all affected parties system will become energized.	
2. Remove Lockout Devices.	
3. Energize.	
4. Test Voltage.	
5. Test phase rotation.	
Voltage Readings (QCPIC must initial each as verified):	
A- Phase:	
B- Phase:	
C- Phase:	
All Affected Parties Notified?	
Signatures at Completion and Dated:	
Owner:	
Owners Rep:	Date:
CCI:	Date:
CCI:	Date:
Electrical Contractor:	Date:
Other:	Date:
Qualified Competent Person in Charge (QCPIC):	
QCPIC must be the last signatory after verifying system is safe to operate.	
Additional Findings/Comments:	

THIS IS A TWO PAGE DOCUMENT; IT IS INVALID IF EITHER PAGE IS MISSING!

LO/TO Plan (Non-Electrical)

06/20

Conducted by:	Date:

In order to determine all energy sources for each piece of equipment all questions must be answered.

Location:	Work Area:
Equipment Name:	Model:
Scope of Work:	
List of authorized employees:	
List of affected employees:	

This form may be used as a LO/TO Permit only for any of the energy sources listed below.

Mark each type of energy source that applies:

Mechanical Power?	☐ Yes	☐ No	☐ N/A
Engine driven?	☐ Yes	☐ No	☐ N/A
If yes, switch or key location:			
Is Lockout device installed?	☐ Yes	☐ No	
If no, method of preventing operation?			
Spring loaded?	☐ Yes	☐ No	☐ N/A
If yes, is there a method of preventing spring activation?	☐ Yes	☐ No	
If no, how can spring tension be safely released or secured?			
Counterweights?	☐ Yes	☐ No	☐ N/A
If yes, is there a method of preventing movement?	☐ Yes	☐ No	
If yes, can it be locked out?	☐ Yes	☐ No	
If no, how can it be secured?			
Flywheel?	☐ Yes	☐ No	☐ N/A
If yes, does it have a method of preventing	☐ Yes	☐ No	
If no, how can it be secured?			

Hydraulic power?	☐ Yes	☐ No	☐ N/A
If yes, location of main control/shutoff valve			
Can control/shutoff valve be locked in "OFF" position?	☐ Yes	☐ No	
If no, what is needed to lock valve closed?			
Is there a bleed or drain valve to reduce pressure to zero?	☐ Yes	☐ No	
If no, what will be required to bleed off pressure?			
Pneumatic energy?	☐ Yes	☐ No	☐ N/A
If yes, location of main control/shutoff valve			
Can control/shutoff valve be locked in "OFF" position?	☐ Yes	☐ No	
If no, location of closest manual shutoff valve			
Does manual shutoff valve have lockout device?	☐ Yes	☐ No	
If no, what is needed to lock valve closed?			
Is there a bleed or drain valve to reduce pressure to zero?	☐ Yes	☐ No	
If no, what will be required to bleed off pressure?			
Chemical system?	☐ Yes	☐ No	☐ N/A
If yes, location of main control/shutoff valve			
Can control/shutoff valve be locked in OFF/closed position?	☐ Yes	☐ No	
If no, location of closest manual shutoff valve			
Does manual shutoff valve have lockout device?	☐ Yes	☐ No	
If no, what is needed to lock valve closed?			
Is there a bleed or drain valve to reduce pressure and drain chemicals?	☐ Yes	☐ No	
If no, how can system be drained and neutralized?			
What personal protective clothing or equipment is needed for this system?			

Thermal energy?	☐ Yes	☐ No	☐ N/A
If yes, location of main control/shutoff valve			
Can control/shutoff valve be locked in OFF/closed position?	☐ Yes	☐ No	
If no, location of closest manual shutoff valve			
Does manual shutoff valve have lockout device?	☐ Yes	☐ No	
If no, what is needed to lock valve closed?			
Is there a bleed/drain valve to reduce pressure, temperature and drain?	☐ Yes	☐ No	
If no, how can system pressure and temperature be reduced and drained?			
What personal protective clothing or equipment is needed for this system?			
Special precautions not noted above (i.e. fire hazards, chemical reactions, required cool down periods, etc.)			
Additional recommendations or comments:			

Completed by: Ken Meyer	Date:	
Reviewed by:	Date:	
Approvals:		
Site Supervisor:	Date:	
H&S Representative	Date:	
Client Representative (if required)	Date:	
Work Completion		
Work Complete:	Date:	Time:

Attach sketch(es) of the layout(s) and setup(s), if necessary.

MEWP Pre-Use Inspection Checklist

Nov. 2019

Project: MPWSP Project					**Date:**
MEWP Type	**Scissor Lift**	☐	**Personnel Lift**	☐	**Make/Model:**
	Aerial Lift	☐	**Telescoping Lift**	☐	**ID Number:**
	Boom Lift	☐	**Articulating Lift**	☐	**Hour Meter Reading:**
Inspection conducted by:					

Power Off Checks	OK	No	N/A	Power On Checks	OK	No	N/A
1. Wheels and tires	☐	☐	☐	21. Unit starts and runs properly	☐	☐	☐
2. Lights/strobes	☐	☐	☐	22. Instruments/gauges	☐	☐	☐
3. Mirrors/visibility aids	☐	☐	☐	23. Warning lights/audible alarms	☐	☐	☐
4. Engine/engine compartment:	☐	☐	☐	24. Fuel/charge level	☐	☐	☐
a. Belts/hoses	☐	☐	☐	25. Horn/audible warning device(s)	☐	☐	☐
b. Cables/wires	☐	☐	☐	26. Function controls:	☐	☐	☐
c. Debris	☐	☐	☐	a. Boom/jib/lift arms (operational)	☐	☐	☐
5. Battery/batteries	☐	☐	☐	b. Turret rotate	☐	☐	☐
a. Terminals tight	☐	☐	☐	c. Drive - forward/reverse	☐	☐	☐
b. Clean/dry/secure	☐	☐	☐	d. Steer – left/right	☐	☐	☐
6. Hydraulics:	☐	☐	☐	e. Platform – tilt/rotate/extend	☐	☐	☐
a. Hoses/lines/fittings	☐	☐	☐	g. Function – enable (deadman) devices	☐	☐	☐
7. Fluids:	☐	☐	☐	27. Emergency/auxiliary controls	☐	☐	☐
a. Engine oil	☐	☐	☐	28. Safety interlocks	☐	☐	☐
b. Engine coolant	☐	☐	☐	39. Braking – stops and holds	☐	☐	☐
c. Hydraulic oil	☐	☐	☐	30. Other	☐	☐	☐
d. Fuel/battery	☐	☐	☐	**General**	**OK**	**No**	**N/A**
8. Data/capacity plate	☐	☐	☐	31. Safety decals/warnings/placards	☐	☐	☐
9. Counterweight/Counterweight bolt(s)	☐	☐	☐	32. Misc. parts – loose/missing/broken	☐	☐	☐
10. Cover panels	☐	☐	☐	**Work Area**	**OK**	**No**	**N/A**
11. Boom valley – leaks/debris	☐	☐	☐	33. Drop-offs/holes	☐	☐	☐
12. Under platform – leaks/debris	☐	☐	☐	34. Bumps/ground obstructions	☐	☐	☐
13. Accessory plugs and cables	☐	☐	☐	35. Debris	☐	☐	☐
14. Boom/lift arms – general condition	☐	☐	☐	36. Overhead obstructions	☐	☐	☐
15. Power track – lines/hoses	☐	☐	☐	37. Energized power lines	☐	☐	☐

MEWP Pre-Use Inspection Checklist

Nov. 2019

16. Platform	☐	☐	☐	38. Hazardous locations	☐	☐	☐
a. Guardrails	☐	☐	☐	39. Ground surface conditions	☐	☐	☐
b. Toeboard	☐	☐	☐	40. Pedestrian/vehicle traffic	☐	☐	☐
c. Anchorages	☐	☐	☐	41. Wind/weather conditions	☐	☐	☐
d. Gate	☐	☐	☐	42. Other	☐	☐	☐
17. Manual in weather-resistant compartment	☐	☐	☐	43. Other	☐	☐	☐
18. Control markings visible	☐	☐	☐	44. Other	☐	☐	☐
19. Other	☐	☐	☐	45. Other	☐	☐	☐
20. Other	☐	☐	☐	46. Other	☐	☐	☐

REPORT ANY PROBLEMS FOUND TO MEWP SUPERVISOR. ALWAYS LOCK/TAG-OUT UNSAFE EQUIPMENT

Item #	Comments/Corrective Actions

Appendix E

Safety Orientation Checklist

SITE SAFETY ORIENTATION CHECKLIST

Nov. 2019

Project Name:	
Project Location:	

☐ **PROJECT PHILOSOPHY**

Health and Safety must be the top priority of every employee

CDM Smith believes that occupational related injuries and illnesses are preventable

☐ **SITE SPECIFIC HEALTH & SAFETY PLAN (SSHASP)**

Contains the minimum safety requirements for this job

Is based on CDM Smith H&S Program requirements

Identifies hazards associated with the scope of work

Identifies personnel protective measures

Provides safe work practices

☐ **ACTIVITY HAZARD ANALYSIS**

Must be written by a competent person overseeing the task

Must be reviewed with job crew prior to working on the task

Is designed to identify work steps, hazards and hazard controls

Recommends critical actions to reduce or eliminate hazard exposure

Should be changed if the process or situation changes and new hazards are encountered

If you don't receive an AHA briefing prior to new or changed work; ASK FOR ONE

☐ **H&S RESPONSIBILITIES: ALL OF US**

Are accountable for the performance of our H&S responsibilities

Must report/correct unsafe conditions immediately or take measures to warn others

Must report Near Misses and Good Catches to our supervisors

Must report all injuries, no matter how slight, to our supervisor immediately

Must follow the instructions of our supervisors in the event of a crisis

☐ **H&S RESPONSIBILITIES: MEDICAL SERVICES AND FIRST AID**

Local medical services address, phone number, and a map to the facility are posted in each trailer

There are personnel who are trained to render First Aid and CPR, ask your supervisor who they are

☐ **LIFE CRITICAL SAFETY RULES: EVERYONE MUST COMPLY**

Always protect employees working six or more feet above the lower level

Always follow the work permit system (Hot Work, LO/TO, Confined Space Entry, and Excavation)

Always conduct overhead lifting according to procedures, industry standards, and site conditions

Always ensure protective systems are in place before entering an excavation or trench

Always perform work free from the influence of drugs or intoxicating substances

☐ **SAFETY MEETINGS**

Supervisor led daily and/or weekly

Discuss safety topics

Discuss new work

Review Activity Hazard Analysis (AHA)

Discuss near misses

Must be signed off by participants

☐ **INSPECTIONS**

Check your work area at start of shift
There must be frequent and regular job site inspections
All tools, equipment, and personal protective equipment must be inspected before each use
Tag and remove defective tools and equipment
Report suspected hazards and changed conditions to your supervisor immediately

☐ **HOUSEKEEPING**

Remove nails from scrap or reusable lumber
Put scraps, trash, and other waste in covered containers
Do not leave water bottles and other trash onsite; put into a trash container
Keep oily rags/combustible debris in covered, labeled metal containers
Good housekeeping reduces the risk of injuries and fires
A neat, clean, orderly work area is the foundation of a safe jobsite

☐ **GENERAL WORK RULES**

No loose clothing and jewelry around operating machines
Keep fingers away from moving parts
Do not bypass interlocked machines
Keep all machinery clear of any material that could pose a fire hazard
Know where fire extinguishers are and keep them readily available

☐ **MATERIAL HANDLING: MANUAL LIFTING**

Avoid manual lifting of loads whenever possible
Bend your hips and knees to squat down to your load
Keep the load close to your body and straighten your legs to lift
Avoid turning or twisting your body while lifting or holding a heavy object
Be sure you have proper footing
Never bend over to lift a load!

☐ **HAZARD COMMUNICATION**

Site Inventory List of Chemicals must be maintained in the CDM Smith site trailer
All Safety Data Sheets (SDSs) must be turned in to CDM Smith before using a chemical
Paper copies of all SDSs will be kept in the CDM Smith trailer
Safety briefings prior to use of hazardous chemicals
All Containers must be properly labeled

☐ **SAFETY DATA SHEETS INCLUDE:**

Product information
Safe handling procedures
Hazardous contents of the substance, if any
Potential exposure situations
Acceptable exposure limits
Hazard prevention and personal protection
Use proper PPE as described in SDSs

☐ **IF EXPERIENCED ON THE JOBSITE, GASES, VAPORS, FUMES, DUSTS, AND MISTS MUST BE:**

Controlled by administrative means; or

By engineering methods; or

Protective equipment/measures if administrative/engineering controls are not feasible

☐ **RESPIRABLE CRYSTALLINE SILICA DUST**

Work activities which generate silica dust must be identified prior to mobilization
Each subcontractor must appoint a Silica Competent Person (SCP)
Each exposed worker must have completed silica awareness training
The SCP must develop a written Exposure Control Plan prior to mobilization
The SCP will administer the Plan during execution of work

The SCP must use Table 1: Specified Exposure Control Methods to plan exposure control measures
For those activities not found on Table 1 the SCP must follow the regulations at 29 CFR 1926.1153

☐ **HEAT STRESS**

When your body's cooling system can't keep up with the heat, you dehydrate, and your temperature rises above 100.4 F. That's when you can get heat-related illnesses such as:
Heat rash (plugged sweat glands)
Heat cramps (sweating has caused salt loss)
Heat exhaustion
Heat stroke (very serious—you can die).
Two serious heat illnesses: heat exhaustion and heat stroke.

☐ **HEAT EXHAUSTION SYMPTOMS:**

Rapid/shallow breathing
Muscle cramps
Moist/clammy skin
Dizziness/confusion
Heavy sweating
Slight increase in body
temperature
Pale complexion
Nausea

☐ **HEAT EXHAUSTION FIRST AID:**

Have the affected worker stop work.
Get the victim to a cooler environment, such as:
Shade, air conditioning, i.e. a building or air-conditioned vehicle
Have the victim drink small sips of water to rehydrate.
Muscle cramps may be treated with over-the counter medication such as Advil or Tylenol. Ensure victim is not allergic to medication. Ask the victim!

☐ **HEAT STROKE SYMPTOMS:**

Slurred speech
Elevated body temperature
Chills
Dry, hot skin (no sweating)
Hallucinations
Throbbing headache
Confusion/dizziness

☐ **HEAT STROKE FIRST AID:**

Call emergency medical services immediately.
Move victim to a cooler environment, out of direct sunlight.
Remove all unnecessary clothing from the victim.

Place victim on his/her side to expose as much skin surface to the air as possible.

☐ **HEAT STRESS PREVENTION:**

Acclimatization – may take a week or longer
May take several days to adjust
Work planning
Evaluate conditions.
Develop a plan.
Training
Toolbox safety meetings

Protective measures include:

Work/rest cycles
Cooling off
Hydration
Cool drinking water

TRAINING for heat stress:

Toolbox safety meetings

☐ **COLD STRESS**

Four factors contribute to cold stress:

Cold temperatures
High or cold wind
Dampness
Cold water

o

A cold environment forces the body to work harder to maintain its core temperature of 98.6 F. Cold air, water, and snow all draw heat from the body. So, while it is obvious that below freezing conditions combined with inadequate clothing could bring about cold stress, it is important to understand that it can also be brought about by temperatures in the 50's coupled with rain and/or wind.

☐ **COLD-RELATED ILLNESSES: HYPOTHERMIA**

Hypothermia means "low heat" and is a potentially serious health condition. It occurs when body heat is lost from being in a cold environment faster than it can be replaced.

Symptoms:

Begin with shivering, as the body temperature continues to fall then slurred speech, lack of coordination, and memory loss develop and shivering ceases.

Once the body temperature falls to around 85° F, the person may become unconscious, and at 78°, the person could die

☐ **HYPOTHERMIA FIRST AID:**

Alert supervisor and request medical assistance
Move victim to warm room or shelter
Remove wet clothing, if applicable
Warm center of body first: chest, neck, head, and groin-using an electric blanket, if available
Use skin-to-skin contact under loose, dry layers of blankets, clothing, towels, or sheets
Give warm beverages (not alcoholic)
Do not try to give beverages to an unconscious person
After body temp increases, keep victim dry & wrapped in warm blanket, including the head and neck
If victim has no pulse, begin cardiopulmonary resuscitation (CPR)

☐ **COLD-RELATED ILLNESSES: FROSTBITE**

Frostbite occurs when layers of skin tissue freeze. Frostbite can be caused by exposure to severe cold or by contact with extremely cold objects. In fact, frostbite occurs more readily from touching cold metal objects because heat is rapidly transferred from skin to metal.

Frostbite typically affects the extremities, particularly the face, ears, fingers and toes. Initial symptoms vary, but typically include skin that looks waxy and feels numb. Once damaged, tissues will always be more susceptible to frostbite in the future.

☐ **FROSTBITE SIGNS AND SYMPTOMS**

Cold, tingling, stinging or aching feeling in the frostbitten area, followed by numbness

Skin color turns red, then purple, then white or very pale skin, cold to the touch

Hard or blistering skin in severe cases

☐ **FROSTBITE FIRST AID:**

Alert a Supervisor and Call Emergency Services

DO NOT rub the affected area

Wrap in soft cloth

If help is delayed, immerse in warm, not hot, water. Don't pour water directly on the affected area because it will warm the tissue too fast. Warming should take about 25-40 minutes.

Do not warm the skin if there is a chance of refreezing. Severe tissue damage can occur.

☐ **COLD STRESS PREVENTION:**

Take breaks in warm locations; limit the amount of time outside on extremely cold days.

Carry cold weather gear, such as extra socks, gloves, hats, jacket, blankets, a change of clothes, and a thermos of hot liquid.

Include a thermometer and chemical hot packs in your first aid kit.

Avoid touching cold metal surfaces with bare skin.

Monitor your physical condition and that of your coworkers.

☐ **PERSONAL PROTECTIVE EQUIPMENT (PPE)**

Hard hats

ANSI Z87.1 safety glass with side shields

Gloves must be carried with you at all times on the job site

Composite/Steel toed work boots or shoes

Long pants

Minimum four-inch sleeved shirts

High-visibility clothing/traffic vests

Other job-specific PPE such as steel toes

Hearing protection is required if working in noisy areas

☐ **FIRE PREVENTION AND PROTECTION: FOUR ELEMENTS NEEDED TO PRODUCE A FIRE**

Enough oxygen to sustain combustion

Enough heat to raise the material to its ignition temperature

Some sort of fuel or combustible material

The chemical, exothermic reaction that is fire

☐ **NEVER FIGHT A FIRE IF:**

You do not know what is burning

The fire is spreading rapidly

Adequate equipment is not available

You might inhale toxic smoke

Your instincts tell you not to fight the fire

☐ **FIRE EXTINGUISHER USE**

Always know where your fire extinguishers are

Remember PASS if you must use a FIRE Extinguisher!

P - Pull the pin on the Fire Extinguisher.

A -Aim the Extinguisher nozzle.

S -Squeeze or press the handle.

S - Sweep side to side at the base of the fire

☐ **KEEPING FUEL SOURCES AND IGNITION SOURCES SEPARATE IS ESSENTIAL TO FIRE SAFETY:**

Return unused chemicals to a proper container at the end of each work shift

Store chemicals in properly labeled containers in designated areas away from non-compatible materials

Store flammable/combustible fluids in approved safety containers with flash arrestors in place

☐ **SIGNS, SIGNALS, AND BARRICADES**

Barricades must be replaced, if moved temporarily

Heed warnings on instructional signs

☐ **YELLOW (TAPE) CAUTION: LOWER DEGREE RISK**

Hoses on ground

Equipment hazards

Work area congestion

☐ **RED (TAPE) DANGER: IMMEDIATE OR HIGH RISK**

Overhead/Suspended loads

Overhead work

High noise

Open holes

Fall protection required

Confined space entry

☐ **IF YOU CROSS/REMOVE/MOVE RED BARRIERS OR SIGNS WITHOUT PERMISSION YOU WILL BE REMOVED FROM THE SITE**

☐ **BARRICADE TAGS:**

Must be filled out completely

Placed conspicuously on the barrier tape

Removed when hazard is corrected

Must be logged with CDM Smith

Returned to CDM Smith for close out

☐ **MATERIAL HANDLING EQUIPMENT**

MATERIAL HANDLING EQUIPMENT INCLUDES:

Earthmoving equipment such as, loaders, graders, bulldozers, off-highway trucks

Lifting and hauling equipment such as forklifts

Rigging equipment such as cranes, derricks, and hoists

☐ **MATERIAL HANDLING EQUIPMENT MUST BE INSPECTED AT THE START OF EACH SHIFT, INCLUDING:**

Pre-operational inspections

Cab inspections

Rigging inspections

Keep original equipment manual in cab of equipment

☐ **MATERIAL HANDLING – RIGGING**

Must be capable and safe for its intended use
Must have labels/ID tags clearly displaying capacity
Must be removed from service immediately if defective
Must not to be used with makeshift fasteners

☐ **MATERIAL HANDLING - SLINGS**

Must be padded to protect from sharp edges of loads
Must be long enough to provide maximum practical angle between sling leg and horizontal plane of load
Must be securely attached to the load by hooks, shackles, or other positive latching devices
Must ***never*** be shortened by knots, bolts, or other makeshift devices
Must ***never*** be pulled from under the load if the load is resting on it

☐ **MATERIAL HANDLING EQUIPMENT - HOOKS/SHACKLES**

All hooks must have a safety latch
Always place a load in the center of a hook, never on the point
A shackle must be used to hold two or more eyes

☐ **MATERIAL HANDLING EQUIPMENT - CHAIN FALLS AND HOISTS:**

Use within rated capacity
Always rigged for a straight pull
Use with a sling unless chain or hoist cable is designed for that purpose
Make sure anchorage point is sufficient for loads to be lifted

☐ **MATERIAL STORAGE - MASONRY/BRICKS**

Do not stack bricks higher than 7 feet
Loose brick must be tapered back two inches in every foot of height >4' level
Loose masonry blocks stacked must be tapered back one-half block per tier >6' level

☐ **MATERIAL STORAGE - LUMBER MUST:**

Have all nails withdrawn before stacking if it is used lumber
Do not exceed 20 feet in height if stacked by equipment (forklift)
Manually stacked lumber must never be stacked more than 16 feet high

☐ **MATERIAL STORAGE - STRUCTURAL STEEL AND CYLINDRICAL MATERIALS**

UNLESS RACKED MUST BE:

Stacked and blocked to prevent spreading or tilting

☐ **MATERIAL STORAGE *DO NOT:***

Store materials within six feet of any hoist way or inside floor opening; or
Store within ten feet of any exterior wall that doesn't extend above the top of the material stored

☐ **MATERIAL STORAGE – MOVING TO LOWER LEVELS:**

Signs warning of the hazard of falling materials must be posted at each level
Whenever materials are dropped more than 20 feet to any point lying outside the exterior walls of the building, an enclosed chute of wood, or equivalent material, must be used
When debris is dropped through holes in the floor without the use of chutes, the area onto which the material is dropped must be completely enclosed with barricades not less than 42 inches high, and not less than six feet back from the projected edge of the opening above

Removal must not be permitted in the lower area until debris handling ceases above

☐ **HAND TOOLS**

Inspect tools before each use
Maintain all tools in good condition
DO NOT use damaged tools
Use the right tool for the job
Operate tools according to manufacturer's instructions
Use the proper PPE

☐ **PORTABLE POWER TOOL SAFETY**

Never carry a tool by the cord or hose
Never yank the cord or hose to disconnect it from the receptacle
Keep cords and hoses away from heat, oil, and sharp edges
Disconnect tools when not in use

☐ **PORTABLE POWER TOOLS**

Keep all people not involved with the work at a safe distance from the work area
Avoid accidental starting
Do not hold fingers on the switch button while carrying a plugged-in tool
Maintain tools with care; keep them sharp and clean for best performance

☐ **HAND AND POWER TOOLS**

Don't forget:

Inspect tools before each use
Anyone can condemn tools
Use only tools you are qualified to handle
Never remove the guards from tools
Select the right tool for the job
Always unplug or de-energize equipment before working on it

☐**POWDER ACTUATED TOOLS**

Only trained personnel shall operate
Test each day before loading
Never load until ready to use
Handle misfires according to manufacturer's recommendations
Loaded tools shall never be left unattended
Never drive fasteners into hard brittle materials

Back easily penetrated material to prevent pins from becoming missiles on the other side

☐ **HOT WORK**

"HOT WORK" INCLUDES THE FOLLOWING:

Burning, welding, soldering, or brazing
Grinding
Chipping
Sawing masonry or metal
Non-explosion proof electric motors
Hot plates

☐ **HOT WORK PERMITS ARE REQUIRED IN AREAS WHERE THERE ARE:**

Flammable/combustible liquids
Gases

Wood debris
Vegetation

HOT WORK PERMIT REQUIREMENTS MAY INCLUDE BUT ARE NOT LIMITED TO:

Atmospheric testing
Removal of combustible materials
Fire extinguishers
Proper PPE
Shielding or guarding of combustible walls

☐ **WELDING AND CUTTING - HAZARDS**

Electric shock, the most serious and immediate risks facing a welder
Fumes and gases
Fire and explosions
Injuries due to insufficient PPE

☐ **WELDING AND CUTTING - SAFETY**

Prevent sparks and hot metal from falling from elevated positions
Remove electrodes if electrode holders are to be left unattended
Leave power supply switch open during lengthy work stoppage
Use approved welding and cutting equipment only.
Proper eye, face, and body, i.e., cotton/leather clothing.
Respiratory protection.
Use friction lighters to light torch.
Remove fire hazards prior to work.
Place signs/shields/barricades to prevent unintentional flash exposure to other workers.
Keep floor swept clean for a radius of 35 feet.
Use flash back arrestors to prevent gas cylinder ignition.
Ground electric welding machine.
Post a fire watch.

☐ **OXYGEN-FUEL GAS WELDING AND CUTTING**

Flammable mixtures of fuel gases and air or oxygen must be prevented
Maximum pressures of 15 psi for acetylene must be observed
Approved apparatus must be used
Competent person must oversee supply equipment

☐ **CYLINDERS AND CONTAINERS MUST:**

Be DOT compliant
Be legibly marked
Have ANSI compliant connections
Have valve protection on compressed gas cylinders
Be removed from cart if unused for 24 hours
Be secured with chains or straps only in an upright position
Have regulators removed and protective caps replaced prior to moving

☐ **ARC WELDING SAFETY**

Use compliant equipment
Have special design for exposure to weather, flammable gases, or marine conditions
Never use cables with splices within ten feet of the electrode holder

The welder should not coil or loop welding electrode cable around parts of his body

Damaged cables and equipment must be replaced
Cables must be joined properly and have adequate insulation

☐ **ELECTRICAL SAFETY**

Ground fault circuit interrupters (GFCI) must always be used
Maintain all electrical equipment according to manufacturer and project standards
Electrical cords must not be fastened with staples, hung from nails or suspended by wire
Any live parts of equipment operating over 50 volts must be guarded to avoid contact

Extension cords must be ≥ 12-gauge heavy duty outdoor cord w/functional grounding conductors
All equipment that is not "double insulated" must have a functional grounding conductor
Damaged cords and tools must be removed from service immediately

☐ **ELECTRICAL SAFETY**

Stay at least 10 feet away from overhead wires during cleanup and other activities
If working at heights or handling long objects, survey the area before starting work for the presence of overhead wires
Electrical hazards can cause burns, shocks and electrocution (death)
Never assume that a wire is safe to touch even if it is down or appears to be insulated
Never operate electrical equipment while you are standing in water
Never repair electrical cords or equipment unless qualified and authorized
Always check for buried lines before excavating

☐ **LOCKOUT/TAGOUT PROGRAM**

Never work on an energized panel
LO/TO protects personnel from the release of kinetic or stored energy
Pre-notify affected personnel and notify affected personnel before locks/tags removed
Attach tags/locks on all energy isolating devices and stored energy sources
Each lock shall be removed only by the employee who installed it

☐ **SCAFFOLD SAFETY**

All affected persons must be trained to recognize scaffold hazards
A competent person must inspect before each shift
Scaffolds over ten feet high shall have standard guard rails, mid-rails, and toe boards
Secure/tether tools when working at heights or provide falling object protection
Remove loose tools, materials, and equipment resting on the scaffold deck before moving scaffold
Provide falling object protection or establish an exclusion zone
Synthetic or natural rope must not be used as scaffold guardrails

☐ **AERIAL LIFT SAFETY**

Trained/authorized operators only
Never exceed load limits
Stand with both feet on the floor
Use safety harnesses on all lifts
Lifts must have proper tie off for fall protection
Secure safety chain/entry gate prior to operating
Do not climb on the rails
Do not climb on rails
Obtain permit for basket exiting if necessary
Never use lift as an anchor point

☐ **FALL PROTECTION**

ALL EMPLOYEES WORKING AT UNGUARDED HEIGHTS ABOVE SIX FEET MUST!

Be trained
Wear a harness with lanyards
Be 100% tied off at all times

☐ **FALL PROTECTION: PERSONAL FALL ARREST SYSTEMS (PFAS)**

Consist of anchorage point, lifeline, and body harness

A PFAS MUST:

Not allow free fall more than six feet
Allow prompt rescue
Be inspected prior to use
Not be used until competent person inspects
Have anchorage that supports at least 5,000 pounds per worker
Never tie a shock absorbing lanyard to a self-retracting device

☐ **FALL PROTECTION: GUARDRAILS MUST HAVE:**

Top rails of 39 – 45 inches high &capable of supporting outward and downward force of 200 pounds
Mid-rails, screens, mesh, or intermediate vertical members must be installed
Toe-boards at least 3 ½ inches high

☐ **FALL PROTECTION: HOLE COVER MUST:**

Overlay any roof or walking/working surface hole
Support at least twice the maximum weight of any anticipated load
Have full edge bearing on all sides of hole
Be secured and marked with the word **"HOLE" or "COVER"**

☐ **FALL PROTECTION: EXCAVATIONS 6 FEET OR MORE DEEP**

Guardrails must be provided or barricades
Warning lines placed at least 6 feet from the hazard
Walkways must be provided where workers are required to cross over excavations
Walkways must have a safety factor of 4 with a minimum clear width of 20 inches
Walkways must have standard rails extending at least 24 inches past the surface edge of the trench

☐ **MOTOR VEHICLES AND MECHANIZED EQUIPMENT**

Only qualified/authorized operators
Ground guide/signalman must be used if vision is limited
Seat belts must be worn while in moving vehicles or equipment
At least ten-foot clearance from overhead power lines
Working back-up alarm
Never leave running equipment unattended
Fully lower hydraulic systems when equipment is idle

☐ **MOTOR VEHICLES AND MECHANIZED EQUIPMENT**

WHEN OPERATING EARTHMOVING EQUIPMENT:

Inspect before use
Be sure brakes can stop and hold when fully loaded
Guard against all hazardous scissors point on front-end loaders
Ensure emergency access ramps and berms are adequately constructed

Operate the horn as needed
Always Use seat belts

☐ **WHEN OPERATING LIFTING AND HAULING EQUIPMENT:**
Keep clear of loads being lifted and suspended loads
Do not exceed load ratings
Completely lower the load, neutralize controls, and set brakes before leaving equipment unattended
Equipment is deemed to be unattended if operator is 25 feet or more away

☐ **MOTOR VEHICLES AND MECHANIZED EQUIPMENT**
Working back-up alarm on equipment.
Never leave running equipment unattended.
Fully lower hydraulic systems when equipment is idle.

☐ **MOTOR VEHICLES AND MECHANIZED EQUIPMENT - VEHICULAR TRAFFIC:**
Establish haul routes away from foot traffic
Set speed limit for vehicles is 10 MPH
Have workers always wear high visibility road vests
Workers must use caution when approaching equipment

☐ **POWERED INDUSTRIAL TRUCK SAFETY**
Never walk under the elevated portion of the fork truck
If moving while empty, lower forks near ground level
Never drive up to anyone standing in front of a fixed object
Never ride on the forks
Maintain a clear view of the path of travel
Use a spotter in high traffic/poor visibility areas
Chock wheels if on an incline

☐ **EXCAVATION SAFETY - BEFORE YOU BEGIN EXCAVATION:**
The site must be assessed
Potential hazards must be determined
Known hazards reduced or eliminated
Emergency procedures established
Access limited to trained employees only
Utility locations must be staked or marked
Periodic inspection intervals determined

☐ **EXCAVATIONS**
An excavation permit is required
Egress must be provided every 25 feet if trench is four feet or deeper
Competent person must inspect daily or when conditions change (rainstorms)
Slope, bench, shore, or shield if five feet or deeper

☐ **EXCAVATIONS**
Overburden must be at least two feet from edge of excavation
Keep vehicles and generators away from edge as carbon monoxide can accumulate in the trench
Atmospheric monitoring may be required
Vibration from equipment parked too close to excavations can cause collapse

☐ **CONCRETE AND MASONRY SAFETY**

A limited access zone must be established
Equal to the height of the wall to be constructed plus four feet
On the side of the wall which will be unscaffolded
All masonry walls over 8 feet in height
Must be adequately braced to prevent overturning or collapse
Bracing must remain in place until permanent supporting structures are in place

A qualified person must determine that a concrete structure can support intended loads
All protruding reinforcing steel onto which a worker can fall must have impalement protection
Workers must not be permitted to ride concrete buckets

☐ **CONCRETE AND MASONRY SAFETY - WORKERS ARE NOT ALLOWED**

Under concrete buckets while the buckets are being elevated or lowered into place
To apply cement mixtures through a pneumatic hose unless wearing head and face protection
Behind the jack during tensioning operations (unless essential to post tensioning operations)
Signs and barriers must be erected to limit access to the post tensioning area

☐ **CONFINED SPACE SAFETY**

OSHA defines a confined space as being made up of 3 main parts:

1) Being large enough for an employee to enter and perform work;

2) Has limited or restricted means of entry or exit; and

3) Is not designed for continuous occupancy.

Confined spaces include but are not limited to:

Tanks and vessels
Boilers
Ventilation or exhaust ducts
Sewer/pump stations
Underground utility vaults
Tunnels
Excavations
Wet wells

☐ **CONFINED SPACES MUST BE EVALUATED TO DETERMINE IF ENTRY PERMITS IS REQUIRED DUE TO:**

Atmospheric hazards
Engulfment potential
Potential for entrapment, and
Identification of any other safety and health hazard

Early-Warning Systems are Required and Include:

Alarms activated by remote sensors
Lookouts with equipment for immediately communicating with the authorized entrants and attendants

☐ **CRANE SAFETY**

Assembly/disassembly (A/D) must be performed by a person who meets the requirements for both a competent and qualified person (A/D Director)

Before Commencing A/D Operations, A/D Director Must Ensure Crew Understands:

Their tasks
The hazards associated with their tasks
The hazardous positions/locations that they need to avoid

☐ **CRANE OPERATION SAFETY**

Only qualified signalmen must give hand signals
Crane and crane operator credentials must be presented at least one week prior to the mobilization
Stay at least 20 feet from power lines
Mark swing radius with accepted barriers
Never lift a load without safety clips
Determine load weight before lifting
Never ride the hook, sling, or load
Use tag lines on all loads

☐ **CRANES OPERATION SAFETY INSPECTION BEFORE A LIFT, INSPECT:**

The crane or hoist
Wire rope, lifting hooks, chains, etc.

☐ **ASSURE CLEAR COMMUNICATION BETWEEN:**

Riggers
Signalperson
Operator

☐ **IF WORKING NEAR CRANES/HEAVY EQUIPMENT:**

Always work a safe distance from equipment
Never stand between a piece of equipment and an immovable object
Never work within the swing radius of rotating equipment

☐ **LIGHTNING PROTECTION PROTOCOL:**

Site personnel will be notified at the morning kickoff meeting if lightning activity is probable that day.
Shut down and take shelter when lightning producing thunderstorms are 0-10 miles (or visible)
Allow 30 minutes of lightning free weather to resume work
"**ALL CLEAR**" will be announced byu your Supervisor

☐**SITE RULES**

ABSOLUTELY NO CELL PHONE USE while operating equipment on site
Notify your supervisor immediately in the event of a chemical spill on site
Workers refueling, or servicing equipment will be instructed in the use and location of spill kits on site
Portable toilets are located the site for your use
Anyone caught stealing or vandalizing property will be immediately removed from the site
Anyone caught stealing or vandalizing property will be prosecuted fully
No fighting, horseplay, or practical jokes are allowed on site.
Incidents and near misses must be reported to the SHSO no matter how minor.
Report all suspicious activity or unauthorized visitors to the SHSO or Superintendent immediately
☐ Violation of safety policy/procedures can result in disciplinary action
☐Violation of safety policy/procedures can result in permanent removal from site

☐ **ALL WORKERS ARE REQUIRED TO KNOW THE LOCATIONS OF THE FOLLOWING:**

Safety Data Sheets
Fire Extinguishers: located on equipment and other locations on site
1st Aid Kit And 1ST Aid and CPR Trained Personnel: information provided by your employer
Emergency Telephone and Numbers – Ensure to get the numbers from your supervisor

☐ **I KNOW TO USE THE FOLLOWING:**

Hard hat, safety glasses, steel toe boots, long pants, sleeved shirt & traffic vest always
Hearing Protection: at 85 dB, when working on equipment, and around loud tools
Goggles or Face Shield: When working with chemicals and debris producing equipment

☐ **I KNOW THAT:**

Forklift and crane operators are to provide proof of certification
All barricades must be respected
Chemicals not used on this project shall be removed from vehicles, job boxes, etc
Damaged tools and equipment shall be removed from vehicles, job boxes, etc
Spotters will be used during work around power lines
Materials used on site must be properly stored, covered and contained
All spills shall be cleaned up immediately

☐***FIREARMS AND OTHER WEAPONS ARE ABSOLUTELY FORBIDDEN ONSITE***

☐ **I AGREE TO COOPERATE FULLY WITH THE SAFETY REQUIREMENTS OF OSHA, AND THIS PROJECT. I WILL FOLLOW ALL SAFETY RULES AND INSTRUCTIONS GIVEN TO ME, USE GOOD JUDGMENT AND SAFE WORK PRACTICES WHILE PERFORMING MY DUTIES. I UNDERSTAND THAT SAFETY IS AN ON-GOING PROCESS AND THAT I WILL ATTEND AND PARTICIPATE IN WEEKLY SAFETY MEETINGS. I UNDERSTAND THAT FAILURE TO FOLLOW THE SAFETY REQUIREMENTS OF CDM SMITH AND THIS PROJECT WILL RESULT IN DISCIPLINARY ACTION AGAINST ME AND PERMANENT REMOVAL FROM THIS SITE. I UNDERSTAND THIS IS A ZERO TOLERANCE JOB SAFETY SITE.**

Company Name:		Date:
Subcontractor to:		
Attendee Printed Name:		
Attendee Signature:		
Printed Instructor Name:		Date:
Instructor Signature:		

Appendix F

Injury/Illness Prevention Program

INJURY AND ILLNESS PREVENTION PROGRAM

CDM Constructors, Inc.

Company/Organization Name and Address

Ken Meyer, P.E., CSP,
303-949-5236

Name and Contact Information for Individual Completing this form

RESPONSIBILITY FOR OUR IIPP (Title 8 California Code of Regulations §3203(a)(1))

Our workplace's Injury and Illness Prevention Program (IIPP) administrator is[1]:
Ken Meyer Associate Safety Manager

IIPP Administrator's Name, Job Title, and Contact Information (business address, phone numbers)

The responsibilities of our IIPP Administrator include (check all that apply):

- ☒ Preparing and updating our workplace's IIPP.
- ☐ Implementing the provisions in our IIPP.
- ☒ Making sure accidents, injuries, illnesses and exposures in our workplace are investigated.
- ☐ Conducting regular workplace inspections for hazard identification.
- ☐ Taking action to mitigate identified hazards.
- ☒ Providing health and safety training to employees.
- ☒ Instituting a Health and Safety Committee.
- ☒ Establishing procedures for employee reporting of workplace hazards, accidents, injuries, illnesses, and general safety concerns.
- ☐ Other: _____

- ☐ Other: _____

☒ All employees have been told who is in charge of health and safety in our workplace.

INJURY AND ILLNESS INVESTIGATIONS (Title 8 CCR §3203(a)(5))

Investigations of workplace accidents, injuries, illnesses and hazardous substance exposures will be conducted by: Ken Meyer Associate Health & Safety Manager (name and job title)

Our procedures for investigating accidents, injuries and illnesses and hazardous substance exposures include:

[1] This item is an activity that is required by Cal/OSHA for compliance with the IIPP standard.

☒ Visiting the scene as soon as possible.[1]
☒ Interviewing injured employees and witnesses.[1]
☒ Determining the cause(s) of the accident/exposure.[1]
☒ Taking corrective action to prevent the accident/exposure from reoccurring.[1]
☐ Identifying and addressing the underlying factors that may have contributed to the incident.
☐ Investigating "near miss" incidents when they occur.
☐ Recording the findings and actions taken.
☒ Taking photos of the accident scene and the employee(s) involved.
☐ Other: _____

HAZARD ASSESSMENT / INSPECTION (Title 8 CCR §3203(a)(4))

Periodic inspections to identify and evaluate hazards in our workplace will be performed by the following individual(s): The SSHO (daily) and the Corporate Safety Director (at least semiannually).

Periodic inspections are always performed according to the following schedule:

☒ Whenever new substances, processes, procedures or equipment are introduced into our workplace that present potential new hazards.[1]
☒ Whenever new, previously unidentified hazards are recognized.[1]
☒ Whenever occupational injuries and illnesses occur.[1]
☒ Whenever workplace conditions warrant an inspection.[1]
☒ When we hire and/or reassign permanent or intermittent employees to processes, operations, or tasks for which a hazard evaluation has not been previously conducted.[1]
☐ Other times: _____

Other methods we use to identify hazards: SDS Reviews, job walks, weekly inspections, etc.

HAZARD CORRECTION (Title 8 CCR §3203(a)(6))

Unsafe or unhealthy work conditions, practices or procedures will be corrected in a timely manner based on the severity of the hazards, including:

☒ When a hazard is observed or as soon as it is discovered.[1]

☒ When an imminent hazard exists, which cannot be immediately abated without endangering employee(s) and/or property, we will remove all exposed employees from the area except those necessary to correct the existing condition. Employees who are required to correct the hazardous condition will be provided with the necessary protection and training.[1]

[1] This item is an activity that is required by Cal/OSHA for compliance with the IIPP standard.

We have plans/policies (which are attached) for addressing the following specific hazards we have identified in our workplace.

_____(list of hazards, for example, chemicals, noise, workplace violence, etc.)

☒ (plans for addressing these hazards are attached)

COMMUNICATION WITH EMPLOYEES ABOUT SAFETY (Title 8 CCR §3203(a)(3))

All supervisors are responsible for communicating with their employees about occupational health and safety hazards and protections in a manner that is easily understandable by all employees.

☒ We have a communication system that includes all the following checked items:

- ☒ New employee orientation including a discussion of safety and health policies and procedures and a review of our Injury and Illness Prevention Program.[1]
- ☒ A system for employees to anonymously inform management about workplace hazards without fear of reprisal.[1] This system involves: 1-800 number and direct communication with the Corporate H&S Manager.
- ☒ Posted or distributed safety information.[1]
- ☒ Regularly scheduled safety meetings. Our safety meetings are held on the following schedule: Weekly. Our safety meetings are held more frequently as deemed necessary by the creation of hazards or the occurrence of injuries and illnesses.
- ☒ Other methods we use to ensure communication with, and involvement of employees include: Activity Hazard Analyses, Safety Data Sheets, Job Postings, routine briefings.

- ☐ Our workplace elects to use a labor/management health and safety committee to meet the communication requirements of the IIPP standard. As required, our committee meets regularly (at least quarterly), prepares written records of the safety and health committees' meetings, reviews results of the periodic scheduled inspections, reviews investigations of accidents and exposures and makes suggestions to management for the prevention of future incidents, reviews investigations of alleged hazardous conditions, and submits recommendations to assist in the evaluation of employee safety suggestions.

TRAINING AND INSTRUCTION (Title 8 CCR §3203(a)(7))

All employees, including supervisors, are provided training and instruction on general and job-specific safety and health practices. Training and instruction are provided according to the following schedule:

☒ When our IIPP was first established.[1]

[1] This item is an activity that is required by Cal/OSHA for compliance with the IIPP standard.

- [x] To all new employees.[1]
- [x] To all employees given new job assignments for which training has not previously been provided.[1]
- [x] Whenever new substances, processes, procedures, or equipment are introduced into our workplace and represent a new hazard.[1]
- [x] Whenever anyone is made aware of a new or previously unrecognized hazard.[1]
- [x] To supervisors to familiarize them with the safety and health hazards to which employees under their immediate direction and control may be exposed.[1]
- [x] To all employees about the hazards specific to each employee's job assignment.[1]
- [ ] Other: _____

We provide training to employees and supervisors on topics such as but not limited to: Confined Spaces, Excavations, Hazardous Energy Control, working at heights, Wildfire Smoke, Silica Awareness See Section 6 of the attached SSHAP.

The following is a description of how our training is conducted: Combinations of face to face and video training.

EMPLOYEE COMPLIANCE WITH SAFETY PROCEDURES (Title 8 CCR §3203(a)(2))

Management is responsible for ensuring that all safety and health policies and procedures are clearly communicated and understood by all employees. Supervisors and lead personnel are expected to enforce the rules fairly and uniformly.

All of our employees, including supervisors, are responsible for complying with safe and healthful work practices. Our system of ensuring that all employees comply with these practices includes all of the following checked practices.[1]

- [x] Informing employees of the provisions of our IIPP.[1]
- [x] Recognizing employees who perform safe and healthful work practices.[1] This recognition is accomplished by: Instant recognition by the supervisor
- [x] Fair and consistent disciplining of employees who fail to comply with safe and healthful work practices.[1] The following outlines our disciplinary process: See Section 3 of the attached SSHAP
- [x] Evaluating the safety performance of all employees
- [x] Providing training to employees whose safety performance is deficient
- [x] Other systems we have in place to ensure compliance with safety practices: routine inspections.

The responsibilities of all employees include the following checked practices:

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[1] This item is an activity that is required by Cal/OSHA for compliance with the IIPP standard.

☒ Reporting unsafe conditions, work practices or accidents to their supervisors or the site safety coordinator(s) immediately.
☒ Following safe work practices.
☒ Using appropriate personal protective equipment (PPE) as instructed by their supervisors.
☒ Other: working free from the influence of drugs and alcohol.

RECORDKEEPING AND DOCUMENTATION (Title 8 CCR 3203(b))

☒ Our workplace has more than ten employees and so maintains the following records to help us effectively implement our IIPP: (If you have checked this box, the following documentation is required.)

- ☒ Records of scheduled and periodic inspections (to identify unsafe conditions and work practices, including the names of the person(s) conducting the inspection, the unsafe conditions and the work practices that have been identified, as well as the action(s) taken to correct the identified unsafe conditions and work practices). These records are maintained for at least one (1) year.[1]

- ☒ Documentation of our safety and health training for each worker, including their name, training date(s), types of training and the name(s) of our training provider(s).[1]

☐ Our workplace has fewer than ten workers, including managers and supervisors, and so we maintain inspection records only until the hazard is corrected and only maintain a log of instructions to workers with respect to their job assignments when they are first hired or assigned new duties.

☐ We are a local government entity (county, city district or other public agency) and are therefore not required to keep written records of the steps taken to implement and

The master copy of this IIPP can be found at: CDM Constructors Inc. Rancho Cucamonga office 9220 Cleveland Ave. Rancho Cucamonga, CA 91730

Other copies of the IIPP can be found at: with each crew's supervisor.

[1] This item is an activity that is required by Cal/OSHA for compliance with the IIPP standard.

Appendix G

Confined Space Entry Procedures

[1] This item is an activity that is required by Cal/OSHA for compliance with the IIPP standard.

1.0 CONFINED SPACE ENTRY GUIDELINES

1. Introduction

These guidelines apply to all CDM Constructors employees performing duties involving confined spaces. They are designed to provide information necessary to ensure that CDM Constructor's confined space entry program is consistent with OSHA's standards for confined spaces, CFR 1926 Subpart AA, CFR 1926.21(b)(2) and CFR 1926,353(b).

1.1 Definitions

When discussing and describing confined spaces, CDM Constructors employees and subcontractors should know the meaning of the following terms:

- **Acceptable Entry Conditions**. The conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.
- **Attendant**. An individual stationed outside one or more permit spaces who monitors the authorized entrants.
- **Barrier** means a physical obstruction that blocks or limits access.
- **Blinding or Blanking**. The absolute closure of a pipe, line, or duct by the fastening of a solid plate, such as a spectacle blind or a skillet blind, that completely covers the bore and that can withstand the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.
- **Competent person** means one who can identify existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them
- **Confined Space**. Any space that is large enough and so configured that an employee can bodily enter and perform assigned work; is not designed for continuous employee occupancy; and has limited or restricted means for entry or exit, such as tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.
- **Control** means the action taken to reduce the level of any hazard inside a confined space using engineering methods (for example, by ventilation), and then using these methods to maintain the reduced hazard level. Control also refers to the engineering methods used for this purpose. Personal protective equipment is not a control.

- **Controlling employer**. The employer that has overall responsibility for construction at the worksite. If the controlling contractor owns or manages the property, then it is both a controlling employer and a host employer.

- **Early-warning system** means the method used to alert authorized entrants and attendants that an engulfment hazard may be developing. Examples of early-warning systems include, but are not limited to: Alarms activated by remote sensors; and lookouts with equipment for immediately communicating with the authorized entrants and attendants.

- **Double Block and Bleed.** The closure of a line, duct, or pipe and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

- **Emergency.** Any occurrence, including any failure of hazard control or monitoring equipment, or event internal or external to the permit space that could endanger entrants.

- **Engulfment.** The surrounding and effective capture of a person by a liquid or finely divided or flowable solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing

- **Entry.** The action by which a person passes through an opening into a permit-required confined space. Entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

- **Entry Employer** means any employer who decides that an employee it directs will enter a permit space.

- **Entry Permit.** The written or printed document that is provided by the employer to allow and control entry into a permit space and provided by CDM Constructors to allow and control entry into a permit space.

- **Entry Supervisor** means the qualified person (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required this program.

- **Hazardous Atmosphere.** An atmosphere that may expose employees to the risk of death, incapacitation, impairment of self-rescue ability, injury, or acute illness may result from one or more of the following causes:

  - Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL)

- Airborne combustible dust at a concentration that meets or exceeds its LFL. This condition is approximated as a condition in which the dust obscures vision at a distance of 5 feet or less.
- Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent
- Atmospheric concentration of any substance for which a dose or a permissible exposure limit (PEL) is published and which could result in employee exposure in excess of its dose or PEL.
- Any atmospheric condition that is immediately dangerous to life or health

- **Hot Work Permit**. CDM Constructor's written authorization to perform operations capable of providing a source of ignition.

- **Host employer.** The employer that owns or manages the property where the construction work is taking place.

- **Immediately Dangerous to Life or Health (IDLH).** Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

- **Inerting.** The displacement of the atmosphere in a permit space by a noncombustible gas, such as nitrogen, to such an extent that the resulting atmosphere is noncombustible.

- **Isolation.** The process by which employees in a confined space are completely protected against the release of energy and material into the space, and contact with a physical hazard, by such means as: Blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tag out of all sources of energy; blocking or disconnecting all mechanical linkages; or placement of barriers to eliminate the potential for employee contact with a physical hazard.

- **Limited or restricted means for entry or exit.** A condition that has a potential to impede an employee's movement into or out of a confined space. Such conditions include, but are not limited to, trip hazards, poor illumination, slippery floors, inclining surfaces and ladders.

- **Line Breaking**. The intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic materials, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

- **Lockout.** The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

- **Non-entry rescue.** When a rescue service, usually the attendant, retrieves employees in a permit space without entering the permit space.

- **Non-Permit-Required Confined Space**. A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

- **Oxygen Deficient Atmosphere**. An atmosphere containing less than 19.5 percent oxygen by volume.

- **Oxygen Enriched Atmosphere**. An atmosphere containing more than 23.5 percent oxygen by volume.

- **Permit-Required Confined Space**. A confined space that has one or more of the following characteristics:

  - Contains, or has the potential to contain, a hazardous atmosphere
  - Contains a material that has the potential for engulfing the entrant
  - Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section
  - Contains any other recognized serious safety or health hazard

- **Physical hazard**. An existing or potential hazard that can cause death or serious physical damage. Examples include, but are not limited to: Explosives, mechanical, electrical, hydraulic and pneumatic energy; radiation; temperature extremes; engulfment; noise; and inwardly converging surfaces. Physical hazard also includes chemicals that can cause death or serious physical damage through skin or eye contact (rather than through inhalation).

- **Prohibited Condition**. Any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

- **Rescue Service**. The personnel designated to rescue employees from permit spaces.

- **Retrieval System**. The equipment used for non-entry rescue of persons from permit spaces. This includes a retrieval line, chest or full body harness, wristlets or anklets, if appropriate, and a lifting device or anchor used for non-entry rescue of persons from permit spaces.

- Serious physical damage. An impairment or illness in which a body part is made functionally useless or is substantially reduced in efficiency. Such impairment or illness may be permanent or temporary and includes, but is not limited to, loss of consciousness, disorientation, or other immediate and substantial reduction in

mental efficiency. Injuries involving such impairment would usually require treatment by a physician or other licensed health-care professional.

- **Tag out.** Placement of a tag out device on a circuit or equipment that has been deenergized, in accordance with an established procedure, to indicate that the circuit or equipment being controlled may not be operated until the tag out device is removed; and

  The employer ensures that:

  - Tag out provides equivalent protection to lockout; or
  - That lockout is infeasible and the employer has relieved, disconnected, restrained and otherwise rendered safe stored (residual) energy.

- **Testing.** The process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space. Testing enables employers both to devise and implement adequate control measures for the protection of authorized entrants and to determine if acceptable entry conditions are present immediately prior to, and during, entry.

- **Ventilate or ventilation**. Controlling a hazardous atmosphere using continuous forced-air mechanical systems that meet the requirements of CFR 1926.57 (Ventilation).

1.2 Roles and Responsibilities

All CDM Constructors employees and subcontractors located or performing duties involving confined spaces have certain roles and responsibilities, as defined in the following list (see *Section 2.2* for definitions of the acronyms used below):

- **CHSD -** He/she is responsible for the overall design, implementation, maintenance, and review of effectiveness of the confined space entry program.

- **Project Manager –** He/She is the primary point of contact, as the controlling contractor, for information about permit spaces at the work site. The host employer must provide information it has about permit spaces at the work site to the controlling contractor, who then passes it on to the employers whose employees will enter the spaces (entry employers). Likewise, entry employers must give the controlling contractor information about their entry program and hazards they encounter in the space, and the controlling contractor passes that information on to other entry employers and back to the host. As mentioned above, the controlling contractor is also responsible for coordinating activities when there are multiple employers at the worksite. This will ensure hazards are not introduced into a confined space by

workers performing tasks outside the space. An example would be a generator running near the entrance of a confined space causing a buildup of carbon monoxide within the space.

- **HSC/SHSO -** He/she is responsible for the implementation of the confined space entry program. These responsibilities include coordinating the appropriate training for individuals that may function as authorized entrants, attendants, or entry supervisors. Duties include evaluating the worksite and to identify permit and non-permit/Permit required confined spaces, perform atmospheric testing and rescue coordination, etc. He/she is responsible to inform exposed employees by posting danger signs of the existence and location of, and the danger posed by, each permit space.

- **Authorized Entrant**. This is the individual who has been appropriately trained and authorized for permit-required confined space entry. Specific responsibilities include:

  - Knowing the hazards associated with the confined space including the mode of exposure and the signs and symptoms of over-exposure
  - Properly using the prescribed personal protective equipment
  - Maintaining communication with the attendant
  - Exiting from the confined space as soon as possible when ordered by the attendant or when a prohibited condition exists or when a pre-set alarm activates
  - Alerting the attendant when a prohibited condition is observed or when signs and symptoms of exposure are encountered
  - Reviewing the completed permit prior to entry to verify that pre-entry preparations have been completed
  - Entrants are encouraged to review air monitoring results before entry.

- **Attendant**. This is the individual who has been appropriately trained and authorized to perform the duties of the attendant. Attendants may only monitor one confined space at a time. Specific responsibilities include:

  - Remaining outside the permit space during entry operations
  - Performing non-entry rescues when specified in the site-specific rescue -procedure
  - Knowing the existing and potential hazards
  - Maintaining communication with all entrants
  - Ordering evacuation of the permit space when a prohibited condition exists or when physiological signs of entrant exposure become apparent
  - Ensuring that unauthorized persons stay clear of permit spaces
  - Summoning rescue services if such services become necessary
  - Refraining from performing other duties that may interfere with the primary duty to monitor and protect the safety of authorized entrant(s)

- **Entry Supervisor**. This individual is the competent person and primarily responsible for the permit-required confined space entry. The entry supervisor must be trained in confined space entry and may serve as the attendant. Specific duties include:

  - Issuing of the confined space entry permit
  - Verifying individuals that have performed all monitoring and testing of the space are properly trained to conduct the tests
  - Ensuring that proper procedures and equipment are in place and in good working order before endorsing the permit
  - Verifying that rescue services are available and that a mechanism to contact these services has been determined
  - Terminating and canceling permits when entry operations are completed or if a new condition is encountered
  - Reviewing entry operations that may not provide enough protection and revising the program prior to subsequent entries

- **Rescue Services**. These services can be secured from on-site employees or from an off-site service. These individuals must be properly trained and have a complete knowledge in the use of personal protective and rescue equipment, and first aid/CPR. They are to be made aware of the confined space hazards and provided with adequate information to aid in the rescue and treatment of employees. Rescue services provided by an outside service will be given an opportunity to examine the entry site, practice rescue, and decline as appropriate. When local emergency services will be used for rescue, CCI must arrange for responders to give advance notice if they will be unable to respond for a period of time (because they are responding to another emergency, attending department wide training, etc.). If local emergency services are unable to respond, all PRCS work will stop until the services become available. Entry rescue services are required to be on site for all IDLH conditions while work is being performed. The preparation of an entry and rescue plan is strongly encourage for complex confined spaces. This plan should be reviewed by the RHSM.

All employees shall receive training in confined space entry before working in confined spaces, prior to a change in assigned duties and when a new hazard has been identified or special deviations occur. This training shall be documented; documentation shall include employees' names, dates of training, and the trainer's name. Training must be provided in a language and vocabulary that the employee understands.

On projects where multiple contractors are working or employees from different organizations are involved in confined space entries, operations shall be coordinated so that the employees of other employers are not endangered.

1.3 Testing of Confined Space Atmospheres

Atmospheric testing of confined spaces is necessary to evaluate the hazards of the permit space, to verify that acceptable conditions exist for entry into the space and to ensure acceptable atmospheric conditions are maintained throughout the entry. Continuous atmospheric testing is required, even when the confined space is continuously ventilated.

Table 1-1
Atmospheric Testing

Evaluation Testing	Confined space atmospheres are tested using equipment with sufficient sensitivities and specificity to identify and evaluate any hazardous atmospheres that may exist or arise during the performance of operations. This evaluation is necessary so that entry procedures can be developed and acceptable conditions stipulated on the permit. Testing is to be performed in the following order: 1) Oxygen 2) Flammable gases and vapors 3) Toxic gases and vapors
Verification Testing	This testing is performed to verify that confined space atmospheres remain within acceptable ranges, as outlined on the permit, during the performance of the entry work.
Heat Stress	Certain confined spaces can present conditions that may represent a heat stress hazard for entrants. These spaces should be monitored for this potential.

1.4 Permit-Required Confined Space Entry

Entry into a permit-required confined space will be by permit only. The permit is an authorization and approval in writing that specifies the location and type of work to be performed; certifies that all existing hazards have been evaluated by a competent person; and ensures that necessary protective measures have been considered. Every entrance into a permit required confined space requires a sign reading "DANGER-PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" or other similar language

The Entry Supervisor is responsible for completing a Confined Space Entry Permit Form. Prior to signing, the Entry Supervisor is to ensure that the following areas and actions have been considered and addressed:

- Location and description of the work to be performed
- Hazards that may be encountered, including external hazards such as pedestrians, and vehicles

- Isolation of the space which may include blanking or blinding of pipes, lines, or ducts, electrical isolation, and mechanical lockout. Identification of specific equipment to be used during entry, such as personal protective equipment, lighting, ventilation, safety harnesses, and ground-fault circuit interruption. Protection from external hazards must also be included.

- The requirement for continuous monitoring of engulfment hazards is in place. For example, when workers are performing work in a storm/sanitary sewer, a storm upstream from the workers could cause flash flooding. An electronic sensor or observer posted upstream from the work site could alert workers in the space at the first sign of the hazard, giving the workers time to evacuate the space safely.

- Results of atmospheric testing, including oxygen levels, flammability levels, and other toxic substance levels

- A description of the types and frequencies of atmospheric testing that will be performed during entry

- Identification of the entrants

- Identification of the attendant

- Identification of the operating and rescue procedures

Once the Confined Space Entry Permit is completed, a copy will be made available to all authorized entrants at the time of entry by posting at every portal or by any other equally effective means.

The duration of the permit may not exceed the time required to complete the assigned task as identified on the permit. Generally, the permit will be valid only for the date specified on the permit.

The Entry Supervisor will terminate the entry and cancel the permit when the operation covered by the permit has been completed. The Entry Supervisor can cancel the permit when a condition that is not allowed under the permit arises in or near the permit space.

The Entry Supervisor can suspend a permit, instead of cancellation, in the event of changes from the entry conditions listed on the permit or an unexpected event requiring evacuation of the space. The space must be returned to the entry conditions listed on the permit before re-entry.

After entry, CCI and/or any subcontractors assigned as entry employers must debrief the controlling contractor regarding the permit space program followed and any hazards confronted or created in the permit space(s) during entry operations. CCI is then required to provide this information to the host employer (owner).

Client forms may be used following review and approval by the RHSM.

Copies of all permits are to be maintained with project records. Any problem encountered during the entry operation is to be specifically noted on the permit to facilitate appropriate revisions to the program.

1.5 Non-Permit Required Confined Space Entry

All spaces are to be considered permit-required confined spaces until pre-entry procedures demonstrate otherwise**.** Confined spaces may be entered without the need for an attendant, provided that either the space has been determined not to be a permit-required confined space or the space can be maintained in a safe condition for entry by mechanical ventilation alone. Continuous air monitoring during entry is required regardless of classifications.

Entry to and the type of all non-permit required confined spaces will be determined during the completion of the Confined Space Evaluation Form. This section is to be completed by the competent person who is to ensure that:

- The confined space has been isolated to prevent worker exposure to physical hazards through elimination of the hazard or isolation methods energy course through lock out tag out. Energy sources include mechanical and electrical.

- Concentrations of the confined space atmosphere are within the acceptable ranges.
- There is no reason to believe that conditions within the confined space may change adversely.
- The evaluation is to be completed and posted near the confined space.

Confined Space Evaluation

Nov. 2019

Project: MPWSP Project	**Project #:**	**Date:**	**Time:**
Confined Space Evaluated:			
Description of Work to be Performed:			

Nature of Hazards in Confined Space: (Check)	
☐	Oxygen deficiency (<19.5% at sea level) not mitigated by ventilation.
☐	Flammable gases or vapors (>10% of the lower flammable limit or >23.5% oxygen at sea level).
☐	Toxic gases or vapors (greater than the permissible exposure limit).
☐	Mechanical hazards – not mitigated by LOTO.
☐	Electrical shock – not mitigated by LOTO.
☐	Engulfment – not mitigated by LOTO and line breaking/blanking.
☐	Hazards introduced by work to be performed – fumes, vapors, etc.
☐	Other:
IF ANY OF THESE ARE CHECKED, THIS IS A PERMIT-REQUIRED CONFINED SPACE	

Atmospheric Monitoring – required if potential exists for oxygen deficiency, flammable or toxic vapors exist based on site conditions:

Test	Acceptable Limit	Date: Time: Results	Permit Required based on Results	
Oxygen - min.	>19.5%		☐ Yes	☐ No
Oxygen – max.	<23.5%		☐ Yes	☐ No
Flammability	<10% LEL		☐ Yes	☐ No
Carbon monoxide	<25 ppm		☐ Yes	☐ No
Hydrogen sulfide	<5 ppm STEL		☐ Yes	☐ No

☐ Monitoring Not Required.

Employee conducting atmospheric monitoring:	
Evaluator Authorization:	
This confined space has been evaluated and determined to be a: ☐ Non-Permit-Required Confined Space ☐ Permit-Required Confined Space	
Name:	Signature:

CDM Smith CSE Monitoring & Entrant Sign In/Out Nov. 2019

This form must be attached to the CSE Permit, which must be on display outside the confined space.

Atmospheric Testing and Conditioning **Date:**

Calibrate instruments per manufacturer's instructions.
Measure gases just inside the space and at locations workers will occupy.

Required?				Gas/Vapor	Readings Time	Time	Time	Time	Time	Time	Time	Time
☐	Y	☐	N	Oxygen (>19.5% and <23.5%)								
☐	Y	☐	N	Flammability (<10% LEL)								
☐	Y	☐	N	Carbon monoxide (<25 ppm)								
☐	Y	☐	N	Hydrogen sulfide (<5 ppm STEL)								

Initials of Attendant: _____

Observations:

CDM Smith CSE Monitoring & Entrant Sign In/Out Nov. 2019

Entry Date:		Attendant Name:	

Entrant Name	Time In	Time Out

New CSE Monitoring & Entrant Sign In/Out sheets must be used daily. The previous sheets must be filed.

Confined Space Entry Permit

Nov. 2019

Project: MPWSP Project		
Space to be entered:		
Section drawing showing material and energy inputs attached?	☐ **Yes**	☐ **No**
Nature of task(s) and what company will be responsible for executing the task(s):		

Physical injuries are always possible. Is there a potential for:

☐	Hot Work	☐	Vehicular Traffic	☐	Toxic Gases or Vapors
☐	Explosive Gases	☐	Oxygen Deficiency	☐	Exposure to Microbes
☐	Heat Stress	☐	Cold Stress	☐	Engulfment

Entry Supervisor:		**Duration of Permit:**	
Authorized Entrants:			
1.	2.	3.	4.
Attendants:			
1.	2.	3.	4.
Rescuers, if off site emergency rescuers are not to be used:			
1.	2.	3.	4.

Means of Communication:

☐ Verbal	☐ Visual	☐ Radio	☐ Secondary Attendant	☐ String Technique
☐ Other, describe:				

Safety Equipment Outside the Space:

Needed?	In Place?	To be checked by Entry Supervisor when In place.
☐	☐	Traffic cones or barriers in place
☐	☐	Ventilation system in operation
☐	☐	Rescue and retrieval equipment in place
☐	☐	Fire extinguisher outside space
☐	☐	SCBA inspected and ready (topside) for emergency use.
☐	☐	Valves locked out or made inoperable

Needed?	In Place?	Verified (X) as in place by Entry Supervisor. Equipment outside space (cont.)
☐	☐	Electrical equipment disconnected & locked out
☐	☐	Pneumatic & hydraulic equipment disconnected & locked out
☐	☐	Rescue service is currently available.
☐	☐	Radio, phone, or portable phone reaches rescue team
☐	☐	Ignition sources eliminated/isolated.
☐	☐	First aid kit
☐	☐	Other (Describe):

Safety Equipment in the Space:

Select below of needed. To be initialed by Entry Supervisor if In Place.

Respirator needed? ☐Yes ☐No				
In Place?	☐	Self-contained breathing apparatus	☐	Airline respirator
Initial:	☐	Air purifying respirator with dust cartridges	☐	Disposable dust mask
	☐	Air purifying respirator with vapor cartridges	☐	Escape mask
	☐	Airline respirator w/escape bottle		
	☐	Other		
Eyewear needed? ☐Yes ☐No				
In Place?	☐	Safety Glasses with side shields	☐	Safety glasses with face shield
Initial:	☐	Safety goggles		
	☐	Face Shield		
Gloves needed? ☐Yes ☐ No				
In Place?	☐	Surgical gloves w/outer gloves (nitrile)	☐	Kevlar-knit rubber palm
Initial:	☐	Surgical gloves w/outer gloves (neoprene)	☐	Surgical (nitrile)
	☐	Surgical gloves w/string knit rubber palm gloves	☐	Outer gloves (nitrile)
	☐	Surgical gloves w/string knit Kevlar palm gloves	☐	Outer gloves (neoprene)
	☐	String-knit rubber palm		
Safety harness and lifeline needed? ☐Yes ☐No				
In Place?	☐	Safety harness and lifeline		
Initial:	☐			

Communication needed? ☐Yes ☐No				
In Place?	☐	Handheld radio	☐	Combination phone/radio
Initial:	☐	Cell phone		
Lighting needed? ☐Yes ☐No				
Initial:	☐	Electric droplight	☐	Flashlight
	☐	High-intensity light	☐	Headlight
	☐	Flashlight and electric lamps	☐	Flashlight and headlight
	☐	Flashlight and high-intensity lamps	☐	Sealed-beam light
Protective footwear needed? ☐Yes ☐No				
Initial:	☐	Safety-toe boots w/disposable boot covers	☐	Chest waders w/safety toes
	☐	Safety-toe boots w/reusable boot covers	☐	Safety-toe boots
	☐	Hip waders w/safety toes	☐	Safety-toe shoes
	☐	Hip waders and safety toes boots	☐	Rubber safety-toe boots
	☐	Chest waders w/safety toe boots		
Ladder needed? ☐Yes ☐No				
Initial:	☐	Ladder w/minimum 300 lbs capacity		
Ear plugs needed? ☐Yes ☐No				
Initial:	☐	Ear plugs	☐	Ear plugs and ear muffs
	☐	Ear muffs		
Hardhat needed? ☐Yes ☐No				
Initial:				
Hi-vis garment needed? ☐Yes ☐No				
Initial:	☐	ANSI/ISEA 107 Type 2 Coverall	☐	ANSI/ISEA 107 Type Vest
	☐	ANSI/ISEA 107 Type 3 Coverall	☐	ANSI/ISEA 107 Type Vest
	☐	ANSI/ISEA 107 Type 4 Coverall	☐	ANSI/ISEA 107 Type Vest
Any other protective devices needed? ☐Yes ☐No				
Initial:	☐			
	☐			

All data fields within this permit must be filled in.

Emergency Services

Emergency Service	Provider	Telephone Number
CDM 24 hour Emergency		
Health and Safety Manager		
Project Manager		
Client Contact		
Off Site Emergency Rescuers		
Police Department		
Health Department		
Poison Control Center	Nationwide	800-222-1222
State Spill Number		
Emergency Medical Facility		
24-hour ambulance		
Route to Hospital (instructions or attached map)		
Special Instructions:		

PERMIT APPROVED:		
	Health and Safety Representative	Date
ENTRY APPROVED:		
	Entry Supervisor	Date

ATTACH DAILY CONFINED SPACE ATMOSPHERIC READINGS AND ENTRANT CHECK IN/CHECK OUT SHEETS TO THIS DOCUMENT.

Appendix H

Silica Exposure Control Plan

Written Silica Exposure Control Plan (ECP) Nov. 2019

Date:	Project Name:	Project #: MPWSP Project
Project Manager: Nate Lazewski	Competent Person:	H&S Manager: Ken Meyer

CDM Smith jobsites must establish and implement a written ECP that contains, at a minimum the following elements as they apply to operations on the site:

A: Job Tasks with Potential for Respirable Crystalline Silica Exposure to Employees (check if applicable):

☒ Stationary masonry saws to cut bricks, concrete blocks, tile, etc;
☒ Handheld power saws any blade diameter to cut brick, concrete blocks, tile, etc;
☐ Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less) to cut fiber-cement boards;
☐ Walk-behind saws to cut contraction and control joints in concrete slabs;
☐ Drivable saws to cut concrete, asphalt, and similar materials;
☐ Rig-mounted core saws or drills to drill large diameter holes in concrete, masonry, etc;
☐ Handheld and stand-mounted drills (including impact and rotary hammer drills)
☐ Dowel drilling rigs for concrete to drill dowel holes into concrete;
☐ Vehicle-mounted drilling rigs for rock and concrete for drilling into rock, concrete, etc;
☒ Jackhammers and handheld powered chipping tools in breaking of concrete, asphalt, masonry, rock, etc;
☐ Handheld grinders for mortar removal (*i.e.*, tuckpointing)
☒ Handheld grinders for uses other than mortar removal
☐ Walk-behind milling machines and floor grinders for surface leveling, floor cleaning and preparation, surface texturing, grooving, removing coatings;
☐ Small drivable milling machines (less than half-lane) to mill asphalt pavement;
☐ Large drivable milling machines (half-lane and larger) to mill asphalt pavement;
☐ Crushing machines to crush concrete and aggregate;
☐ Heavy equipment and utility vehicles to abrade or fracture silica-containing materials (*e.g.*, hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials
☐ Heavy equipment and utility vehicles for tasks such as grading and excavating but not including:
☐ Demolishing, abrading, or fracturing silica-containing materials
☐ Any other equipment, machines or tools on the site that may be used on silica-containing materials: Descriptions:

Refer to attached Table 1: Specific Exposure Control Methods When Working with Materials Containing Crystalline Silica

B: Descriptions of Engineering Controls, Work Practices, and Respiratory Protection used to limit employee exposure to respirable crystalline silica for each task as described in Table 1: Specific Exposure Control Methods When Working with Materials Containing Crystalline Silica:

a) For indoor tasks, or enclosed areas, ventilated exhausting will be provided as needed to lower accumulating visible airborne dust.

b) When using WET METHOD, water will be applied at sufficient follow rates to minimize visible airborne dust.

c) For measures concerning enclosed cabs, like hoe rams, ensure the following:

i. The cab is maintained to be free from settled dust.

ii. The cab doors and seals and closing mechanisms work properly.

iii. Window and door gaskets or seals seal the interior cab properly.

iv. The cab is under positive pressure, continually delivering filtered air.

v. The air intake filter is 95% efficient in the 0.3 – 10.0 μm^3 range.

vi. The cab has heating and cooling capabilities.

vii. Other applicable control methods_____.

C: Description of Housekeeping Measures used to limit employee exposure to respirable crystalline silica

a) Dry sweeping or dry brushing will not be allowed where wet sweeping or HEPA-filtered vacuuming or other minimizing methods are feasible; unless:

i. Performed with sweeping compound [(not containing quartz sand (crystalline silica)]; and

ii. There is objective air monitoring data that establishes the exposure to respirable crystalline silica is measurably less than the action level of 25 μm^3.

b) Compressed air must not be used to clean clothing or surfaces where such activity contributes to employee exposures to respirable crystalline silica, unless:

i. The compressed air is used in conjunction with a ventilation system;

ii. That the method does not imperil others in the vicinity; and

iii. No other alternate methods are available.

D: Restricting Work Area Access to minimize employee exposure to respirable crystalline silica. Which includes:

a) A CDM Smith review all subcontractor written ECPs for respirable crystalline silica exposure at the Preconstruction Meeting and at least annually or when changes occur that may impact the plan

b) Areas will be restricted where respirable crystalline silica exposure has been determined by:

   i. Scheduling non-exposure tasks so they are not concurrent with tasks in the same area where exposure will occur;

   ii. The use of barricades, signage and physical barriers such as guard rails to prevent entry by unauthorized personnel;

   iii. Inform employees of restricted areas at morning safety meetings; and

   iv. Strictly enforce company rules concerning unauthorized entry into restricted zones.

c) The Project Manager, Competent Person and the Regional H&S Manager must review and evaluate the effectiveness of the project's written ECP annually, following an incident, when processes change or when new respirable crystalline silica exposure activities or equipment are introduced to the job.

d) CDM Smith will make the project ECP available for examination and copying, upon request, to each employee, their designated representative and OSHA.

   i. A copy of the ECP will be located inside the CDM Smith office trailer.

   ii. Copies of subcontractor ECPs will be kept in each subcontractor trailer and inside the CDM Smith office trailer.

e) The designated Competent Person (CP) will make frequent and regular inspections of work sites, materials and equipment, and

   i. Will implement and enforce the written ECP;

   ii. Will instruct personnel in matters concerning the written ECP; and

   iii. Due to changed conditions, has the authority and enforcement capability to maintain the effectiveness of the ECP and amend the ECP as necessary to fully protect all project employees from exposures to respirable crystalline silica,

   IV. Work cannot be performed without the presence of the CP or a designated alternate CP.

   Name of alternate CP:

Signatures:

Project Manager:_____ Date:_____

Competent Person:_____ Date:_____

H&S Manager:_____ Date: _____

Table 1: Specific Exposure Control Methods When Working with Materials Containing Crystalline Silica
29 CFR 1926.1183 Respirable Crystalline Silica

Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
Stationary masonry saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade; and Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade; and Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:		
	-When used outdoors	None	APF 10
	-When used indoors or in an enclosed area	APF 10	APF 10
Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less)	For tasks performed outdoors only: Use saw equipped with commercially available dust collection system; Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions; and Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.	None	None
Walk-behind saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade; and Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:		
	-When used outdoors	None	None
	-When used indoors or in an enclosed area	APF 10	APF 10
Drivable saws	For tasks performed outdoors only:		
	Use saw equipped with integrated water delivery system that continuously feeds water to the blade; and Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
Rig-mounted core saws or drills	Use tool equipped with integrated water delivery system that supplies water to cutting surface; and Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None

Table 1: Specific Exposure Control Methods When Working with Materials Containing Crystalline Silica
29 CFR 1926.1183 Respirable Crystalline Silica

Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
Handheld and stand-mounted drills (including impact and rotary hammer drills)	Use drill equipped with commercially available shroud or cowling with dust collection system; Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions; Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism; and Use a HEPA-filtered vacuum when cleaning holes.	None	None
Dowel drilling rigs for concrete	For tasks performed outdoors only:		
	Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency and a filter cleaning mechanism; and Use a HEPA-filtered vacuum when cleaning holes.	APF 10	APF 10
Vehicle-mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector	None	None
	OR		
	Operate from within an enclosed cab and use water for dust suppression on drill bit	None	None
Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact:		
	-When used outdoors	None	APF 10
	-When used indoors or in an enclosed area	APF 10	APF 10
	OR		
	Use tool equipped with commercially available shroud and dust collection system		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism:		
	-When used outdoors	None	APF 10
	-When used indoors or in an enclosed area	APF 10	APF 10

Table 1: Specific Exposure Control Methods When Working with Materials Containing Crystalline Silica
29 CFR 1926.1183 Respirable Crystalline Silica

Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
Handheld grinders for mortar removal (*i.e.*, tuckpointing)	For tasks performed outdoors only: Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface;	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions; and		
	Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism		
Handheld grinders for uses other than mortar removal	For tasks performed outdoors only: Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	OR		
	Use grinder equipped with commercially available shroud and dust collection system;		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions; and		
	Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism:		
	-When used outdoors	None	None
	-When used indoors or in an enclosed area	None	APF 10
Walk-behind milling machines and floor grinders	Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface; and	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	OR		
	Use machine equipped with dust collection system recommended by the manufacturer;	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions;		
	Dust collector must provide the air flow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism; and		

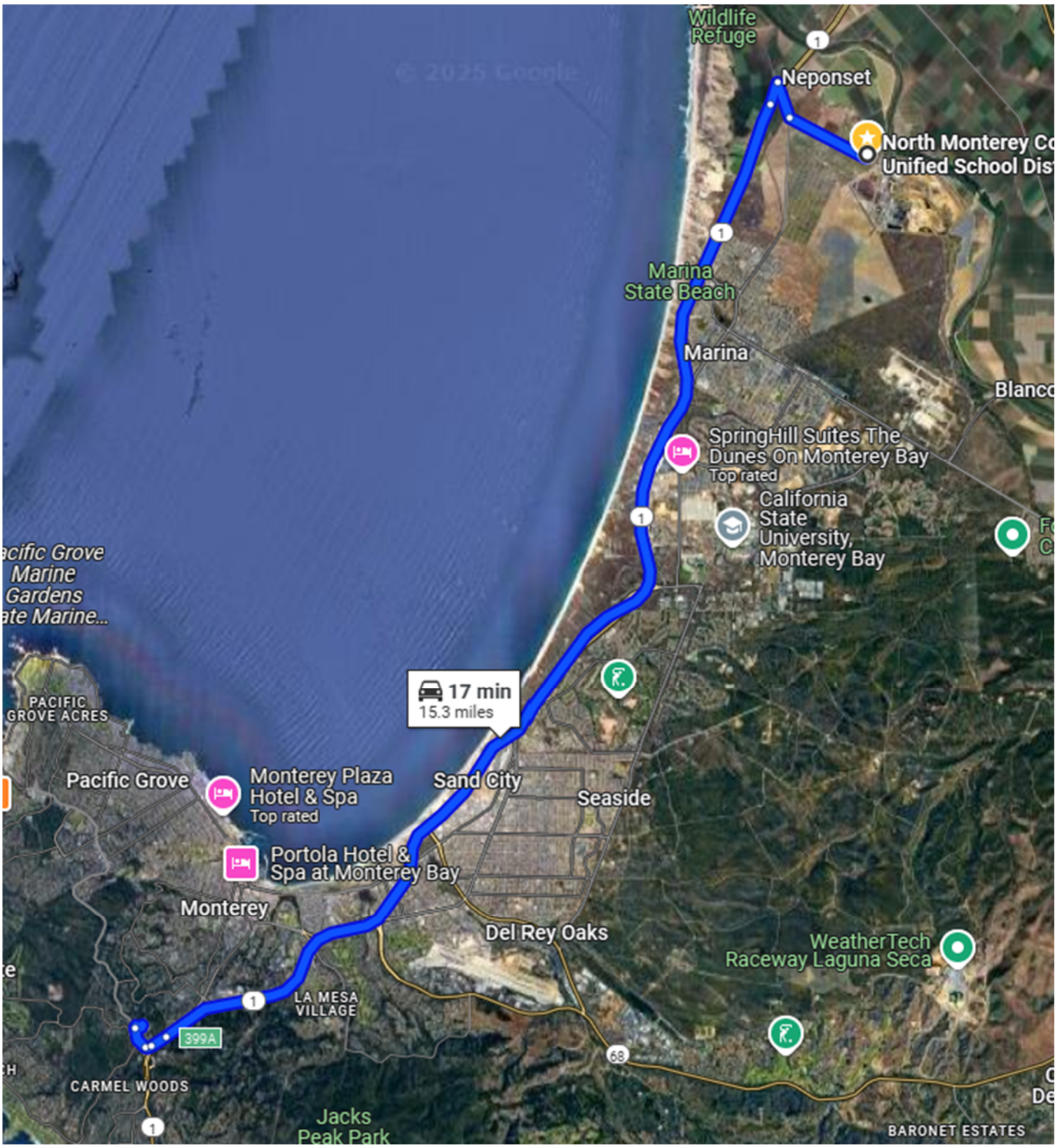
Table 1: Specific Exposure Control Methods When Working with Materials Containing Crystalline Silica
29 CFR 1926.1183 Respirable Crystalline Silica

Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
Walk-behind milling machines and floor grinders (Continued)	When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes	None	None
Small drivable milling machines (less than half-lane)	Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant; and	None	None
	Operate and maintain machine to minimize dust emissions		
Large drivable milling machines (half-lane and larger)	For cuts of any depth on asphalt only: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust; and	None	None
	Operate and maintain machine to minimize dust emissions		
	For cuts of four inches in depth or less on any substrate:		
	Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust; and	None	None
	Operate and maintain machine to minimize dust emissions		
	OR		
	Use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant	None	None
	Operate and maintain machine to minimize dust emissions		
Crushing machines	Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (e.g., hoppers, conveyers, sieves/sizing or vibrating components, and discharge points)	None	None
	Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions		
	Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote-control station		
Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (*e.g.*, hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	Operate equipment from within an enclosed cab	None	None
	When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions	None	None
Heavy equipment and utility vehicles for tasks such as grading and excavating but not including: Demolishing, abrading, or fracturing silica-containing materials	Apply water and/or dust suppressants as necessary to minimize dust emissions	None	None
	OR		
	When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab	None	None

Appendix I

Hospital and Clinic Route Maps

MPWSP to Community Hospital of Monterey Peninsula



Google Maps

Monterey Peninsula Water Supply Project to Community Hospital of the Monterey Peninsula, 23625 Holman Hwy, Monterey, CA 93940

Drive 15.3 miles, 17 min

⚠ This route has restricted usage or private roads.

California

Get on CA-1 S

3 min (1.6 mi)

1. Head northwest on Charles Benson Rd toward Del Monte Blvd
   ⚠ Restricted usage road

0.9 mi

2. Turn right onto Del Monte Blvd

0.4 mi

3. Turn left onto the State Route 1 S ramp

0.2 mi

Follow CA-1 S to Monterey. Take exit 399A from CA-1 S

12 min (13.3 mi)

4. Merge onto CA-1 S

13.1 mi

5. Take exit 399A for CA-68 W toward Pacific Grove/Pebble Beach

0.2 mi

Take CA-68 W to your destination

2 min (0.5 mi)

6. Slight right toward CA-68 W

420 ft

7. Merge onto CA-68 W

0.2 mi

8. Slight right
   ℹ Destination will be on the right

0.1 mi

Community Hospital of the Monterey Peninsula
23625 Holman Hwy, Monterey, CA 93940

Appendix J

CDM Constructors Severe Weather Plan

Appendix J Severe Weather Plan

1.0 Emergency Response Plan

The following provides requirements and guidelines for the development of each contractor's emergency response procedures. Emergency Response Plans and procedures to ensure employee's safety in case of emergencies shall be reviewed by each contractor with their employees. A list of key project contacts is provided as in Section 1.8 of this document Spill Response and Reporting.

1.1 Emergency Coordination

The CDM Constructors Emergency Response Coordinator (CCI ERC) is Tom Simpson. In his absence, The senior CCI employee on-site will substitute. A supervisor will be designated by each subcontractor prior to the start of their work who will act as their emergency coordinator (SEC) during emergency situations. All subcontractor ECs will perform under the direction and oversight of the CCI ERC. The CCI ERC and SECs will be familiar with all aspects of the site emergency response procedures, all operations and activities at the site under their control, the location and characteristics of hazardous substances handled, the location of all records, and the site layout.

Personnel training shall be conducted by each contractor's Site Health and Safety Officer (SHSO) or a qualified representative through initial briefings and periodic review with their personnel involved in site activities. Training elements shall include an overview of the facility, detailed instructions on site-specific operations, and the use of emergency equipment such as first aid kits, fire extinguishers, and two-way radios if alternate communication is needed. This training shall be included in each contractor's employee H&S orientation and shall be documented and filed onsite.

1.2 Medical Emergencies

Emergency first aid treatment may only be administered by First Aid/CPR trained individuals. The purpose of treatment is to maintain life and/or prevent further injury until professional treatment can be obtained.

An emergency contact number and hospital map shall be maintained by each contractor (and included in the contractor's component-specific HASP) and distributed to on-site contractor personnel for all medical emergencies. Personnel shall have a means of contacting the emergency number or an available supervisor with the capability while in the field, and supervisors shall review availability of service prior to starting work activities. A map showing a nearby emergency hospital and a non-emergency clinic, listed in Section 1.4.1, is attached to this ERP, posted in the CCI construction trailer and a copy must be kept in each CCI site vehicle. However, each contractor is responsible for verifying this information and the medical service availability prior to beginning onsite work.

Each contractor shall provide training to its employees in medical emergency contact procedures during their H&S orientation. Each contractor shall make emergency contact numbers and procedures available to its employees at each work location.

1.3 Evacuation and Communications

Each contractor shall be responsible for designating an assembly point for employees. When an evacuation is necessary, all field team members shall go to the designated assembly point. This area will be located upwind of the site and will be dependent on the normal prevailing wind. Each contractor's SHSO will designate any other assembly points at the morning safety meeting or daily tailgate meeting, as appropriate.

Appendix J Severe Weather Plan

All emergency communications will be conducted by direct vocal communication. If employees work on multiple areas concurrently, communication between employee groups will be by means of cell phones. Cell phones will be carried by all management, staff and supervision onsite. A contact list with the phone numbers will be given to the crews.

1.1 Fire Emergencies

Every member of each contractor's field team shall be responsible for observing and reporting any fire, and conditions that could potentially lead to fires.

If an employee observes a fire, the employee may attempt to quench the fire with a fire extinguisher if one is readily available and if it is safe to do so. If the fire cannot be readily extinguished, the employee shall notify all personnel onsite to evacuate the area immediately. All on-site personnel shall convene at the assembly point identified by the contractor's SHSO, who in turn shall immediately notify the fire department and applicable services.

When an employee observes a condition that potentially increases the chance for a fire, the employee shall immediately inform the contractor's SHSO of the condition. The contractor's SHSO shall immediately cease any field activity that increases the risk of fire until appropriate controls are in place. The contractor's SHSO shall be responsible to take whatever actions are necessary, including withdrawal from the area to eliminate or reduce the hazardous condition.

Each contractor shall be responsible for providing fire emergency information in their component-specific HASP, including emergency notification numbers and procedures. Each contractor shall also make this information available to its site employee at each work location.

1.2 Severe Weather Response Procedures

The basic components of these severe weather response procedures provide a framework to manage early warning notification and response if severe weather conditions are encountered during operations at the site. Each contractor's severe weather response procedures shall be further defined in their component-specific HASP.

The contractor's SHSO is responsible for implementation of these severe weather response procedures.

Each contractor's SHSO shall have the capability to obtain local weather forecasts 24 hours in advance of expected operations. A means of obtaining real time weather reports for local conditions shall be maintained during all site operations. Each contractor's SHSO is responsible for communicating severe weather conditions to their field team and ensuring that an appropriate rally point is established.

Efforts shall be made to secure equipment and materials in a severe weather event.

Severe weather events also impact driver safety and must be emphasized during a severe weather evacuation event.

1.8.1 Expected Weather Hazards

Lightning

Appendix J Severe Weather Plan

Prior to the start of field activities, the contractor's SHSO shall work with the field team to identify a site evacuation and rally point capable of providing protection from a lightning strike.

The weather forecast for the area shall be checked at the start of the day. A cursory risk assessment can be made on how probable lightning activity is. If lightning activity is reasonably probable that day, notify site personnel of the potential threat for increased lightning hazard.

The Superintendent will be appointed as the weather safety lookout. That individual has been issued an iPhone with the Weather Bug app to determine storm/lightning proximity.

The following warning action protocol is adopted for communicating the lightning hazard to operatives working on site:

- Yellow Alert – Lightning is over 20 miles (32 km) distant. Be cautious.
- Orange Alert – Lightning is 11-19 miles (18-30 km) distant. Be aware.
- Red Alert – Lightning is 0-10 miles (0-16 km) distant. Suspend activities and go to shelter.

Where thunder or lightning has been heard or observed, all site activities must be suspended, and shelter sought immediately. Abandon efforts to secure equipment if not completed.

In those situations where thunder or lightning has not been heard or observed, all outdoor site activities shall be suspended, and shelter sought when lightning crosses a 10-mile radius.

Always err on the side of caution.

If the lightning detectors or other weather media/services (e.g. TV, radio, websites, weather

Apps) are indicating two different distances then always adopt the lower (i.e. closer) distance.

Wait at least 30 minutes after the last observed lightning or thunder to resume activities.

The superintendent shall be notified of all lightning shutdowns, which must be documented.

Preparedness and quick responses are the best defenses towards the lightning hazard. The all-encompassing general rule, as promulgated by the National Lightning Safety Institute, shall be: “If you can hear it (thunder), clear it (evacuate); if you can see it (lightning), flee it.”

High Winds

If high winds are expected, or are encountered during work activities, appropriate action shall be taken to ensure the protection of site workers and the surrounding community. The contractor's SHSO or a site supervisor shall determine if the winds prevent proper dust suppression or present a hazard to personnel and the public that warrants a temporary shutdown of operations.

Thunderstorms

Appendix J Severe Weather Plan

Flooding resulting from a thunderstorm presents a significant safety hazard and must be continually monitored if a severe weather event is expected. If flooding can't be properly controlled and presents a hazard to personnel and the public, the contractor's SHSO or a site supervisor shall temporarily shut down operations until the hazards are abated.

Tornados

Know the Difference between a Tornado Watch and a Tornado Warning

- **TORNADO WATCH**…Tornadoes are possible in your area. Remain alert for approaching storms. Listen to NOAA Weather Radio All Hazards, commercial TV or radio for weather information.
- **TORNADO WARNING**…A tornado has been sighted or indicated by weather radar. If you may be in the path of the storm, move to a previously designated safe area.
- Tornado watches and warnings are issued as soon as the conditions are identified. Use the available time, once you note a warning, to prepare for one of nature's most destructive storms. Stay informed about the approaching storm.
- Sometimes tornadoes develop so rapidly that advance warning is not possible. Remain alert for signs of an approaching tornado.

Tornado Identification

- Violent storms associated with low barometric pressure can spawn a tornado. Strong winds in the lower few thousand feet of the atmosphere may be noted by cloud movements. The storm cells develop from an elevation of 20,000 to 40,000 feet. Rotation of air (cloud movement) usually starts with a circulation near 20,000 feet and builds up and down.
- Tornadoes often form near a thunderstorm's updraft. Often surface winds of 25 to 35 miles per hour are noted near a developing tornado. Small clouds will rise quickly into the larger cloud layer. Near a tornado, the barometric pressure drops rapidly. The characteristic funnel may drop down, loop and appear to dissipate at times.
- If a funnel is sighted, take shelter immediately. Tornadoes can reach you within a few minutes. Other funnels can spawn directly overhead.
- Tornadoes may "mature" in a classic fashion. However, be aware that violent storm cells can cause two or more circulations. It is important to have a good view of the entire sky to avoid being surprised by another funnel obscured behind a ridge, buildings or a row of trees.
- Any time you are observing a storm, be alert to the potential of being struck by lightning. Anyone standing near a tree or house that projects above the landscape during violent weather risks being in the deadly path of lightning discharge. Any vertical projections, especially metal structures, can readily attract a fatal electrical current.

From OSHA:

https://www.osha.gov/dts/weather/tornado/preparedness.html#planning

Planning – identify shelter location

Accountability – have accountability procedures in place

- Use site sign-in sheet
- Establish an alarm system (handheld air horn) to warn workers
  - Test systems frequently
- Account for workers and visitors as they arrive in the shelter
  - Use a prepared roster or checklist
  - Take a head count
- Assign specific duties to workers in advance; create checklists for each specific responsibility. Designate and train employee alternates in case the assigned person is not there or is injured

Training:

- Ensure that all workers know what to do in case of an emergency.
- Practice shelter-in-place plans and/or storm drills on a regular basis.
- Update plans and procedures based on lessons learned from exercises.

Guidance for Construction Sites

1. Take refuge in the designated sheltering structure offsite (motel/hotel). Avoid window and door openings.

   DO NOT SEEK SHELTER IN VEHICLES, CONEXES OR TRAILERS

2. Operations of mobile cranes are to be suspended. Booms should be laid down if time permits or the load line hooked to the structure at some low point. The equipment should be left and refuge taken in a shelter.
3. If the site is hit by a tornado, the SHSO or designated representative will survey the site for damage before authorization to return to work is given. The area SHSO will determine how and who will initiate repairs before the general workforce returns to their stations.
4. When returning to work stations, all personnel should proceed with caution and inform their supervisors of downed power lines, washed out scaffold mudsills, and other storm damage they may encounter.

1.7 Earthquakes

Since earthquakes come without warning and they are common in California, it is best to be prepared at all times. Some measures that can be taken include:

- Designate safe places around the site that are away from buildings and equipment. Most accidents after an earthquake happen within 10 feet of a building.
- Personnel should not move to far from their position during an earthquake. The more a person moves the greater the chance for injury.

- Practice the Drop, Cover and Hold On technique
  - Drop to your hands and knees
  - Cover you head and neck with one arm
  - Crawl for the nearest shelter
  - Hold on to something steady until the quake stops.
- If operating a piece of equipment when the earthquake strikes, stop and exit the equipment as soon as safely possible.
- Watch for fires. Broken gas lines and damaged electrical components can cause fires. The motion of the earthquake can release sparks that can start fires.
- After the shaking stops be aware that aftershocks are always a possibility. Do not return to work until confident all risk has passed.
- Go to the nearest assembly point as soon as possible.
- A head count will be taken.
- Assess damage only after all risk of an aftershock has passed. Stay in contact withemergency personnel or listen for instructions from a weather or emergency radio.
- If trapped, find something to tap so rescuers can find you. Rescuers are trained to listen for tapping on pipes.
- During cleanup operations keep a safe distance from buildings unless they have bee inspected and deemed safe to work around.

1.8 Emergency Contacts

Contractor shall emergency procedures in accordance with Federal, State and Local requirements and they must be included in their Site Specific HASP.

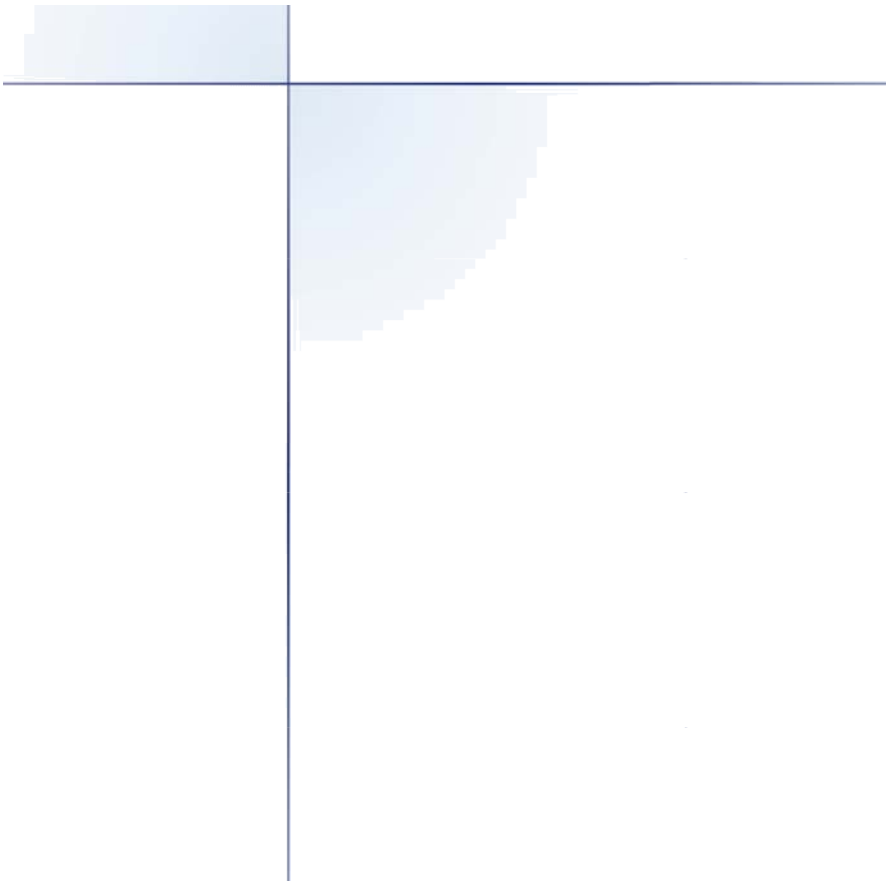
Contact	Phone Number
Hemet Fire/EMS Emergency Services	911
24 Hour Ambulance/Paramedic EMS	911
Marina, CA Police	911
Community Hospital of the Monterey Peninsula	831-624-5311
Clinic (Non-Emergency) Concentra	

Appendix J Severe Weather Plan

Pacific Gas & Electric	
Client Emergency Contact Information	
CDM Constructors Emergency Contact Information	
Ken Meyer, Corporate H&S Director - 1st Aid/CPR Trained	Office: 303-383-2433 Mobile: 303-949-5236
Agency Contact Information	
California Poison Control	800-222-1222
Spill Control (USEPA)	800-424-8802
CHEMTREC	800-424-9300

Appendix K

COVID-19 Procedures and Safety Guidelines



CDM Smith.

cdmsmith.com

C-3. Construction Equipment & Vehicle Efficiency Plan

Construction Equipment & Vehicle Efficiency Plan for the Monterey Peninsula Water Supply Project (MPWSP) Desalination Plant

Prepared for:

California American Water
511 Forest Lodge Road #100
Pacific Grove, CA 93950

Prepared by:

CDM Smith
2300 Clayton Road, Suite 950
Concord, CA 94520

Denise Duffy & Associates, Inc
947 Cass Street, Suite 5
Monterey, CA 93940

Construction Equipment & Vehicle Efficiency Plan

The following engineering controls will be implemented to increase the efficient use of construction equipment and vehicles to the maximum extent feasible:

- All equipment will be properly maintained and tuned according to manufactures specifications.
- As possible, trucks used for hauling materials from the site will use low-sulfur diesel fuels.
- Vehicles utilized on this job will not be allowed to idle unnecessarily.
- CDM Smith shall ensure that line power is used instead of diesel generators when line power is available.
- CDM Smith will utilize the most efficient haul routes to ensure that all materials and debris hauling is conducted in a fuel-efficient manner.
- All state idling restrictions will be consistently complied with.
- Worker carpooling options will be provided by the CDM Smith.

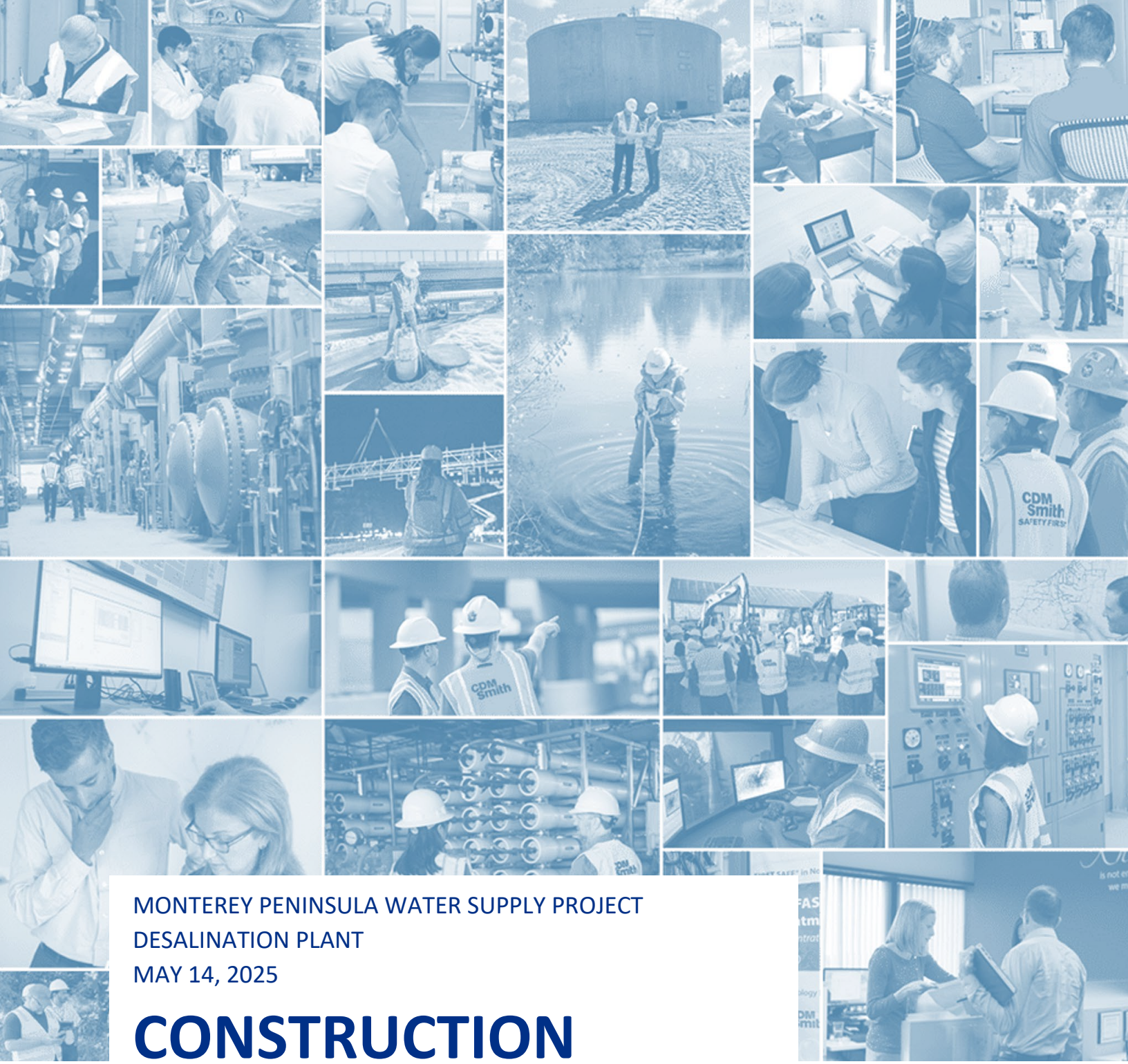
Additionally, the following measures will be implemented to minimize airborne pollution generated by site operations.

- Only California Air Resources Board (CARB) certified construction equipment will be used onsite.
- Low sulfur diesel fuel will be burned in all construction equipment, in accordance with the proposed CARB regulation to reduce public exposure to diesel particulate matter and other air contaminants.
- For diesel-fueled off-road construction equipment of more than 50 horsepower, CDM Smith shall make a good faith effort to use available construction equipment that meets the highest USEPA certified tiered emission standards or is alternatively powered (e.g., with electricity, natural gas, propane, methanol and ethanol blends, or gasoline) construction equipment. For all pieces of equipment that would neither meet Tier 4 emission standards nor be alternatively powered, CalAm or its construction contractor shall provide to the CPUC documentation from two local heavy construction equipment rental companies that indicate that the companies do not have access to higher-tiered equipment or alternatively powered equipment for the given class of equipment. Such documentation shall be provided to the CPUC at least two weeks prior to the anticipated use of those pieces of equipment. (Mitigation Measure 4.10-1a)
- In order to ensure that idling time for on road vehicles with a gross vehicular weight rating of 10,000 pounds or greater does not exceed the 5-minute limit established in

Section 2485 of Title 13 CCR Section 2485, and that idling time for off-road engines does not exceed the 5 minute limit established in Title 13 CCR Section 2449(d)(3), CDM Smith shall prepare and implement a written idling policy and distribute it to all equipment operators. The idling policy shall extend the 5-minute idling limit to cover all on road vehicles (regardless of gross vehicular weight rating) and shall further require that for all diesel-powered off-road engines, the idling limit is reduced to 2 minutes, while maintaining the exceptions specified in Title 13 CCR Section 2449(d)(3). Clear signage of these requirements shall be provided for construction workers at all access points to construction areas. (Mitigation Measure 4.10-1b)

- CalAm shall require its construction contractor(s) to implement a dust control plan that includes, at minimum, the following dust control measures:
    - Water all active construction areas at least three times daily;
    - Cover all trucks hauling soil, sand, and other loose materials and require trucks to maintain at least 2 feet of freeboard;
    - Apply water three times daily, or apply (non-toxic) soil stabilizers, on unpaved access roads, parking areas, and staging areas at construction sites;
    - Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas at construction sites;
    - Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets;
    - Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more);
    - Enclose, cover, or water twice daily exposed stockpiles (dirt, sand, etc.);
    - Limit traffic speeds on unpaved roads to 15 miles per hour;
    - Install sandbags or other erosion control measures to prevent silt runoff to public roadways;
    - Replant native, drought-tolerant vegetation in disturbed areas as quickly as possible;
    - Wheel washers shall be installed and used by truck operators at the exits of the construction sites to the MPWSP Desalination Plant.
    - Post a publicly visible sign that specifies the telephone number and person to contact regarding dust complaints.
    - This person shall respond to complaints and take corrective action within 48 hours. The phone number of the Monterey Bay Air Resources District (MBARD) shall also be visible to ensure compliance with MBARD rules. (Mitigation Measure 4.10-1c).

C-4. Construction Waste Reduction and Recycling Plan



MONTEREY PENINSULA WATER SUPPLY PROJECT
DESALINATION PLANT
MAY 14, 2025

CONSTRUCTION WASTE REDUCTION AND RECYCLING PLAN

CDM Smith

MPWSP Desalination Plant

Construction Waste Reduction and Recycling Plan

CDM Smith will generate the least amount of construction waste possible in this project. Of the inevitable waste that is generated, as much as is economically feasible will be reused salvaged or recycled. Waste disposal to landfills will be minimized, and all waste will be properly disposed of in a safe, appropriate, and lawful manner in compliance with all applicable regulations of local (Monterey County's Integrated Waste Management Plan), state (California Integrated Waste Management Act of 1989 & California Green Building Standards), and federal agencies having jurisdiction over the disposal of removed materials. Documentation for all disposals, landfill/recycling, will be kept so that upon the project's completion, California American Water can show that the waste reduction, recycling, and diversion goals have been met.

Source Reduction Methods:

CDM Smith will aim to reduce the amount of construction debris onsite, by reducing the use of nonrecyclable materials, replacing disposable materials and products with reusable materials and products, reducing packaging, and increasing the efficiency of the use of paper, cardboard, glass, metal, and other materials.

CDM Smith will aim to divert 65% of the nonhazardous construction waste and debris from landfill disposal. CDM Smith will aim to recycle all trees, stumps, rocks, and associated vegetation and soils. We will accomplish this by designating a specific area for the separation of materials for potential reuse salvage, recycling, and return using clearly marked bins or signage for each category of waste. Waste bins and pile areas will be maintained neat and clean.

C-5. Soil and Groundwater Management Plan

MONTEREY PENINSULA WATER SUPPLY PROJECT
DESALINATION PLANT
MAY 2025

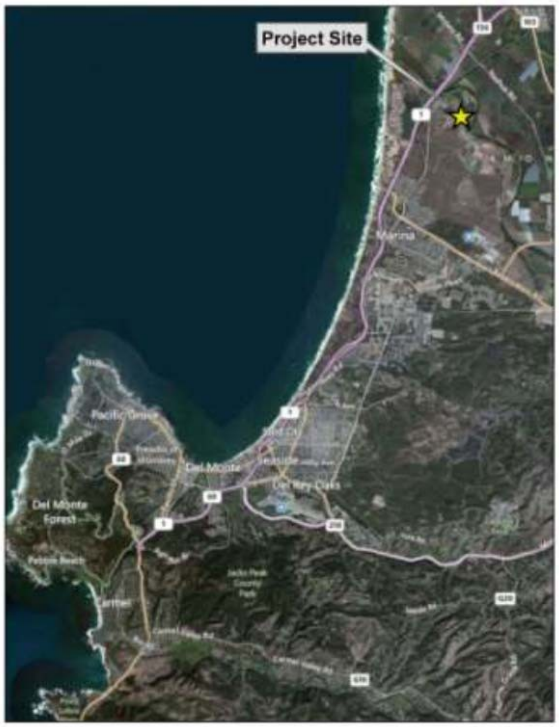
SOIL AND GROUNDWATER MANAGEMENT PLAN

CDM Smith

1.0 Introduction and Purpose

This Soil and Groundwater Management Plan (SGMP) has been prepared has been prepared for California American Water for use during construction of the Monterey Peninsula Water Supply Project Desalination Plant. The site is located on Charles Benson Road (Figure 1 & 2: Site Location). The SGMP provides guidelines for management of soil and groundwater impacted by hazardous substances and/or petroleum hydrocarbons that may be encountered or generated during excavation for the project. Management encompasses identification and evaluation of impacted soil and groundwater, handling (including health and safety guidelines), and onsite reuse or offsite disposal.

The purpose of this SGMP is to provide guidelines for the Design Builder (CDM Smith) and their authorized designees for management of soil and groundwater that is or appears to be impacted by hazardous substances and/or petroleum hydrocarbons that may be encountered or generated during construction activities.



Figures 1 & 2 Site Location

2.0 Project Overview

The work to be done under this Contract is shown on the drawings and specified in Contract Documents. The project will include construction of a new desalination water treatment plant with a rated capacity of 4.8 million gallons a day of drinking water with provisions for expansion to 6.4 mgd. Major treatment elements include:

- Disinfection.
- Pressure Filtration, Cartridge Filtration, and Reverse Osmosis Filtration.
- Backwash & Sludge System
- Post stabilization treatment with CO2 and Calcite Contactors.

Major structures to be constructed include:

- Reverse Osmosis Building
- Administration Building
- Treated Water Steel Tanks, Filtered Water Tanks
- Remote MCC Building.

Site improvement elements include:

- Brine pond
- Stormwater drainage infrastructure including bioretention ponds
- Asphalt road and parking area
- Landscaping garden

3.0 Project Contacts

The following table lists potential contacts, their affiliation, and their responsibility with respect to activities associated with this SGMP.

Name	**Role**	**Contact Number/s**	**Email**
Tyler Marriott	Project Manager	310-925-0019	marriottts@cdmsmith.com
Matt Carelas	General Superintendent	281-543-9862	carelasm@cdmsmith.com
James Conway	Site Safety and Health Officer	760-585-5142	conwayjp@cdmsmith.com
Kriss Althauser	Foreman		althauserke@cdmsmith.com

4.0 Notification Procedures

The following table provides notification procedures for situations or occurrences that may develop during site development activities. Onsite personnel that observe the situations or occurrences indicated below will notify the primary contact(s) who in-turn will notify secondary contacts as deemed appropriate. Contact names and phone numbers are indicated above.

5.0 Responsibility of Implementation

This plan was prepared by CDM Smith for California American Water. CDM Smith will oversee implementation of this plan, and it will be the responsibility of CDM Smith to make its workers aware of the requirements of the SGMP. In addition, CDM Smith shall provide a copy of this plan to third-party contractors working at the site who may encounter subsurface materials during execution of their work.

The Soil and Groundwater Management Plan was developed based on an understanding of current conditions as characterized by observations made during geotechnical investigation. It may be necessary to modify this plan for any of several reasons, including but not limited to the following:

- Change in the understanding of environmental conditions
- Intrusive activity that is not addressed by the SGMP
- New chemical toxicity information
- New legal requirements

CDM Smith will be responsible for modifying this SGMP when substantial changes occur to the assumptions or conditions documented herein.

CDM Smith and all its subcontractors will follow all procedures outlined in this plan when handling and transporting soil and ground water over the course of this project. CDM Smith will follow, in addition to procedures outlined in this plan, all local and general regulations pertaining to the proper handling of soil and ground water.

6.0 Soil Management

Management of Non-Impacted Soils

In the absence of obvious discoloration, chemical odors, or other indicators of apparent contamination, excavated soil should be suitable for onsite reuse within geotechnical guidelines. Excess soil, if any, shall be temporarily stockpiled onsite, then characterized for offsite fill or disposal.

Excavated pavement (e.g., asphalt and concrete) and other construction materials or debris shall be transported offsite to an appropriate local recycling facility or disposed of offsite as general construction debris at a licensed landfill facility according to applicable disposal requirements.

Management of Impacted Soils

Onsite personnel should immediately notify the Site Safety Officer (SSO) if apparently contaminated soil is encountered (based on observed soil discoloration, detection of chemical odor, etc.) during excavation.

If impacted soil is identified and ultimately required to be excavated, it shall be temporarily stockpiled on and covered with 6-mil polyethylene sheeting to prohibit wind dispersal and contact with underlying non-impacted soil. Stockpiled impacted soil shall be sampled and tested according to the procedures indicated in the section *Soil Sampling Procedures*.

Soil Sampling Procedures

Soil samples will be collected from stockpiles of visibly impacted soil. Soil samples will be collected and handled in accordance with industry-standard procedures. The following summarizes soil sampling activities and procedures:

Stockpile sampling will include collection of one discrete soil sample for each approximately 25 cubic yards of stockpiled soil. Each group of four discrete samples will be composited into one four-part composite sample representative of approximately 100 cubic yards of soil. Discrete composite subsamples will be obtained by a backhoe, hand-auger, or drive-sampler.

- Stockpile soil samples will be obtained at different locations and depths in the stockpile to obtain material representative of the stockpile.
- Sample labels indicating the sample identification number, the date/time of collection, and the sampler's initials will be affixed to the sample containers. Sample locations will be recorded on a field site plan and log sheet.

- Sample containers will be transported to the laboratory for analysis following standard chain-of- custody procedures.

Soil Transport

Following completion of the excavation and backfill, based on the estimated volume of impacted soil, an appropriate number of stockpile soil samples will be submitted to a laboratory for analysis. A waste profile for impacted soil will be submitted to the appropriate disposal facility for approval. Soil characterization information for non-impacted soils will be submitted to the receiving entity for approval.

Soil that requires offsite disposal will be transported to the offsite disposal facility using non-hazardous or hazardous waste manifests, as appropriate based on stockpile characterization analytical data.

Manifests and other records maintained by the trucking contractor will include the date and time of transport, approximate truckload volume, trucking company and driver information. Manifests will not be required for transport of non-impacted soil.

Trucks used to transport impacted soil offsite shall be equipped with cover tarps to minimize soil loss during transport. Soil shall be covered at all times except during loading and unloading activities. During loading activities, soil shall be sprayed liberally with water to minimize the generation of dust.

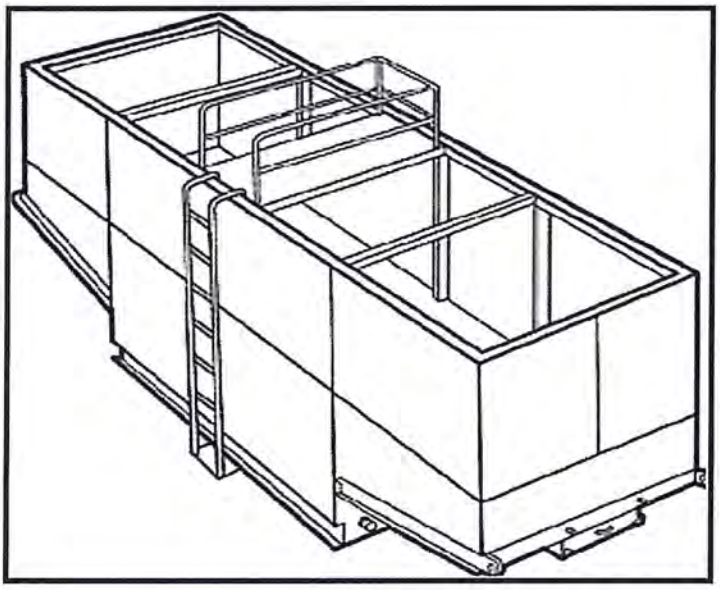
Groundwater Management

If groundwater is encountered on the job in small quantities, containment and testing of the water will be done in a towable water tank or water truck. The water will either be disposed of as sewage at the Monterey Regional Waste Management District (14201 Del Monte Blvd, Marina, CA 93933) or at an approved discharge site.

Alternatively, we may containerize large quantities of extracted groundwater into a Baker tank and then sample and profile the accumulated water for offsite disposal as sewage at MRWMD site or at an approved discharge site. (Attached CASQA BMP Fact Sheet – Dewatering)

Appendix A CASQA BMP Fact Sheet Dewatering

Dewatering Operations NS-2



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**

Description and Purpose

Dewatering operations are practices that manage the discharge of pollutants when non-stormwater and accumulated precipitation (stormwater) must be removed from a work location to proceed with construction work or to provide vector control.

The General Permit incorporates Numeric Action Levels (NAL) for turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Discharges from dewatering operations can contain high levels of fine sediment that, if not properly treated, could lead to exceedances of the General Permit requirements or Basin Plan standards.

The dewatering operations described in this fact sheet are not Active Treatment Systems (ATS) and do not include the use of chemical coagulations, chemical flocculation or electrocoagulation.

Suitable Applications

These practices are implemented for discharges of non-stormwater from construction sites. Non-stormwaters include, but are not limited to, groundwater, water from cofferdams, water diversions, and waters used during construction activities that must be removed from a work area to facilitate construction.

Practices identified in this section are also appropriate for implementation when managing the removal of accumulated

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

SE-5: Fiber Roll

SE-6: Gravel Bag Berm

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precipitation (stormwater) from depressed areas at a construction site.

Stormwater mixed with non-stormwater should be managed as non-stormwater.

Limitations

- Dewatering operations will require, and should comply with applicable local and project-specific permits and regulations. In some areas, all dewatering activities, regardless of the discharge volume, require a dewatering permit.
- Site conditions will dictate design and use of dewatering operations.
- The controls discussed in this fact sheet primarily address sediment. Other secondary pollutant removal benefits are discussed where applicable.
- The controls detailed in this fact sheet only allow for minimal settling time for sediment particles. Use only when site conditions restrict the use of the other control methods.
- Avoid dewatering discharges where possible by using the water for dust control.

Implementation

- A Construction Site Monitoring Plan (CSMP) should be included in the project Stormwater Pollution Prevention Plan (SWPPP).
- Regional Water Quality Control Board (RWQCB) Regions may require notification and approval prior to any discharge of water from construction sites.
- The destination of discharge from dewatering activities will typically determine the type of permit required for the discharge. For example, when discharging to a water of the U.S., a dewatering permit may be required through the site's governing RWQCB. When discharging to a sanitary sewer or Municipal Separate Storm Sewer System (MS4), a permit may need to be obtained from the owner of the sanitary sewer or MS4 in addition to obtaining an RWQCB dewatering permit. Additional permits or permissions from other agencies may be required for dewatering cofferdams or diversions.
- Dewatering discharges should not cause erosion at the discharge point. Appropriate BMPs should be implemented to maintain compliance with all applicable permits.
- Maintain dewatering records in accordance with all local and project-specific permits and regulations.

Sediment Treatment

A variety of methods can be used to treat water during dewatering operations. Several devices are presented below and provide options to achieve sediment removal. The sediment particle size and permit or receiving water limitations on sediment or turbidity are key considerations for selecting sediment treatment option(s); in some cases, the use of multiple devices may be appropriate. Use of other enhanced treatment methods (i.e., introduction of chemicals or electric current to enhance flocculation and removal of sediment) must comply with: 1) for storm drain or surface water discharges, the requirements for Active Treatment Systems (see SE-11); or 2) for sanitary sewer discharges, the requirements of applicable sanitary sewer discharge permits.

Sediment Basin (see also SE-2)

Description:

- A sediment basin is a temporary basin with a controlled release structure that is formed by excavation or construction of an embankment to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment basins are generally larger than Sediment Traps (SE-3) and have a designed outlet structure.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, silt, some metals that settle out with the sediment.

Implementation:

- Excavation and construction of related facilities is required.
- Temporary sediment basins should be fenced if safety is a concern.
- Outlet protection is required to prevent erosion at the outfall location.

Maintenance:

- Maintenance is required for safety fencing, vegetation, embankment, inlet and outlet, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Sediment Trap (See also SE-3)

Description:

- A sediment trap is a temporary basin formed by excavation and/or construction of an earthen embankment across a waterway or low drainage area to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment traps are generally smaller than Sediment Basins (SE-2) and do not have a designed outlet (but do have a spillway or overflow).

Appropriate Applications:

Effective for the removal of large and medium sized particles (sand and gravel) and some metals that settle out with the sediment.

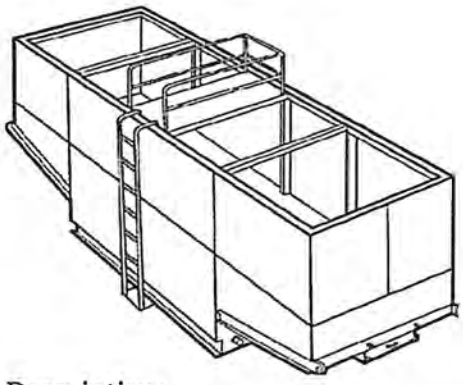
Implementation:

- Excavation and construction of related facilities is required.
- Trap inlets should be located to maximize the travel distance to the trap outlet.
- Use rock or vegetation to protect the trap outlets against erosion.

Maintenance:

- Maintenance is required for vegetation, embankment, inlet and outfall structures, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Weir Tanks



Description:

- A weir tank separates water and waste by using weirs. The configuration of the weirs (over and under weirs) maximizes the residence time in the tank and determines the waste to be removed from the water, such as oil, grease, and sediments.

Appropriate Applications:

- The tank removes trash, some settleable solids (gravel, sand, and silt), some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.
- Treatment capacity (i.e., volume and number of tanks) should provide at a minimum the required volume for discrete particle settling for treatment design flows.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal should be conducted by a licensed waste disposal company.

Dewatering Tanks

Description:

- A dewatering tank removes debris and sediment. Flow enters the tank through the top, passes through a fabric filter, and is discharged through the bottom of the tank. The filter separates the solids from the liquids.

Appropriate Applications:

- The tank removes trash, gravel, sand, and silt, some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

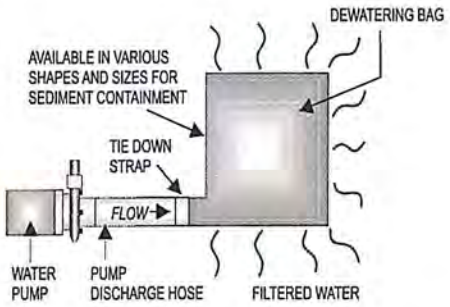
Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal should be conducted by licensed waste disposal company.

Gravity Bag Filter



Description:

- A gravity bag filter, also referred to as a dewatering bag, is a square or rectangular bag made of non-woven geotextile fabric that collects gravel, sand, silt, and fines.

Appropriate Applications:

- Effective for the removal of sediments (gravel, sand, silt, and fines). Some metals are removed with the sediment.

Implementation:

- Water is pumped into one side of the bag and seeps through the top, bottom, and sides of the bag.
- Place filter bag on pavement or a gravel bed or paved surface. Avoid placing a dewatering bag on unprotected bare soil. If placing the bag on bare soil is unavoidable, a secondary barrier should be used, such as a rock filter bed placed beneath and beyond the edges of the bag to, prevent erosion and capture sediments that escape the bag.
- Perimeter control around the downstream end of the bag should be implemented. Secondary sediment controls are important especially in the initial stages of discharge, which tend to allow fines to pass through the bag.

Maintenance:

- Inspection of the flow conditions, bag condition, bag capacity, and the secondary barrier (as applicable) is required.
- Replace the bag when it no longer filters sediment or passes water at a reasonable rate.
- Caution should be taken when removing and disposing of the bag, to prevent the release of captured sediment
- Properly dispose of the bag offsite. If sediment is removed from the bag prior to disposal (bags can potentially be reused depending upon their condition), dispose of sediment in accordance with the general maintenance procedures described at the end of this BMP Fact Sheet.

Sand Media Particulate Filter

Description:

- Water is treated by passing it through canisters filled with sand media. Generally, sand filters provide a final level of treatment. They are often used as a secondary or higher level of treatment after a significant amount of sediment and other pollutants have been removed using other methods.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, and silt and some metals, as well as the reduction of biochemical oxygen demand (BOD) and turbidity.
- Sand filters can be used for stand-alone treatment or in conjunction with bag and cartridge filtration if further treatment is required.
- Sand filters can also be used to provide additional treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filters require regular service to monitor and maintain the level of the sand media. If subjected to high loading rates, filters can plug quickly.
- Venders generally provide data on maximum head loss through the filter. The filter should be monitored daily while in use, and cleaned when head loss reaches target levels.
- If cleaned by backwashing, the backwash water may need to be hauled away for disposal, or returned to the upper end of the treatment train for another pass through the series of dewatering BMPs.

Pressurized Bag Filter

Description:

- A pressurized bag filter is a unit composed of single filter bags made from polyester felt material. The water filters through the unit and is discharged through a header. Vendors provide bag filters in a variety of configurations. Some units include a combination of bag filters and cartridge filters for enhanced contaminant removal.

Appropriate Applications:

- Effective for the removal of sediment (sand and silt) and some metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Oil absorbent bags are available for hydrocarbon removal.
- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filter bags require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

Cartridge Filter

Description:

- Cartridge filters provide a high degree of pollutant removal by utilizing a number of individual cartridges as part of a larger filtering unit. They are often used as a secondary or higher (polishing) level of treatment after a significant amount of sediment and other pollutants are removed. Units come with various cartridge configurations (for use in series with bag filters) or with a larger single cartridge filtration unit (with multiple filters within).

Appropriate Applications:

- Effective for the removal of sediment (sand, silt, and some clays) and metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Hydrocarbons can effectively be removed with special resin cartridges.
- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance.

Maintenance:

- The cartridges require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

Costs

- Sediment control costs vary considerably depending on the dewatering and sediment treatment system that is selected. Pressurized filters tend to be more expensive than gravity settling, but are often more effective. Simple tanks are generally rented on a long-term basis (one or more months) and can range from $360 per month for a 1,000 gallon tank to $2,660 per month for a 10,000 gallon tank. Mobilization and demobilization costs vary considerably.

Inspection and Maintenance

- Inspect and verify that dewatering BMPs are in place and functioning prior to the commencement of activities requiring dewatering.
- Inspect dewatering BMPs daily while dewatering activities are being conducted.

- Inspect all equipment before use. Monitor dewatering operations to ensure they do not cause offsite discharge or erosion.
- Sample dewatering discharges as required by the General Permit.
- Unit-specific maintenance requirements are included with the description of each unit.
- Sediment removed during the maintenance of a dewatering device may be either spread onsite and stabilized, or disposed of at a disposal site as approved by the owner.
- Sediment that is commingled with other pollutants should be disposed of in accordance with all applicable laws and regulations and as approved by the owner.

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), March 2003; Updated March 2004.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Labor Surcharge & Equipment Rental Rates, April 1, 2002 through March 31, 2003, California Department of Transportation (Caltrans).

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Appendix B Geotechnical Report

May 21, 2019 Project Number 1405.1-M223-C21

Mr. Michael Zafer
CDM Smith
2300 Clayton Road, Suite 950
Concord, CA 94520

Subject: **Addendum II to Geotechnical Investigation Report**
Monterey Peninsula Desalination Infrastructure Project
Charlie Benson Lane
Marina, California

Reference: **Geotechnical Investigation and Engineering Geology Report**
Monterey Peninsula Desalination Infrastructure Project
Project No. 1405-M223-C21, dated September 2, 2014

Dear Mr. Zafer,

As requested by your design team, we have performed a quantitative slope stability analysis for the three proposed surface impoundments (Brine Equalization and Backwash Reclamation Basins) in order to assess the seismic stability of the proposed basin slopes. Our analysis is based upon the subsurface data obtained during our 2014 geotechnical investigation and the proposed basin geometry as depicted on Sheets 154001-0191-C14 and C15 of the 90% civil grading plan submittal. This report is issued as Addendum II to our September 2, 2014 geotechnical report and should be reviewed in conjunction with that document.

Quantitative Slope Stability Analysis

It is our understanding that the basin bottoms will be excavated into native sands with raised perimeter berms constructed of engineered fill generated from the on-site native soils. All three basins will be lined. The interior basin slopes will be constructed at 3:1 and the exterior of the berms will be 4:1 (horizontal to vertical). A maximum water surface level of 10 feet above the bottom of the basin was applied to our stability model.

Stability analysis was performed using the 2-dimensional computer software SLIDE by Rocscience (Version 7.020). This program also has a built-in finite element ground water seepage analysis which we used to determine the phreatic surface for steady state groundwater conditions through the modeled cross section. Circular and non-circular search routines were used, employing the simplified Bishop and Janbu limit equilibrium methods. The following discussion summarizes the basis for our stability analysis:

Section Analyzed - We developed a representative cross section using the planned slope geometry as shown on Section 1 of Sheet 154001-0191-C14 of the 90% civil drawings. The basin slopes will be constructed of engineered fill overlying native soil. The cross section geometry is presented in Figures 1 through 4 of this report.

Determination of Strength Parameters - Drained shear strength of cohesionless soils (friction angle) was selected by considering our field and laboratory test results, conservative values for typical representative soil types as

outlined in geotechnical literature and correlations between effective friction angle and standard penetration resistance (N_{60} or $N1_{60}$).

Shear strengths for the various subsurface layers that were used in our analysis are listed in the table below.

Table No. 1 – Shear Strength Parameters for Stability Analysis

Subsurface Layer	Friction Angle (degrees)	Cohesion (psf)
Native Sand	27	0
Engineered Fill	36	0

Determination of subsurface ground water characteristics - We have made the conservative assumption that a design water surface elevation of 10 feet above the basin bottom persists long enough to develop full steady-state subsurface flow conditions and develops a steady-state seepage phreatic surface through the perimeter of the basin and extending down to the regional groundwater elevation of approximately 36 feet. The phreatic surface for this case was developed using the finite element groundwater seepage routine in SLIDE 7.02 and assuming hydraulic conductivity values based on a comparison of gradation, fines content and typical values available in geotechnical literature. Employing this phreatic surface, stability of the basin slopes was then analyzed using drained shear strength parameters for all soils. Please refer to Figure No. 1 through 4 of this report for a graphical representation of the phreatic surface modeled in our analysis.

Seismic Analysis: A pseudo-static slope stability analysis using the above-mentioned model was performed.

Selection of the seismic coefficient was based on the work of Bray and Travasarou (2009)[1], which considers the allowable seismic displacement and the fundamental period of the sliding mass. Parameters used in this method are outlined below:

Fundamental Period of Landslide Mass (Ts = 4H/Vs)	= 0.015 secs
Degraded Period of Landslide Mass (1.5Ts)	= 0.0225 secs
Magnitude Earthquake	= 8.1
Distance Seismic Source to Site	= 24.6 km
Threshold Displacement	= 5 cm
Spectral Acceleration at Degraded Period (Sa)	= 0.243 secs
Seismic Coefficient (k)	= 0.14g

The spectral acceleration at the degraded period (Sa) is based on Next Generation Attenuation relationships (NGA 2008). Magnitude and distance of the predominant fault for the site was based on the USGS Unified Hazard Tool Deaggregation website https://earthquake.usgs.gov/hazards/interactive/.

Using strength values mentioned above and a seismic coefficient of 0.14g the following minimum safety factors were obtained:

[1] Bray, Jonathan D., Travasarou, T., "Pseudostatic Coefficient for Use in Simplified Seismic Slope Stability Evaluation" Journal of Geotechnical and Geoenvironmental Engineering, ASCE September 2009, p.1336

Table No. 2 – Minimum Safety Factors

Slope Geometry	Minimum Safety Factors	
	Static Case	Seismic Case
3:1 (Waterside of Basin)	2.3	1.1
4:1 Landward Side of Basin	2.3	1.4

Please refer to Figures 1 through 4 of this report for a graphical presentation of our slope stability analysis results. The results of our analysis indicate stability of the basin slopes under static and seismic conditions with safety factors that meet or exceed 2.3 and 1.1, respectively.

It should be noted that the seismic coefficient of 0.14 that was used in our analysis is based on an estimated slope displacement of 5 cm. Assuming a slope displacement of 15 cm yields a seismic coefficient of 0.08 and significantly higher seismic factors of safety than reported herein. Both a 5 cm and a 15 cm slope displacement are considerably less than threshold values typically used for dams and levees[2]. Therefore, in our opinion the factors of safety reported herein are quite conservative.

We appreciate the opportunity to be of service. If you have any questions, please feel free to call our office at 831-722-9446.

Very truly yours,

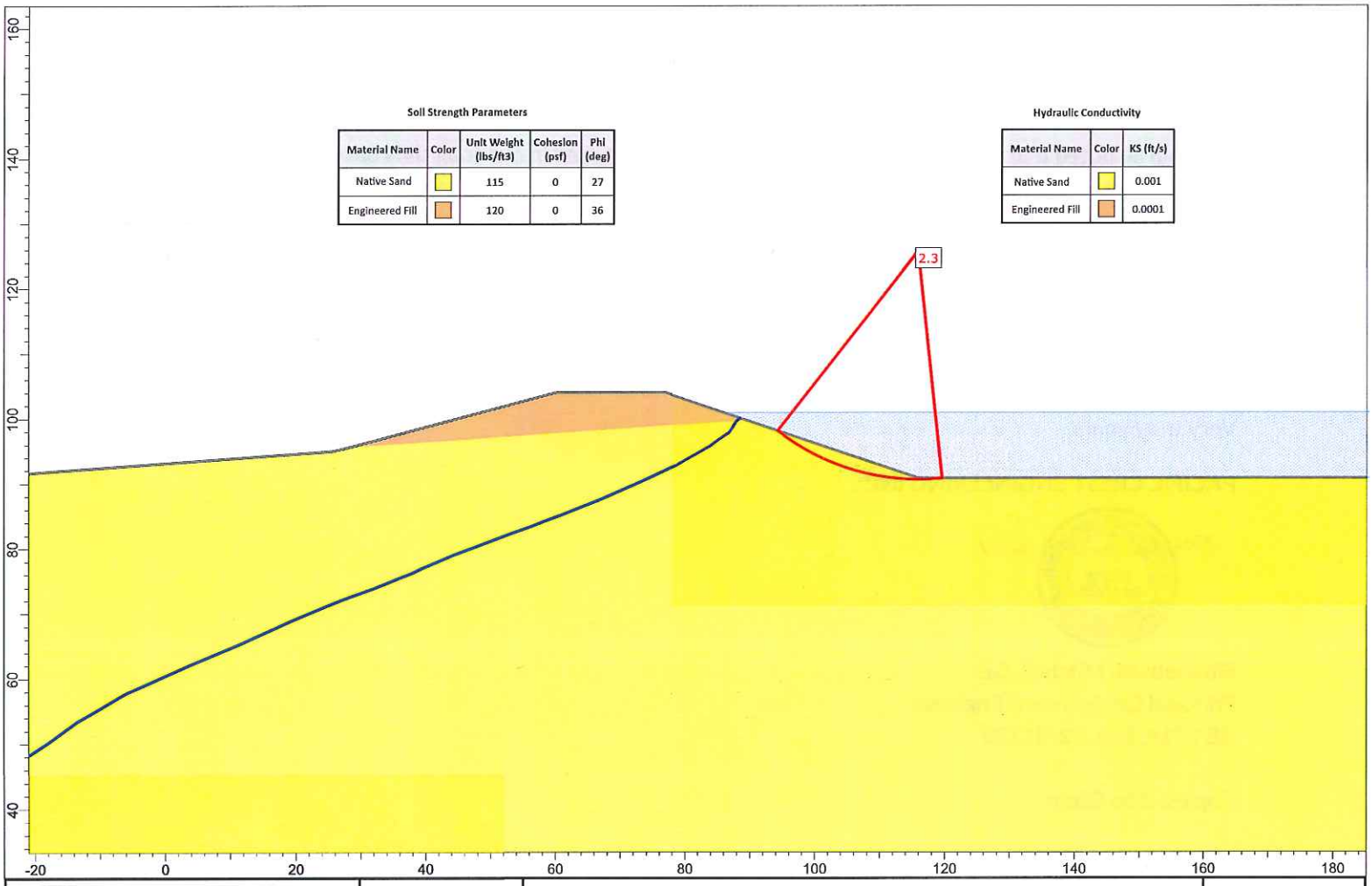
PACIFIC CREST ENGINEERING INC.

Elizabeth M. Mitchell, GE
Principal Geotechnical Engineer
GE 2718, Exp. 12/31/20

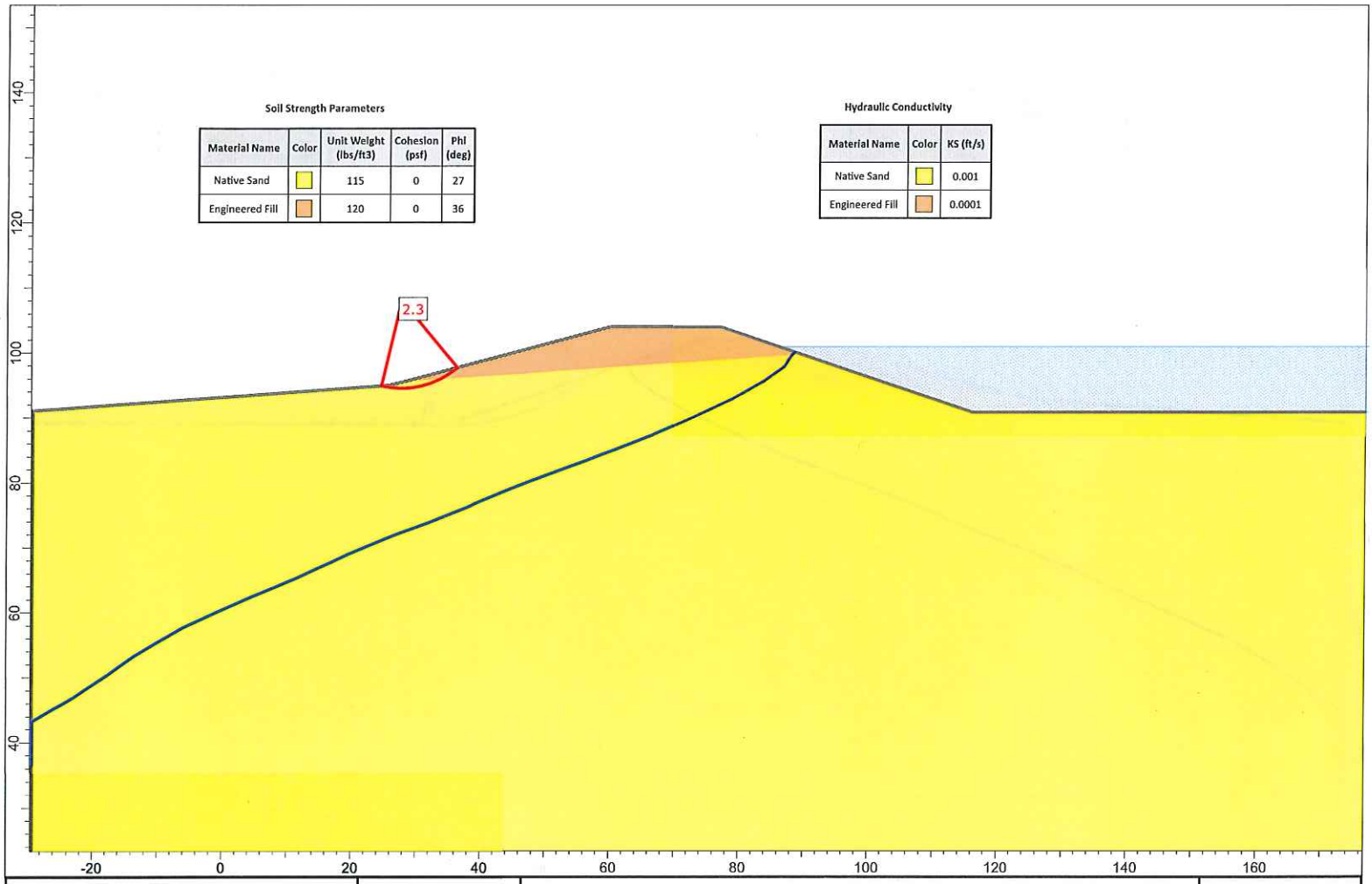
Copies: 2 to Client

Enclosures: Figures 1 through 4, Slope Stability Analysis Results

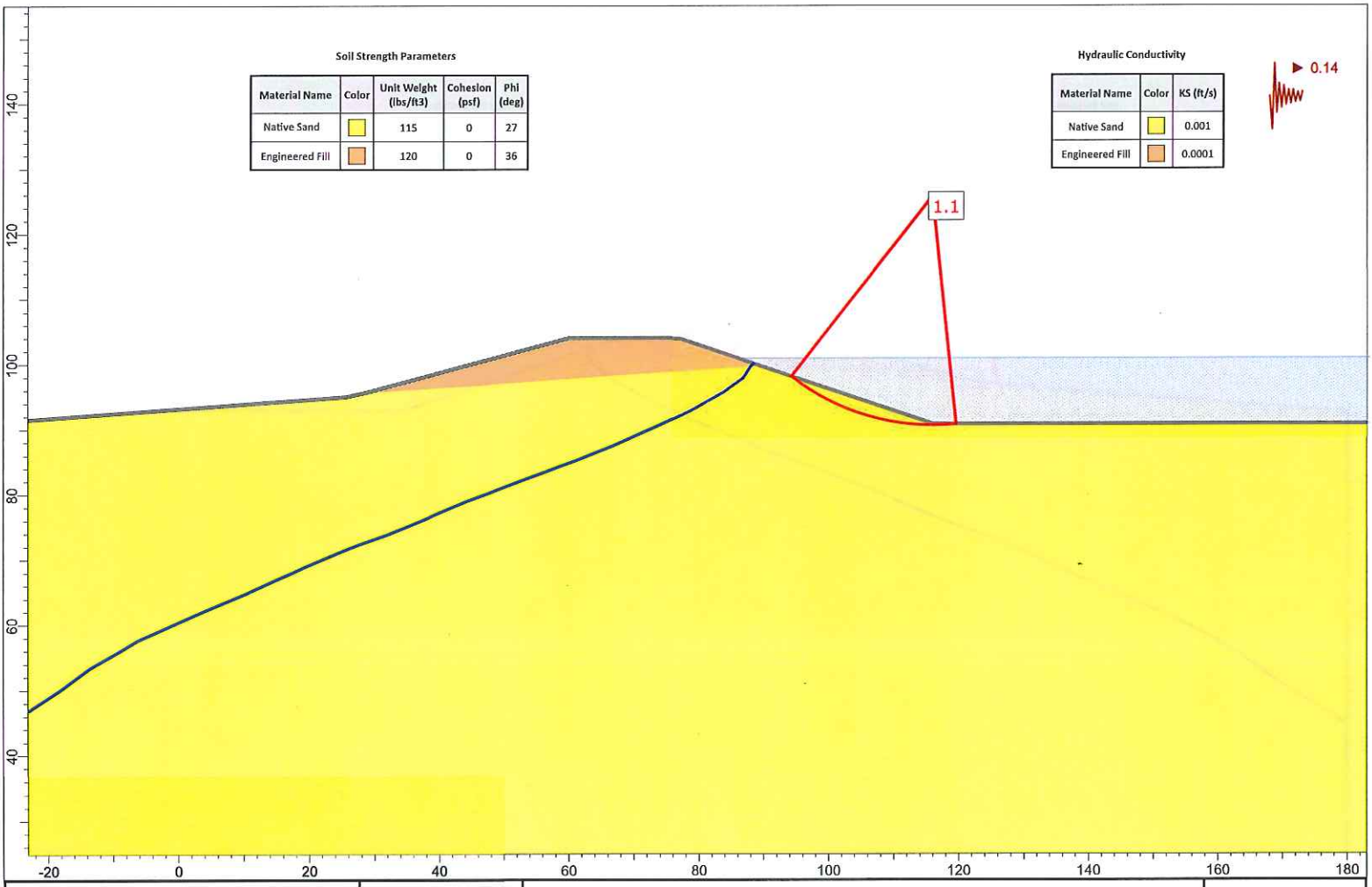
[2] Recommended Procedures for Implementation of DMG Special Publication 117, T.F. Blake 2002



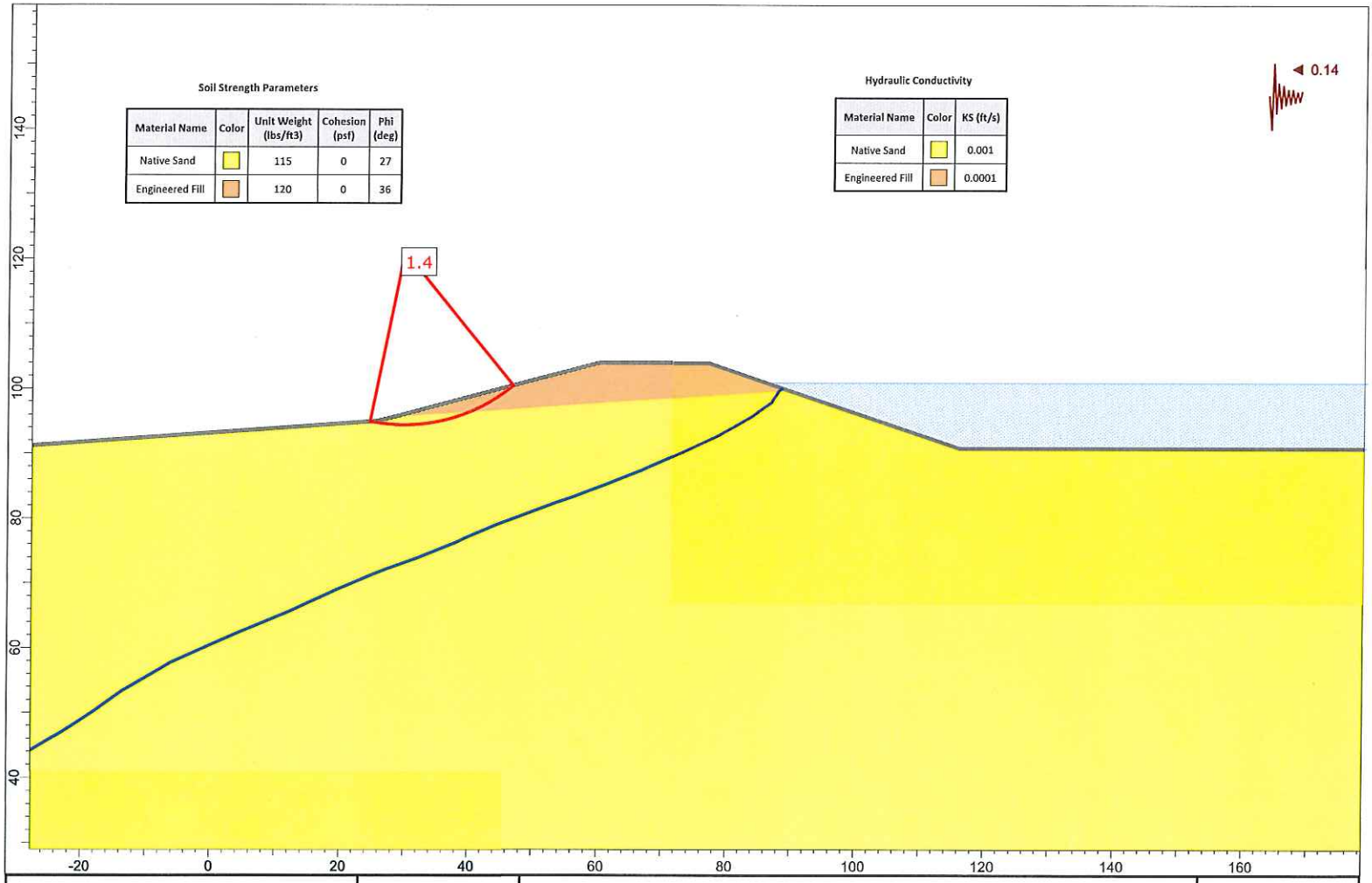
Pacific Crest ENGINEERING INC	Date: 5/21/2019 File Name: Desal A2 static.slim	Static Analysis Watersdie Monterey Peninsula Desalination Plant Marina, California	Figure No: 1 Project No. 1405.1



Pacific Crest ENGINEERING INC	Date: 5/21/2019 File Name: Desal A2 static 1 Left.slim	Static Analysis Landside Monterey Peninsula Desalination Plant Marina, California	Figure No: 2 Project No. 1405.1



Pacific Crest ENGINEERING INC	Date: 5/21/2019	Seismic Analysis Waterside Monterey Peninsula Desalination Plant Marina, California	Figure No: 3
	File Name: desal a2 .14.slim		Project No. 1405.1



Pacific Crest ENGINEERING INC	Date: 5/21/2019 File Name: Desal A2 Left.slim	Seismic Analysis Landside Monterey Peninsula Desalination Plant Marina, California	Figure No: 4 Project No. 1405.1

February 13, 2019 Project Number 1405.1-M223-C21

Mr. Michael Zafer
CDM Smith
2300 Clayton Road, Suite 950
Concord, CA 94520

Subject: **Addendum I to Geotechnical Investigation Report**
Monterey Peninsula Desalination Infrastructure Project
Charlie Benson Lane
Marina, California

Reference: **Geotechnical Investigation and Engineering Geology Report**
Monterey Peninsula Desalination Infrastructure Project
Project No. 1405-M223-C21, dated September 2, 2014

Dear Mr. Zafer,

As requested during various meetings and discussions with the design team, we have developed supplemental geotechnical engineering recommendations in conjunction with the 90% submittal plans currently being developed for the MPWSP Desalination Infrastructure project located in Marina, California. Our recommendations are based upon the subsurface data obtained during our 2014 geotechnical investigation, review of select sheets from the 90% civil drawings, and several discussions and meetings with your design team.

This report is issued as Addendum I to our September 2, 2014 geotechnical report and should be reviewed in conjunction with that document. As part of this Addendum we have also updated Figure No. 2 and 2A in Appendix A of the 2014 report to reflect the most current site plan. Except as modified herein, all recommendations of the September 2014 geotechnical report remain applicable to the design and construction of the project.

We respectfully request the opportunity to review the project plans and specifications during preparation and before bidding to confirm that our recommendations have been included, and to provide additional recommendations, if needed.

Geologic Hazards

This section replaces the Ground Shaking portion of the Geologic Hazards section on Pages 7 and 8 of the referenced report.

Ground shaking will be felt on the site during strong seismic events. Structures founded on thick soft soil deposits are more likely to experience more destructive shaking, with higher amplitude and lower frequency, than structures founded on bedrock. Generally, shaking will be more intense closer to earthquake epicenters. Thick soft soil deposits large distances from earthquake epicenters, however, may result in seismic accelerations significantly greater than expected in bedrock. Structures built in accordance with the latest edition of the California Building Code have an increased potential for experiencing relatively minor damage which should be

repairable. The seismic design of the project should be based on the 2016 California Building Code (CBC) as it has incorporated the most recent seismic design parameters.

It is our understanding that the on-site storage tanks and related equipment have been assigned to Risk Category of IV, and the buildings and remaining structures proposed for development have been assigned to Risk Category III as outlined in the 2016 California Building Code. Table No. 2 below presents 2016 CBC seismic design parameters for Risk Category III and IV:

(Revised) TABLE No. 2, The 2016 CBC Seismic Design Parameters for Risk Category III and IV

Design Parameter	Specific to Site ASCE 7-10 (Note 1)
Site Class	D, Stiff Soil
Mapped Spectral Acceleration for Short Periods (**Note 2**)	Ss = 1.582 g
Mapped Spectral Acceleration for 1-second Period	S_1 = 0.561 g
Short Period Site Coefficient	Fa = 1.0
1-Second Period Site Coefficient	Fv = 1.5
MCE Spectral Response Acceleration for Short Period	S_{MS} = 1.582 g
MCE Spectral Response Acceleration for 1-Second Period	S_{M1} = 0.842 g
5% Damped Spectral Response Acceleration for Short Period	S_{DS} = 1.054 g
5% Damped Spectral Response Acceleration for 1-Second Period	S_{D1} = 0.561 g
Seismic Design Category – (**Note 3**)	D

Note 1: Design values have been obtained by using the SEAOC/OSHPD Seismic Design Maps Tool available on the website at https://seismicmaps.org

Note 2: Per Section 12.8.1.3 of ASCE 7-10 the S_s value can be reduced to 1.5 for the purposes of calculating C_s for regular structures five stories or less in height and having a period T of 0.5 seconds or less.

Note 3: Seismic Design Category assumes the structure is a Category III or IV occupancy as defined by Table 1604.5 of the 2016 CBC. Pacific Crest Engineering Inc. should be contacted for revised Table 2 seismic design parameters if the building has a different occupancy rating from the one assumed.

Revised Subexcavation and Recompaction Zones

Based on review of preliminary 90% civil drawings we have revised our recommended subexcavation and recompaction zones as follows. This Addendum section replaces Item #17 and #18 on Page 13 of our 2014 geotechnical report.

17. Following the stripping and backfilling of voids, all areas to receive structural elements should be subexcavated as recommended below and shown in Figure No. 2A attached to this Addendum. Subexcavation in new parking, pavement or exterior (non-structural) slab areas should extend to a minimum depth of 12 inches below subgrade elevation, or 12 inches below existing ground, whichever results in the lower elevation. Recompacted sections should extend 5 feet horizontally beyond all slabs, footings and pavement areas, or to an adjacent property boundary, whichever is less.

18. In order to reduce total and differential settlements below structural elements to less than 1 and ½-inch, respectively, we recommend subexcavation and recompaction zones be established below the building envelopes as recommended below. These grades may need to be modified upon completion of final grading plans and design elevations. The Contractor should verify final footing dimensions and elevations to assure the minimum recommended fill depth below foundations.

RO Building and RO Unit Slabs: 48 inches below bottom of footing elevation. Based on a design bottom of footing elevation of 98.5 feet, we estimate a subexcavation elevation of 94.5 feet.

RO Building – North Side Containment Area: 48 inches below bottom of footing elevation. Based on a design bottom of footing elevation of 95.0 feet, we estimate a subexcavation elevation of 91.0 feet.
Administration Building: 48 inches below bottom of footing elevation. Based on a design bottom of footing elevation of 98.5 feet, we estimate a subexcavation elevation of 94.5 feet.

Cal-Flo Containment Pad: 48 inches below bottom of footing elevation Based on a design bottom of footing elevation of 95.5 feet, we estimate a subexcavation elevation of 91.5 feet.

Permeate Tank and CO2 Tank: 48 inches below bottom of footing elevation. Based on a design bottom of footing elevation of 98.0 feet, we estimate a subexcavation elevation of 94 feet.

Filtered Water Tanks: Upper 72 inches, as measured from lowest existing ground elevation (91-foot contour). We estimate a subexcavation elevation of 85 feet.

Treated Water Tanks: Based on a design bottom of footing elevation of 98.5 feet, we recommend subexcavation and recompaction to elevation 93 feet as preparation to receive engineered fill. There should be a minimum of 30 inches of engineered fill below all footing elements.

Remote MCC Building and Pump Pad: Minimum of 48 inches of engineered fill below all footing elements. Based on a design bottom of footing elevation of 96.0 feet, we estimate a subexcavation elevation of 92 feet.

Other Structural Footings and Slabs (including Brine Pump Station, Rainwater Cistern, Pedestrian Bridge and transformer and generator pads: Subexcavate 48 inches below bottom of footing/slab subgrade, or 12 inches below existing ground, whichever results in the lower elevation.

Exterior Slabs, Pads, Pavements or other Non-Structural Appurtenances: Subexcavate 12 inches below subgrade or 12 inches below existing ground, whichever results in the lower elevation.

Backwash Basins: 24 inches below bottom of basin. A minimum of 12 inches below existing grades within areas to receive engineered fill should be subexcavated and recompacted.

Brine Equalization Basin: 12 inches below bottom of basin. A minimum of 12 inches below existing grades within areas to receive engineered fill should be subexcavated and recompacted.

Lateral Resistance Values

This Addendum section replaces Items #41 and #67(a) and #67(b) on Pages 17 and 21 of the 2014 geotechnical report:

41., 67 a & b. Footings may be assumed to have a resistance to lateral sliding coefficient of .35 and a passive resistance of 465 pcf. These are ultimate values. The upper 1 foot of soil should be ignored when calculating passive soil resistance. If both friction and passive pressure are used to resist lateral forces, one of the values should be reduced by 50%.

Infiltration Rates

This Addendum section replaces Table No. 7 on Page 27 of the 2014 Geotechnical report and provides additional comment. Based on our discussions with the project civil engineer, we are revising the K_d and K_{LT} value for boring B-12 to 1.6 inches per hour. The Porchet method allows a safety factor of 1.0 to be applied to "shallow" facilities such as the bioretention pond at B-12. As discussed in the 2014 report, we recommend limiting K_{LT} to 5.0 inches per hour for the other tested locations.

(Revised) TABLE No. 7, Infiltration Test Results

Percolation Test	Approximate Boring Elevation (feet)	Depth of Test Boring (feet)	Test Elevation (feet)	K_{FS} Field Saturated Hydraulic Conductivity (in/hr)	K_d	K_{LT} Design Long Term Saturated Hydraulic Conductivity (in/hr)
B-12	101.5	6.00	95.5	1.6	1.6	1.6
B-13	93.5	11.75	81.75	16.7	8.4	5.0
B-15	100	15.02	84.98	58.3	29.2	5.0
B-16	93	9.15	83.85	24.1	12.0	5.0

We recommend that all soils within the proposed bio-retention/detention basin areas be properly classified during the construction process by a representative of Pacific Crest Engineering, Inc.

Maintenance of the basins will be critical in order to maintain the design percolation rates. The bottoms of the basins should be cleaned on a routine basis following each winter season to remove accumulated fines that could reduce the permeability of the basin soils.

We appreciate the opportunity to be of service. If you have any questions, please feel free to call our office at 831-722-9446.

Very truly yours,

PACIFIC CREST ENGINEERING INC.

Elizabeth Mitchell

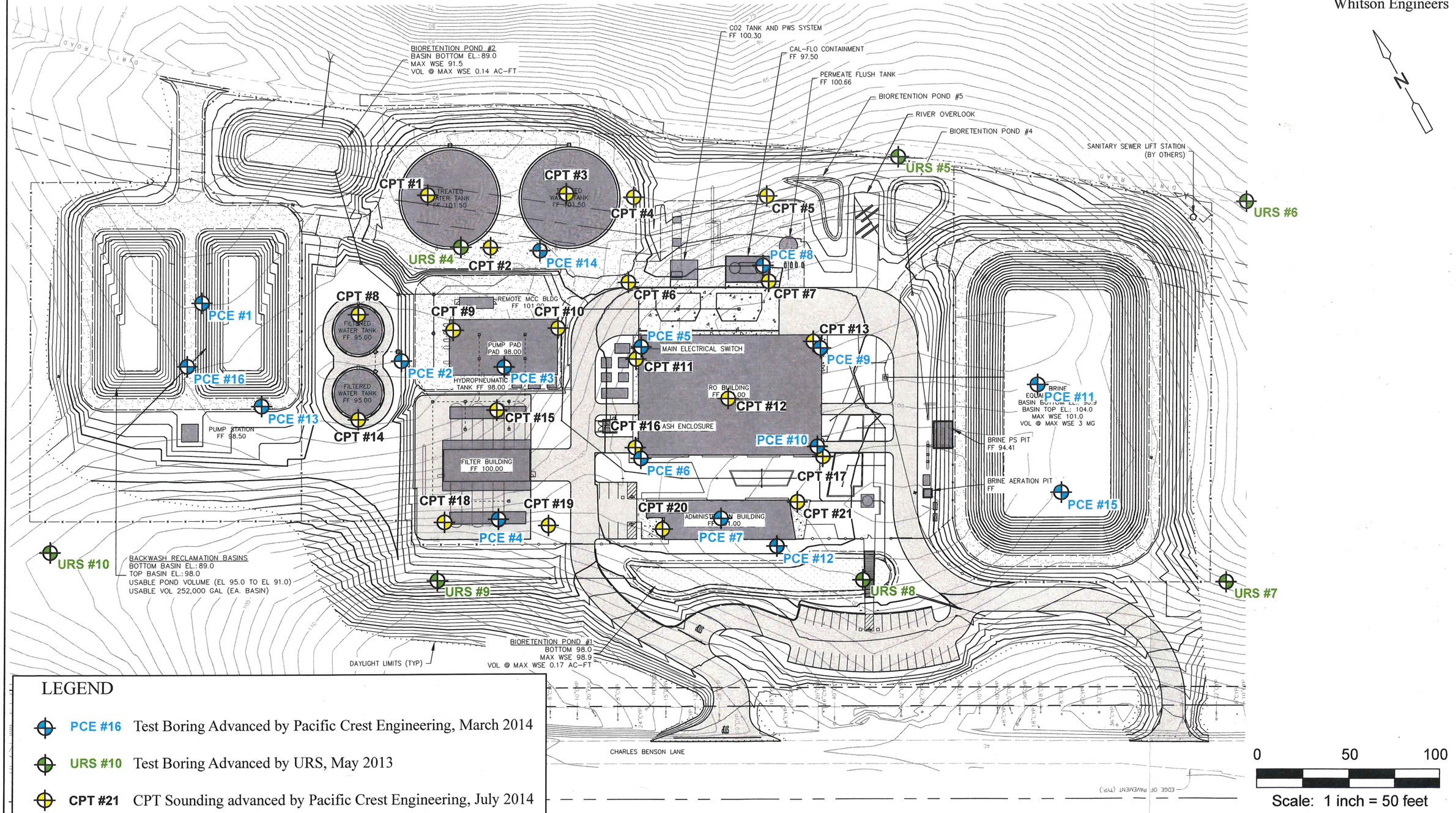
REGISTERED PROFESSIONAL ENGINEER
ELIZABETH MAE MITCHELL
GE2718
Exp. 12/31/20
GEOTECHNICAL
STATE OF CALIFORNIA

Elizabeth M. Mitchell, GE
Principal Geotechnical Engineer
GE 2718
Exp. 12/31/20

Copies: 2 to Client
1 to Whitson Engineers (e-copy)

Enclosures: Revised Figure No. 2 - Updated Site Map Showing Test Boring Locations
Revised Figure No. 2A – Updated Subexcavation Plan

Base Map Provided By:
Whitson Engineers



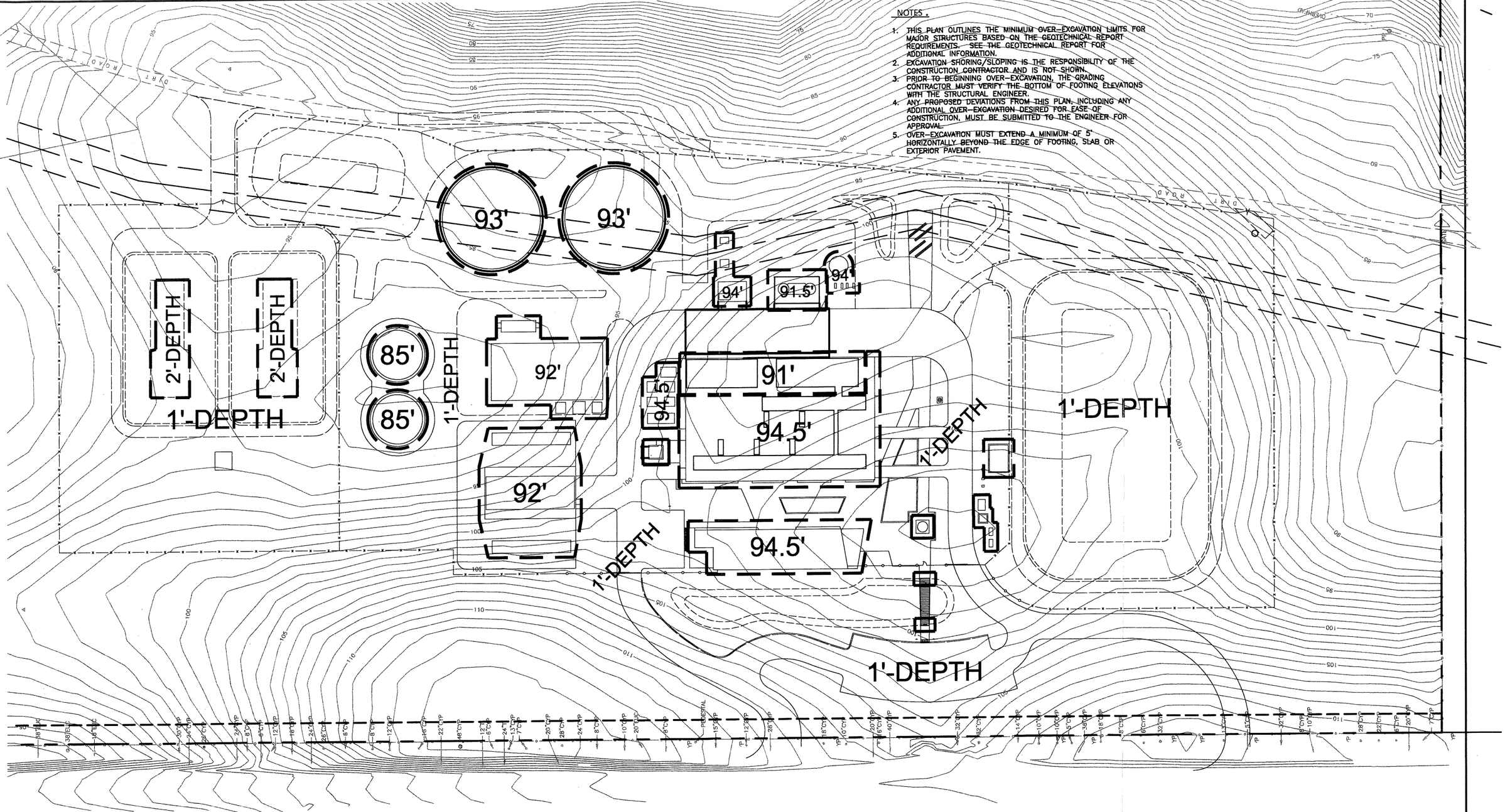
LEGEND

- **PCE #16** Test Boring Advanced by Pacific Crest Engineering, March 2014
- **URS #10** Test Boring Advanced by URS, May 2013
- **CPT #21** CPT Sounding advanced by Pacific Crest Engineering, July 2014

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Site Map Showing Test Boring Locations** MPWSP Desalination Infrastructure Project Marina, California	Figure No. 2 Project No. 1405.1 Date: 2/13/19

NOTES :

1. THIS PLAN OUTLINES THE MINIMUM OVER-EXCAVATION LIMITS FOR MAJOR STRUCTURES BASED ON THE GEOTECHNICAL REPORT REQUIREMENTS. SEE THE GEOTECHNICAL REPORT FOR ADDITIONAL INFORMATION.
2. EXCAVATION SHORING/SLOPING IS THE RESPONSIBILITY OF THE CONSTRUCTION CONTRACTOR AND IS NOT SHOWN.
3. PRIOR TO BEGINNING OVER-EXCAVATION, THE GRADING CONTRACTOR MUST VERIFY THE BOTTOM OF FOOTING ELEVATIONS WITH THE STRUCTURAL ENGINEER.
4. ANY PROPOSED DEVIATIONS FROM THIS PLAN, INCLUDING ANY ADDITIONAL OVER-EXCAVATION DESIRED FOR EASE OF CONSTRUCTION, MUST BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
5. OVER-EXCAVATION MUST EXTEND A MINIMUM OF 5' HORIZONTALLY BEYOND THE EDGE OF FOOTING, SLAB OR EXTERIOR PAVEMENT.



Base Map Provided by Whitson Engineers, February 2019

0 100 200

Scale: 1 inch = 100 feet

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Site Map Showing Recommended Subexcavation Elevations** MPWSP Desalination Infrastructure Project Marina, California	Figure No. 2A Project No. 1405.1 Date: 2/13/19

GEOTECHNICAL AND GEOLOGIC INVESTIGATION
FOR
MONTEREY PENINSULA DESALINATION PLANT
MARINA, CALIFORNIA

FOR
CDM SMITH
WALNUT CREEK, CALIFORNIA

BY
PACIFIC CREST ENGINEERING INC.
CONSULTING GEOTECHNICAL ENGINEERS
1405-M223-C21
SEPTEMBER 2014
www.4pacific-crest.com

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APPENDIX F
CPT Data, Interpretation and Settlement Estimates

Pacific Crest Engineering Inc. www.4pacific-crest.com

444 Airport Blvd, Suite 106
Watsonville, CA 95076
Phone: 831-722-9446
Fax: 831-722-9158

September 2, 2014 Project No. 1405-M223-C21

Mr. Michael Zafer
CDM Smith
100 Pringle Avenue #100
Walnut Creek, CA 94596

Subject: **Geotechnical Investigation and Engineering Geology Report**
Monterey Peninsula Desalination Infrastructure Project
Charlie Benson Lane
Marina, California

Dear Mr. Zafer,

In accordance with your authorization, we have performed a geotechnical and geologic study for the proposed desalination infrastructure project located just north of Charles Benson Road in Monterey County, California. Our investigation was completed in conjunction with Zinn Geology, our engineering geology subconsultant. Their report is included herein as Appendix B. The accompanying report presents our conclusions and recommendations as well as the results of the geotechnical investigation on which they are based.

We appreciate the opportunity to be of service. If you have any questions concerning the data, conclusions or recommendations presented in this report, please call our office.

Very truly yours,

PACIFIC CREST ENGINEERING INC.

Cara Al-Lami
Staff Geologist

Elizabeth M. Mitchell, GE
Principal Geotechnical Engineer
GE 2718
Exp. 12/31/14

REGISTERED PROFESSIONAL ENGINEER
ELIZABETH MAE BAHNS MITCHELL
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GEOTECHNICAL
STATE OF CALIFORNIA

Copies: 3 to Client

GEOTECHNICAL INVESTIGATION

PURPOSE AND SCOPE

This report describes our geotechnical and geologic investigation and presents results, including recommendations, for the proposed desalination infrastructure project located north of Charles Benson Lane and west of the Monterey Regional Waste Management facility in Marina, California. Our scope of services for this project has so far consisted of:

1. Site reconnaissance by the project geotechnical engineer and project geologist, and reconnaissance-level geological mapping of the desalination plant site.

2. Compilation of a set of base maps to create a suitable suite of maps for data collection, including boring locations and our geomorphic analysis.

3. Review of existing available geological and geotechnical engineering reports pertinent to the project site.

4. Review of historical stereopair aerial photographs available for our account at the UC Santa Cruz Map Library.

5. Field exploration, consisting of 16 exploratory borings and 21 cone penetrometer (CPT) soundings. The test borings were drilled to depths of 6 to 75 feet below the ground surface; four of these borings were drilled to depths where groundwater was located and water quality samples were obtained and tested for various constituents as listed in this report. The CPT soundings were advanced to depths of 25 to 50 feet.

6. Four of the borings drilled in the vicinity of the bio-retention area and retention ponds were converted to percolation test holes and tested for percolation characteristics using a falling-head test method.

7. Laboratory testing of selected samples obtained during drilling operations. Tests included density, moisture content, grain size distribution, R-Value, soil corrosivity, and shear strength.

8. Construction of a geological map and geologic cross sections.

9. Engineering analysis and geologic review of data collected from our literature review, site mapping and field exploration program. This information was used to develop qualitative and quantitative geotechnical and geologic recommendations pertinent to the design and construction of the desalination plant. Our analysis included quantitative evaluation of seismically-induced settlement at the plant site, development of lateral earth pressures and foundation design criteria, development of general earthwork, materials and utility trench recommendations, deterministic evaluation of seismic design parameters in accordance with the California Building Code and discussion of pertinent seismic and geologic hazards.

10. Preparation of this Geotechnical and Geologic Investigation Report. The report includes summaries of our compiled data with related references, factual data, descriptions of the geologic and seismic settings, and descriptions of prospective geologic hazards and attendant risks with respect to seismically-induced settlement, landsliding, surface fault ground rupture and seismic shaking. The report also provides geotechnical conclusions and recommendations pertinent to the design phase of the project. As discussed, the geologic portion of this report was prepared by our sub-consultant Zinn Geology. Their report is presented in Appendix B.

LOCATION AND DESCRIPTION

The Monterey Peninsula Desalination Infrastructure project consists of a proposed seawater desalination and treatment facility located within an undeveloped 46-acre parcel just north of the southeastern terminus of Charles Benson Road in Marina, California. Please refer to Figure No. 1, Regional Site Map, for the general vicinity of the project site. Furthermore, the site is located at the following coordinates:

Latitude = 36.71566 degrees
Longitude = -121.77303 degrees

The proposed location of the desalination and treatment facility is situated on ancient sand dune fields near the mouth of the Salinas River. The general site topography is flat to slightly sloping with small hills and hummocks typical of old dune field terrain. In general, the site slopes to the northeast, towards the Salinas River Valley.

At the time of our investigation, the dune fields were vegetated with native grasses and shrubs up to three feet high. The existing elevations within the proposed building areas range from approximately 94 feet to 110 feet above sea level. The site is bound by Charles Benson Road to the south, The Last Chance Mercantile to the east, the Salinas River to the north, and agricultural farmland to the west.

Based upon discussions with the design team and review of preliminary site plans, it is our understanding that the proposed project will include the construction of a new SWRO chemical building, electrical building, administration building, brine equalization basin, two backwash reclamation basins, two 65-foot diameter pre-stressed concrete treated water tanks, and two 60-foot diameter steel bolted filtered water tanks. Also planned are new pumps, pressure filters, and piping networks associated with the operation of the desalination facility. We presume that the new chemical and electrical buildings will be of light-industrial type construction, and the administration building and associated visitor center will be wood frame and masonry construction with concrete slab-on-grade. We also anticipate that retaining walls, exterior flatwork, and attendant utility and landscape improvements will be required.

The proposed finished floor elevations for the new buildings will be 101.0 feet, and finished slab elevation for the new treated and filtered water tanks will be 101.5 and 95.0 feet, respectively. The pressure filter gallery and pump pad slab elevations will be 100.0 and 98.0 feet, respectively. The proposed bottom elevation of the Brine Equalization Basin is 90.9

feet and the proposed bottom elevation of the two Backwash Reclamation Basins is 89.0 feet. The proposed pad elevations will require minor cuts and fills within the undulating dunes. The basins will be excavated into native soils and bounded by compacted berms. Cut and fill slopes will be necessary to establish the entry way from Charlie Benson Road. Grading is therefore expected to be moderate.

PREVIOUS STUDIES

A draft geotechnical baseline report was completed by URS for the site. The report, *Proposed Desalination Plant Monterey Peninsula Water Supply Project* dated June 20, 2013, provided preliminary geotechnical recommendations to address the feasibility of site development. The URS study included the advancement of 10 test borings around what are essentially the outer limits of planned site development. The borings ranged in depth from 40 to 100 feet below ground surface. The baseline report provided preliminary recommendations for foundations, concrete slabs-on-grade, retaining walls, earthwork, and pavements. The study also addressed general geologic hazards, corrosion potential of the native soils, and a recommended work scope for design phase studies.

The URS soil borings encountered older dune deposits underlain by older fluvial deposits, which we have interpreted as belonging to the Aromas formation. The dune deposits, derived from wind driven deposits of sand, ranged from fine grained silty sand to poorly graded sand. The sands were generally loose to medium dense within the upper 12 feet (as measured from the ground surface), and became generally dense below depths of 15-20 feet below the ground surface. The contact between the older dune deposits and the underlying older fluvial deposits was encountered at an elevation of approximately 20 to 25 feet, as depicted on geologic cross-section A-A' and B-B'.

Groundwater was encountered within URS borings BH-1, BH-2, BH-4, and BH-6 at depths ranging between 7 and 57 feet below ground surface (approximate elevation 29 to 40 feet). Of the four borings, only BH-4 was located within the limits of the proposed desalination footprint. The depth to groundwater within this boring was 57 feet (approximate elevation 40 feet).

FIELD INVESTIGATION

Soil Borings

Twelve, 8-inch diameter and four 6-inch diameter test borings were drilled on the site from March 11-14, 2014. The location of the test borings are shown on Figure No. 2 of Appendix A, Site Map Showing Test Borings. The drilling method used was mechanically operated continuous flight augers. A geologist from Pacific Crest Engineering Inc. was present during the drilling operations to log the soil encountered and to choose soil sampling type and locations.

Relatively undisturbed soil samples were obtained at various depths by driving a split spoon sampler 18 inches into the ground. This was achieved by dropping a 140 pound down hole safety hammer through a vertical height of 30 inches. The number of blows needed to drive the sampler for each 6 inch portion is recorded and the total number of blows needed to drive

the last 12 inches is reported as the Standard Penetration Test (SPT) value. The outside diameter of the samplers used in this investigation was either 3 inches or 2 inches, and is noted respectively as “L” or “T” on the boring logs. All standard penetration test data has been normalized to a 2 inch O.D. sampler so as to reflect the SPT "N" value.
The soils encountered in the borings were continuously logged in the field and visually described in accordance with the Unified Soil Classification System (ASTM D2488 (Modified), Figure No. 3). The soil classification was verified and or modified upon completion of laboratory testing.

Cone Penetrometer Testing
Twenty-one (21) cone penetrometer (CPT) soundings were advanced on July 17th and 18th, 2014. A geologist from Pacific Crest Engineering Inc. was present to supervise the field operations. The locations of the Cone Penetrometer soundings are shown on Figure No. 2 of Appendix A, Site Plan Showing Boring and CPT Locations.

The cone takes measurements of cone bearing (qc), sleeve friction (fs) and penetration pore water pressure at 5-cm intervals during penetration to provide a nearly continuous hydrogeologic log. Correlations between these measurements and many soil properties are made with the assistance of the computer program CPTINT from the University of British Columbia. The above mentioned parameters are stored on disk for further analysis and reference. All CPT soundings were performed in accordance with ASTM standard (D5778). The cone also contains a porous filter element located directly behind the cone tip that is used to obtain penetration pore pressure as the cone is advanced. When the soundings were complete, the test holes were grouted.

Appendix A contains the site plan showing the locations of the test borings and cone penetrometer soundings. The Log of Test Borings in Appendix A presents the soil profile explored in each boring, the sample locations, and SPT "N" values for each sample. Stratification lines on the boring logs are approximate as the actual transition between soil types may be gradual.

LABORATORY INVESTIGATION

The laboratory testing program was developed to help in evaluating the engineering properties of the materials encountered on the site. Laboratory tests performed include:

a. Moisture Density relationships in accordance with ASTM test D2937.

b. Direct Shear tests in accordance with ASTM test D3080.

c. "R" Value tests in accordance with California test 301.

d. Gradation tests in accordance with ASTM test D1140 as D422

e. Corrosivity testing including pH, resistivity, chloride concentration, and sulfate concentration.

Four of the test borings (B-1, B-7, B-8, and B-11) were drilled to groundwater. These borings ranged in depth from 65 to 75 feet below the ground surface. Once a sufficient groundwater column was observed the groundwater was sampled using a bailer, placed in appropriate sampling containers, and placed in a cooler with ice. The samples were transported using standard chain-of-custody procedures and analyzed by Soil Control Labs, a California state-certified laboratory, for the following constituents:

a. Total Dissolved Solids (TDS), Chloride, Bromide, Total Alkalinity, Nitrates, Nitrites, and Turbidity.

b. Sodium, Total Hardness, Iron, Arsenic, Magnesium, and Boron.

c. Ammonia.

d. Total Organic Carbon (TOC).

The results of the laboratory tests are presented below and in Appendix C.

SOIL CONDITIONS

Regional Geologic Maps

The surficial geology in the area of the project site is mapped as Older Dune Deposits (Dibblee' and Minch, 2007). The Older Dune Deposits are described as poorly graded silt and sand deposits within an extensive coastal dune field. These deposits are generally weakly to moderately consolidated. The native soils encountered within the test borings are generally consisted with this description.

As described in the geology report prepared by Zinn Geology, the Older Dune Deposits encountered within the test borings blanket the fluvial facies member of the Aromas Formation. Plate 1 and Plate 2 within Appendix B depict the Aromas Formation daylighting immediately north of the proposed desalination facility site, and up gradient of the Younger Flood Plain Deposits. Furthermore, Plate 2 illustrates the unconformable contact between the older dune deposits and the Aromas Formation. Please refer to the Zinn Geology report for more information regarding the two geologic units underlying the site.

Soil Borings

Our field exploration program encountered a variety of soil types generally consistent with published geologic maps. A total of sixteen (16) test borings and twenty-one (21) CPT soundings were advanced to depths ranging between 6 and 75 feet below the ground surface. The test locations were selected in order to characterize the general underlying soils across the proposed building envelope(s). The following describes the general subsurface conditions encountered; the Log of Test Borings and CPT data in Appendices A and F, respectively, provides more descriptive terms of soil profile encountered at each test location.

The near surface deposits are comprised of loose, poorly graded to silty sand. This loose, sandy material contains a trace amount of organics resulting from the native ground cover and extends to approximately 5 to 7 feet below ground surface. The loose sand horizon is

underlain by sand dune deposits generally described as fine to medium grained or medium to coarse grained, clean sand. The sand was typically sub-rounded to rounded in shape, and poorly graded. Occasional interbeds of silty sand or sand with silt were encountered within several of the test borings. As described in the Zinn Geology report, no distinct bedding was observed within obtained soil samples, leading to the conclusion that the on-site dune deposits are structurally massive.

Groundwater

Groundwater was encountered within Boring No. 1, Boring No. 7, Boring No. 8, and Boring No. 11 at depths of 60 feet, 70 feet, 71 feet, and 65 feet below ground surface, respectively. It should be noted that the groundwater level was not allowed to stabilize for more than a few hours; therefore, the actual groundwater level may be higher or lower than initially encountered.

Based upon the cross-sections presented as Plate 2 within Appendix B, the local groundwater table is slightly above the contact between the Older Dune Deposits and the Aromas Formation. Despite the fact that URS and PCE advanced test borings during one of the driest rainfall seasons ever recorded, the lack of mottling and gleying observed within the samples suggests that there is little seasonal fluctuation of the groundwater table.

Furthermore, the Zinn Geology report notes that the formations that underlie the site are in direct hydraulic communication with the ocean. These characteristics make them susceptible to water quality degradation, either from seawater intrusion or surface-derived contaminants.

The groundwater does appear to be flowing to the south, away from the Salinas River Valley, which may indicate that it is structurally controlled and is perching on the contact between the Older Dune Deposits and the Aromas Formation.

PCE personnel collected groundwater samples from each of the four test borings. The samples were delivered to Soil Control Labs, a state-certified California laboratory, under standard Chain-of-Custody procedures. The results of the analyses, as selected by CDM Smith, are listed below:

Constituent	Boring No. 1	Boring No. 7	Boring No. 8	Boring No. 11	Reporting Limit
Total Alkalinity as $CaCO_3$	290 mg/L	520 mg/L	1200 mg/L	820 mg/L	2.0
Total Organic Carbon	4.3 mg/L	4.8 mg/L	6.5 mg/L	ND	2.0
Bromide	0.15 mg/L	0.52 mg/L	0.62 mg/L	0.45 mg/L	0.10
Chloride	43 mg/L	140 mg/L	160 mg/L	180 mg/L	1.0
Hardness	1200 mg/L	1500 mg/L	1700 mg/L	2100 mg/L	120
Turbidity	11000 NTU	23000 NTU	31000 NTU	25000 NTU	20
Ammonia as N	0.41 mg/L	0.94 mg/L	0.37 mg/L	ND	0.28
Nitrate as N	36 mg/L	63 mg/L	74 mg/L	63 mg/L	0.10

Nitrite as N	ND	0.28 mg/L	ND	ND	0.10
Total Dissolved Solids	650 mg/L	860 mg/L	730 mg/L	820 mg/L	26
Total Arsenic	160 ug/L	390 ug/L	230 ug/L	340 ug/L	2.5
Total Boron	ND	ND	ND	ND	25000
Total Iron	730000 ug/L	1300000 ug/L	920000 ug/L	1500000 ug/L	620
Total Manganese	13000 ug/L	16000 ug/L	18000 ug/L	16000 ug/L	500
Total Sodium	110 mg/L	120 ug/L	150 mg/L	130 mg/L	12

Analytical results in their entirety as well as the purge logs for each groundwater sample are presented within Appendix D of this report.

REGIONAL SEISMIC SETTING

Please refer to the Geology Report prepared by Zinn Geology in Appendix B for detailed discussion on local faulting in the general vicinity of the project site.

GEOLOGIC HAZARDS

Please refer to the Zinn Geology report in Appendix B for a detailed discussion on geologic hazards affecting this site, which include strong seismic shaking and dynamic compaction of the coastal dune deposits. Geotechnical aspects of these issues are discussed below:

Ground Shaking

Ground shaking will be felt on the site during strong seismic events. Structures founded on thick soft soil deposits are more likely to experience more destructive shaking, with higher amplitude and lower frequency, than structures founded on bedrock. Generally, shaking will be more intense closer to earthquake epicenters. Thick soft soil deposits large distances from earthquake epicenters, however, may result in seismic accelerations significantly greater than expected in bedrock. Structures built in accordance with the latest edition of the California Building Code have an increased potential for experiencing relatively minor damage which should be repairable. The seismic design of the project should be based on the 2013 California Building Code (CBC) as it has incorporated the most recent seismic design parameters.

It is our understanding that the on-site storage tanks and related equipment have been assigned to Risk Category of IV, and the buildings and remaining structures proposed for development have been assigned to Risk Category III as outlined in the 2013 California Building Code. Table No. 2A and 2B below presents 2013 CBC seismic design parameters for Risk Category III and IV, respectively.

TABLE No. 2A, The 2013 CBC Seismic Design Parameters for Risk Category III

Design Parameter	Specific to Site ASCE 7-10	Reference (See Note 1)
Site Class	D, Stiff Soil	Chapter 20 ASCE 7-10
Mapped Spectral Acceleration for Short Periods (**See Note 2**)	Ss = 1.582 g	Fig. 22-1 ASCE 7-10
Mapped Spectral Acceleration for 1-second Period	S_1 = 0.561 g	Fig. 22-2 ASCE 7-10
Short Period Site Coefficient	Fa = 1.0	Table 1613.3.3(1)
1-Second Period Site Coefficient	Fv = 1.5	Table 1613.3.3(2)
MCE Spectral Response Acceleration for Short Period	S_{MS} = 1.582 g	Equation 16-37 CBC
MCE Spectral Response Acceleration for 1-Second Period	S_{M1} = 0.842 g	Equation 16-38 CBC
5% Damped Spectral Response Acceleration for Short Period	S_{DS} = 1.054 g	Equation 16-39 CBC
5% Damped Spectral Response Acceleration for 1-Second Period	S_{D1} = 0.561 g	Equation 16-40 CBC
Seismic Design Category (**Note 3)**	D	Section 1613.3.5

Note 1: Design values may also have been obtained by using the Ground Motion Parameter Calculator available on the USGS website at http://geohazards.usgs.gov/designmaps/us/application.php

Note 2: Per Section 12.8.1.3 of ASCE 7-10 the S_s value can be reduced to 1.5 for the purposes of calculating C_S for regular structures five stories or less in height and having a period T of 0.5 seconds or less.

Note 3: Seismic Design Category assumes the structure is a Category III occupancy as defined by Table 1604.5 of the 2013 CBC. Pacific Crest Engineering Inc. should be contacted for revised Table 2 seismic design parameters if the building has a different occupancy rating from the one assumed.

TABLE No. 2B, The 2013 CBC Seismic Design Parameters for Risk Category IV

Design Parameter	Specific to Site ASCE 7-10	Reference (See Note 1)
Site Class	D, Stiff Soil	Chapter 20 ASCE 7-10
Mapped Spectral Acceleration for Short Periods (**See Note 2**)	Ss = 1.582 g	Fig. 22-1 ASCE 7-10
Mapped Spectral Acceleration for 1-second Period	S_1 = 0.561 g	Fig. 22-2 ASCE 7-10
Short Period Site Coefficient	Fa = 1.0	Table 1613.3.3(1)
1-Second Period Site Coefficient	Fv = 1.5	Table 1613.3.3(2)
MCE Spectral Response Acceleration for Short Period	S_{MS} = 1.582 g	Equation 16-37 CBC
MCE Spectral Response Acceleration for 1-Second Period	S_{M1} = 0.842 g	Equation 16-38 CBC
5% Damped Spectral Response Acceleration for Short Period	S_{DS} = 1.054 g	Equation 16-39 CBC
5% Damped Spectral Response Acceleration for 1-Second Period	S_{D1} = 0.561 g	Equation 16-40 CBC
Seismic Design Category (**Note 3)**	D	Section 1613.3.5

Note 1: Design values may also have been obtained by using the Ground Motion Parameter Calculator available on the USGS website at http://geohazards.usgs.gov/designmaps/us/application.php

Note 2: Per Section 12.8.1.3 of ASCE 7-10 the S_s value can be reduced to 1.5 for the purposes of calculating C_S for regular structures five stories or less in height and having a period T of 0.5 seconds or less.

Note 3: Seismic Design Category assumes the structure is a Category IV occupancy as defined by Table 1604.5 of the 2013 CBC. Pacific Crest Engineering Inc. should be contacted for revised Table 2 seismic design parameters if the building has a different occupancy rating from the one assumed.

Ground Surface Fault Rupture

Ground surface fault rupture occurs along the surficial trace(s) of active faults during significant seismic events. Pacific Crest Engineering Inc., has not performed a specific investigation for the presence of active faults on the project site. Since the nearest known

active or potentially active fault is mapped approximately 2.1 miles (approximately 14.1 km) from the site (Clark, Dupre', Rosenberg, 1997, and CDMG, 1998), the potential for ground surface fault rupture at this site is low.

Liquefaction

Liquefaction tends to occur in loose, saturated fine grained sands, coarse silts or low plasticity clays. Based upon our review of the regional liquefaction maps (Rosenberg, 2001; Dupre' and Tinsley, 1980) the proposed facility site lies within an area mapped as having a low potential for liquefaction. The soils encountered in our test borings and CPT soundings have been interpreted as older sand dune deposits that are loose in the upper 5 to 7 feet and medium dense to very dense with depth. Where encountered, the groundwater table was located more than 60 feet below the ground surface.

Given the lack of a shallow groundwater table in conjunction with dense sandy soils at depth, it is our opinion that there is a low potential for liquefaction to occur at this site and cause damage to structures thereon.

Liquefaction Induced Lateral Spreading

Liquefaction induced lateral spreading occurs when a liquefied soil mass fails toward an open slope face, or fails on an inclined topographic slope. Our analysis of the project site indicates that the potential for liquefaction to occur is low, consequently the potential for lateral spreading is also low.

Dynamic Compaction

Standard Penetration Test (SPT) data obtained from the exploratory borings suggest that the relative density of the sand below the proposed building sites is consistently loose to medium dense at depths up to 20 feet below the ground surface. This presented a contrast with the Baseline Geotechnical Report (URS) borings that were drilled around the perimeter of the proposed facility footprint, and illustrates the varying nature of sand dune deposits with respect to density. Sand deposits with a lower relative density can be expected to exhibit higher seismically-induced settlements during strong seismic shaking. The CPT program was therefore implemented for the purpose of evaluating soil density and other properties over a continuous soil profile.

The CPT data was used to quantitatively evaluate the potential for settlement of the coastal dune deposits under dynamic (seismic) shaking. Given the high degree of seismic performance required by the project, our analysis conservatively assumed a magnitude 7.9 earthquake with an assumed peak ground acceleration (PGA) value of 0.608g. The PGA value was determined using the California Geological Survey PSHA Ground Motion Interpolator (2008) with a 2% chance of exceedance in 50 years. Our analysis utilized the Geologismiki software CLiq Version 1.76.34, which is based upon recommendations by Dr. Peter Robertson. Please refer to Appendix C for the model parameters and the results we obtained.

Figure No. 1 of Appendix C provides a summary of total calculated settlements for each CPT sounding, assuming safety factor of 1.2. The analysis also indicates that a majority of this settlement occurs within the upper 5 feet of soil profile. We then estimated potential settlements

assuming ground improvement within the upper five feet of the ground surface. As shown in Figure No. 1, the settlement potential can be significantly reduced by redensification of the upper five feet of surface soils. The improved settlement estimates were used to develop the settlement contour map shown in Figure No. 2 of Appendix C.

The recommendations of this report are intended to reduce the potential for structural damage to an acceptable risk level, however strong seismic shaking could result in architectural damage and the need for post-earthquake repairs. It should be assumed that exterior improvements such as pavements, slabs, sidewalks or patios will need to be repaired or replaced following strong seismic shaking. An increased depth of subgrade compaction below exterior improvements will assist in minimizing the damage to these elements.

Landsliding

Landsliding is a hazard with low potential for affecting structures on this site due to the relatively flat topography within the proposed building envelope.

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

GENERAL

1. The results of our investigation indicate that from a geotechnical engineering standpoint the property may be developed as proposed, provided our recommendations and those of the project geologist are included in the design and construction of the project.

2. Our field observations and laboratory testing indicates that the near surface soils are predominately granular and therefore possess very low expansive potential.

3. Grading and foundation plans should be reviewed by Pacific Crest Engineering Inc. during their preparation and prior to contract bidding.

4. Pacific Crest Engineering Inc. should be notified at least four (4) working days prior to any site clearing and grading operations on the property in order to observe the stripping and disposal of unsuitable materials, and to coordinate this work with the grading contractor. During this period, a pre-construction conference should be held on the site with an owner representative, the grading contractor, a County representative and one of our engineers present. At this meeting, the project specifications and the testing and inspection responsibilities will be outlined and discussed.

5. Field observation and testing must be provided by a representative of Pacific Crest Engineering Inc., to enable them to form an opinion as to the degree of conformance of the exposed site conditions to those foreseen in this report, the adequacy of the site preparation, the acceptability of fill materials, and the extent to which the earthwork construction and the degree of compaction comply with the specification requirements. **Any work related to grading or foundation excavation that is performed without the full knowledge and direct observation of Pacific Crest Engineering Inc., the Geotechnical Engineer of Record, will render the recommendations of this report invalid, unless the Client hires a new Geotechnical Engineer who agrees to take over complete responsibility for this report's findings, conclusions and recommendations.** The new Geotechnical Engineer must agree to prepare a Transfer of Responsibility letter. This may require additional test borings and laboratory analysis if the new Geotechnical Engineer does not completely agree with our prior findings, conclusions and recommendations.

PRIMARY GEOTECHNICAL CONSIDERATIONS

6. Based upon the results of our investigation, primary geotechnical considerations for the project include uniform and appropriate foundation support, strong seismic shaking and the potential for seismically-induced settlements, and surface drainage.

7. The near surface soils beneath the proposed development area are generally comprised of loose to very loose sand and are therefore considered unsuitable in their present state for structural support. We recommend additional compactive effort below all structural foundation elements in order to establish uniform and adequate bearing capacity for the foundation systems. We anticipate that this process could be incorporated into a ground

improvement program intended to reduce the effects of seismically-induced settlement on the proposed improvements.

8. The project site is located within a seismically active area and strong seismic shaking is expected to occur within the design lifetime of the project. Improvements should be designed and constructed in accordance with the most current and applicable CBC criteria and the recommendations of the final geotechnical report to minimize reaction to seismic shaking, however strong seismic shaking could result in architectural damage and the need for post-earthquake repairs.

9. Quantitative dynamic settlement analysis using cone penetrometer data indicates the magnitude of total settlements resulting from the design earthquake ranges from about ¼-inch to 4.25 inches. This presents a contrast with the Baseline Geotechnical Report (URS) borings that were drilled around the perimeter of the proposed facility footprint, and illustrates the varying nature of sand dune deposits with respect to density. However, since the majority of this settlement is confined within the upper five feet of the existing ground surface, recompaction of this zone can significantly reduce the dynamic settlement potential below the building sites.

10. Given the high degree of seismic performance required by the project design, we recommend a program of subexcavation and recompaction of the native soil below all structural elements in order to improve bearing capacity and reduce potential settlements to acceptable levels.

11. Surface runoff should be strictly controlled around the structures to mitigate erosion potential and avoid concentrating runoff against foundations. An engineered drainage plan is recommended for this project.

SITE PREPARATION

12. The initial preparation of the site will consist of the removal of any on-site debris and/or other deleterious material that may be encountered. Septic tanks and leaching lines, if found, must be completely removed. The extent of this soil removal will be designated by a representative of Pacific Crest Engineering Inc. in the field. This material must be removed from the site.

13. Any voids created by removal of deleterious materials, buried tanks and leach lines must be backfilled with properly compacted native soils that are free of organic and other deleterious materials or with approved imported fill.

14. Any wells encountered shall be capped in accordance with the requirements and approval of the County Health Department. The strength of the cap shall be equal to the adjacent soil and shall not be located within 5 feet of a structural footing.

15. Surface vegetation, tree roots and organically contaminated topsoil should then be removed (“stripped”) from the area to be graded. In addition, any remaining debris or large rocks must also be removed (this includes asphalt or rocks greater than 2 inches in greatest dimension). This material may be stockpiled for future landscaping. It is anticipated that the

depth of stripping may be 2 to 4 inches, however the required depth of stripping must be based upon visual observations of a representative of Pacific Crest Engineering Inc., in the field. The depth of stripping will vary upon the type and density of vegetation across the project site and with the time of year. Areas with dense vegetation may require an increased depth of stripping.

16. It is possible that there are areas of man-made fill on the project site that our field investigation did not detect. Areas of man-made fill, if encountered on the project site will need to be completely excavated to undisturbed native material. The excavation process should be observed and the extent designated by a representative of Pacific Crest Engineering Inc., in the field. Any voids created by fill removal must be backfilled with properly compacted approved native soils that are free of organic and other deleterious materials, or with approved imported fill.

17. Following the stripping and backfilling of voids, all areas to receive structural elements should be subexcavated as recommended below and shown in Figure No. 2A of Appendix A. Subexcavation in new parking, pavement or exterior (non-structural) slab areas should extend to a minimum depth of 12 inches below subgrade elevation. Recompacted sections should extend 5 feet horizontally beyond all slabs, footings and pavement areas, or to an adjacent property boundary, whichever is less.

18. In order to reduce total and differential settlements below structural elements to less than 1 and ½ inch, respectively, we recommend subexcavation and recompaction zones be established below the building envelopes as recommended below. These grades may need to be modified upon completion of final grading plans and design elevations.

SWRO/Electrical Building: 48 inches below bottom of footing elevation. Based on an approximate footing elevation of 93.5 to 97 feet, we estimate an approximate subexcavation elevation of 93 feet at the south, west and east sides, and 89.5 at north side containment area.

Administration Building: 48 inches below bottom of footing elevation. Based on an approximate footing elevation of 97 feet, we estimate an approximate subexcavation elevation of 93 feet.

Equipment Pad/Cal-Flo Containment Basin: 48 inches below bottom of slab elevation. Based on an approximate bottom of slab elevation of 97 feet, we estimate an approximate subexcavation elevation of 93 feet.

Filtered Water Tanks: Upper 72 inches, as measured from existing ground. Based on an approximate footing elevation of 92.5 feet, we estimate an approximate subexcavation elevation of 86 feet.

Treated Water Tanks: Minimum of 30 inches of engineered fill below bottom of footing elevation. Based on an approximate footing elevation of 99 feet, we anticipate that the fill required to meet the design grades for these pads will meet this requirement.

Pressure Filters/Pipe Gallery/Pump Pad: Minimum of 48 inches of engineered fill below all footing elements. Based on an approximate bottom of footing elevation of 99 feet for the pressure filter gallery, and 97 feet for the pump pad, we estimate subexcavation elevations of 95 and 93 feet, respectively.

Exterior Slabs, Pads, or Other Non-Structural Appurtenances: 60 inches below bottom of pad elevation.

19. Following subexcavation to the recommended depths, the base of the excavation should be scarified to a minimum depth of 8 inches and the soil moisture conditioned and compacted as an engineered fill except for any contaminated material noted by a representative of Pacific Crest Engineering Inc. in the field. The scarification and compaction at the base of the excavation may be waived at the sole discretion of the Geotechnical Engineer, based on the conditions exposed. The moisture conditioning procedure will depend on the time of year that the work is done, but should result in the soils being 1 to 3 percent over their optimum moisture content at the time of compaction. The excavated soil may then be placed to design grades in maximum 8 inch lifts and compacted as outlined below.

20. While we generally anticipate that the native soils can be used as engineered fill, any expansive soils or organically contaminated material which may be encountered during site development will not be allowed as engineered fill beneath foundation areas.

Note: If this work is done during or soon after the rainy season, the on-site soils and other materials may be too wet in their existing condition to be used as engineered fill. These materials may require a diligent and active drying and/or mixing operation to reduce the moisture content to the levels required to obtain adequate compaction as an engineered fill. If the on-site soils or other materials are too dry, water may need to be added.

21. The soil on the project site should be compacted as follows:

a. All engineered fill beneath structural slabs or footings should be compacted to a minimum of 95% of maximum dry density
b. In pavement areas the upper 12 inches of subgrade, and all aggregate subbase and aggregate base, should be compacted to a minimum of 95% of its maximum dry density,
c. In pavement areas all utility trench backfill should be compacted to 95% of its maximum dry density,
d. The remaining soil on the project site should be compacted to a minimum of 90% of its maximum dry density.

22. The maximum dry density will be obtained from a laboratory compaction curve run in accordance with ASTM Procedure #D1557. This test will also establish the optimum moisture content of the material. Field density testing will be performed in accordance with ASTM Test #D2922 (nuclear method).

23. Native or imported soil used as engineered fill on this project should meet the following requirements:

a. free of organics, debris, and other deleterious materials,
b. free of "recycled" materials such as asphaltic concrete, concrete, brick, etc.,
c. granular in nature, well graded, and contain sufficient binder to allow utility trenches to stand open,
d. free of rocks in excess of 2 inches in size.

In addition to the above requirements, import fill should have a Plasticity Index between 4 and 12, and a minimum Resistance "R" Value of 30, and be non-expansive.

24. All native and import fill should be placed in maximum 8 inch lifts, before compaction, at a water content which is within 1 to 3 percent of the laboratory optimum value.

25. We recommend field density testing be performed in maximum 2 foot elevation differences. In general terms, we would recommend at least one compaction test per 200 linear feet of utility trench or retaining wall backfill, and at least one compaction test per 2,000 square feet of building or structure area. This is a subjective value and may be changed by the Geotechnical Engineer based on a review of the final project layout and exposed field conditions.

26. Samples of any proposed imported fill planned for use on this project should be submitted to Pacific Crest Engineering Inc. for appropriate testing and approval not less than ten (10) working days before the anticipated jobsite delivery. Imported fill material delivered to the project site without prior submittal of samples for appropriate testing and approval must be removed from the project site.

CUT AND FILL SLOPES

27. All fill slopes should be constructed with engineered fill meeting the minimum density requirements of this report and have a gradient no steeper than 3:1 (horizontal to vertical). Fill slopes should not exceed 15 feet in vertical height unless specifically reviewed by Pacific Crest Engineering Inc. Where the vertical height exceeds 15 feet, intermediate benches must be provided. These benches should be at least 6 feet wide and sloped to control surface drainage. A lined ditch should be used on the bench.

28. Fill slopes should be keyed into the native slopes by providing a 10 foot wide base keyway sloped negatively at least 2% into the bank. The depth of the keyways will vary, depending on the materials encountered. It is anticipated that the depth of the keyways may be 3 to 6 feet, but at all locations shall be at least 2 feet into firm material.

29. Subsequent keys may be required as the fill section progress upslope. Keys will be designated in the field by a representative of Pacific Crest Engineering Inc. See Figure No. 33 for general details.

30. Cut slopes shall not exceed a 3:1 (horizontal to vertical) gradient and a 15 foot vertical height unless specifically reviewed by a representative of Pacific Crest Engineering Inc. Where the vertical height exceeds 15 feet, intermediate benches must be provided. These benches should be at least 6 feet wide and sloped to control surface drainage. A lined ditch should be used on the bench.

31. The above slope gradients are based on the strength characteristics of the materials under conditions of normal moisture content that would result from rainfall falling directly on the slope, and do not take into account the additional activating forces applied by seepage from spring areas. Therefore, in order to maintain stable slopes at the recommended gradients, it is important that any seepage forces and accompanying hydrostatic pressure encountered be relieved by adequate drainage. Drainage facilities may include subdrains, gravel blankets, rock fill surface trenches or horizontally drilled drains. Configurations and type of drainage will be determined by a representative of Pacific Crest Engineering Inc. during the grading operations.

32. The surfaces of all cut and fill slopes should be prepared and maintained to reduce erosion. This work, at a minimum, should include track rolling of the slope and effective planting. The protection of the slopes should be installed as soon as practicable so that a sufficient growth will be established prior to inclement weather conditions. It is vital that no slope be left standing through a winter season without the erosion control measures having been provided.

33. The above recommended gradients do not preclude periodic maintenance of the slopes, as minor sloughing and erosion may take place.

34. If a fill slope is to be placed above a cut slope, the toe of the fill slope should be set back at least 8 feet horizontally from the top of the cut slope. A lateral surface drain should be placed in the area between the cut and fill slopes.

EROSION CONTROL

35. The surface soils are classified as having a high potential for erosion. Therefore, the finished ground surface should be planted with ground cover and continually maintained to minimize surface erosion. Specific and detailed recommendations regarding erosion control on and surrounding the project site should be developed by the project civil engineer or an erosion control specialist.

FOUNDATION RECOMMENDATIONS – CONVENTIONAL SPREAD FOOTINGS

36. At the time we prepared this report, the project plans had not been completed and the structure location and foundation details had not been finalized. We request an opportunity to review these items during the design stages to determine if supplemental recommendations will be required.

37. In consideration of the aforementioned ground improvement recommendations, it is our opinion that an appropriate foundation system to support the proposed structures may consist

of reinforced concrete spread footings bearing upon a zone of engineered fill as outlined above.

38. Footing depths should be based upon the allowable bearing value, but not less than 18 inches for tank foundations and one to two story structures, and 24 inches for three-story structures. The minimum footing embedment is measured from the lowest existing and adjacent soil grade and should not include any concrete slab-on-grade, capillary break and sand cushion in the total depth of embedment.

39. Footings constructed to the geotechnical criteria outlined in this report may be designed for the following allowable bearing capacities:

a. 3,000 psf for Dead plus Live Load
b. a 1/3rd increase for Seismic or Wind Load

Please note: In computing the pressures transmitted to the soil by the footings, the embedded weight of the footing may be neglected

40. Provided our recommendations are closely followed during design and construction, expected total and differential settlement due to applied dead and live loads is not expected to exceed 1 inch and ½ inch, respectively. Seismically-induced settlements outside of treated areas are expected to be higher and may need to be repaired or replaced following strong seismic shaking.

41. Footings may be assumed to have a resistance to lateral sliding coefficient of 0.35. This value may be increased by 1/3 for short term wind or seismic loading. Alternatively, footings may be assumed to have a lateral bearing pressure resistance value of 350 psf/foot of foundation depth, with a 1/3 increase for wind or seismic loads. We do not recommend combining these two values.

42. A modulus of subgrade reaction of 125 tons per cubic foot may be assumed.

43. No footing should be placed closer than 10 feet to the top of an adjacent fill slope or 5 feet from the base of an adjacent cut slope. Permanent erosion control measures should be implemented for the face of cut slopes with foundations within 10 feet of the slope base. This especially applies to the area between the pump pad and pressure filters, and the pump pad and adjacent roadway.

44. All footings should be excavated to the design depths as measured from lowest adjacent soil grade. No footings shall be constructed with the intent of placing engineered fill against the footing after the footing is poured, and counting that engineered fill as part of the embedment depth of the footing.

45. All grade beams, thickened slab edges and other foundation elements which impart structure loads to the soil (from dead, live, wind or seismic loads) should be considered “footings” and constructed according to the recommendations of this section, including required depths below lowest adjacent soil grade.

46. All footing excavations must be free of loose material prior to placing concrete. Footing excavations must be observed by a representative of Pacific Crest Engineering Inc. before placement of formwork, steel and concrete to ensure bedding into proper material.

47. The footings should contain steel reinforcement as determined by the Project Civil or Structural Engineer in accordance with applicable CBC or ACI Standards.

SLAB-ON-GRADE CONSTRUCTION

48. Concrete slab-on-grade floors may be used for ground level construction on modified native soils as outlined above, or engineered fill. The upper 12 inches of slab subgrade should be processed and compacted to a minimum of 95% relative dry density as discussed above.

49. Slabs may be structurally integrated with the footings. If the slabs are constructed as "free floating" slabs, they should be provided with a minimum ¼ inch felt separation between the slab and footing. The slabs should be separated into approximately 15' x 15' square sections with dummy joints or similar type crack control devices.

50. All interior concrete slabs-on-grade should be underlain by a minimum of 4-inches of capillary break material consisting of ¾-inch clean crushed rock (no fines). It is recommended that neither Class II baserock nor sand be employed as the capillary break material.

51. Where floor coverings are anticipated or vapor transmission may be a problem, a vapor retarder/membrane should be placed between the capillary break layer and the floor slab in order to reduce the potential for moisture condensation under floor coverings. We recommend a high quality vapor retarder at least 10 mil thick and puncture resistant (Stego Wrap or equivalent). The vapor retarder must meet the minimum specifications for ASTM E-1745, Standard Specification For Water Vapor Retarder. Please note that low density polyethylene film (such as Visqueen) may meet minimum current standards for permeability but not puncture resistance. Laps and seams should be overlapped at least six inches and properly sealed to provide a continuous layer beneath the entire slab that is free of holes, tears or gaps. Joints and penetrations should also be properly sealed.

52. Floor coverings should be installed on concrete slabs that have been constructed according to the guidelines outlined in ACI 302.2R and the recommendations of the flooring material manufacturer.

53. Currently, ACI 302-1R recommends that concrete slabs to receive moisture sensitive floor coverings be placed directly upon the vapor retarder, with **no sand cushion**. ACI states that vapor retarders are not effective in preventing residual moisture within the concrete slab from migrating to the surface. Including a low water-to-cement ratio (less than 0.50) and/or admixtures into the mix design are generally necessary to minimize water content, reduce soluble alkali content, and provide workability to the concrete. As noted in CIP 29 (*Concrete in Practice by the National Ready Mixed Concrete Association*), placing concrete directly on the vapor retarder can also create potential problems. If environmental conditions do not

permit rapid drying of bleed water from the slab surface then the excess bleeding can delay finishing operations (refer to CIP 13, 19 and 20). Most of these problems can be alleviated by using a concrete with a low water content, moderate cement factor, and well-graded aggregate with the largest possible size. **With the increased occurrence of moisture related floor covering failures, minor cracking of floors placed on a vapor retarder and other problems discussed here are considered a more acceptable risk than failure of floor coverings, and these potential risks should be clearly understood by the Client and Project Owner**.

54. If a sand layer is chosen as a cushion for slabs without floor coverings, it should consist of clean sand. Clean sand is defined as 100 percent passing the #4 sieve, and less than 5 percent passing the #200 sieve.

55. Requirements for pre-wetting of the subgrade soils prior to the pouring of the slabs will depend on the specific soils and seasonal moisture conditions and will be determined by a representative of Pacific Crest Engineering Inc. at the time of construction. It is important that the subgrade soils be properly moisture conditioned at the time the concrete is poured. Subgrade moisture contents should not be allowed to exceed our moisture recommendations for effective compaction, and should be maintained until the slab is poured.

Please Note: Recommendations given above for the reduction of moisture transmission through the slab are general in nature and present good construction practice. Moisture protection measures for concrete slabs-on-grade should meet applicable ACI and ASTM standards. Pacific Crest Engineering Inc. are not waterproofing experts. For a more complete and specific discussion of moisture protection within the structure, a qualified waterproofing expert should be consulted to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. The waterproofing consultant should provide recommendations for mitigation of potential adverse impacts of moisture vapor transmission on various components of the structure as deemed appropriate.

56. Slab thickness, reinforcement, and doweling should be determined by the Project Civil or Structural Engineer. The use of welded wire mesh is not recommended for slab reinforcement.

UTILITY TRENCHES

57. Utility trenches that are parallel to the sides of the building should be placed so that they do not extend below a line sloping down and away at a 2:1 (horizontal to vertical) slope from the bottom outside edge of all footings.

58. Utility pipes should be designed and constructed so that the top of pipe is a minimum of 24 inches below the finish subgrade elevation of any road or pavement areas. Any pipes within the top 24 inches of finish subgrade should be concrete encased, per design by the Project Civil Engineer.

59. For the purpose of this section of the report, backfill is defined as material placed in a trench starting one foot above the pipe, and bedding is all material placed in a trench below the backfill.

60. Unless concrete bedding is required around utility pipes, free-draining clean sand should be used as bedding. Sand bedding should be compacted to at least 95 percent relative compaction.

61. Approved imported clean sand or native soil should be used as utility trench backfill. Backfill in trenches located under and adjacent to structural fill, foundations, concrete slabs and pavements should be placed in horizontal layers no more than 8 inches thick. This includes areas such as sidewalks, patios, and other hardscape areas. Each layer of trench backfill should be water conditioned and compacted to at least 95 percent relative compaction. Clean sand is defined as 100 percent passing the #4 sieve, and less than 5 percent passing the #200 sieve.

62. Utility trenches should be backfilled with controlled density fill (such as 2-sack sand\cement slurry) below perimeter footing areas to help minimize potential moisture intrusion below slabs. The length of the plug should extend a minimum of three times the footing width to either side of the slab perimeter, but no less than 36 inches. A representative from Pacific Crest Engineering Inc. should be contacted to observe the placement of slurry plugs.

63. A representative from our firm should be present to observe the bottom of all trench excavations, prior to placement of utility pipes and conduits. In addition, we should observe the condition of the trench prior to placement of sand bedding, and to observe compaction of the sand bedding, in addition to any backfill planned above the bedding zone.

64. Jetting of the trench backfill is not recommended as it may result in an unsatisfactory degree of compaction.

65. Trenches must be shored as required by the local agency and the State of California Division of Industrial Safety construction safety orders.

LATERAL PRESSURES

66. Retaining walls with full drainage should be designed using the following criteria:

a. The following lateral earth pressure values should be used for design:

TABLE No. 4, Active and At-Rest Earth Pressure Values

Backfill Slope (H:V)	Active Earth Pressure (psf/ft of depth)	At-rest Earth Pressure (psf/ft of depth)
Level	35	55
3:1	40	60

67. Active earth pressure values may be used when walls are free to yield an amount sufficient to develop the active earth pressure condition (about 1% of height). The effect of wall rotation should be considered for areas behind the planned retaining wall (pavements, foundations, slabs, etc.). **When walls are restrained at the top or to design for minimal wall rotation, use the at-rest earth pressure values.**

a. For resisting passive earth pressure use 350 psf/ft of depth.

b. A "coefficient of friction" between base of foundation and soil of 0.35.

c. Site wall footings not associated with structural foundations may be designed for an allowable bearing capacity of 1,200 psf for dead plus live load, with a one-third increase for short term loads.

d. To develop the resisting passive earth pressure, the retaining wall footings should be embedded a minimum of 18 inches below the lowest adjacent grade. There should be a minimum of 5 feet of horizontal cover as measured from the outside edge of the footing.

e. Any live or dead loads which will transmit a force to the wall, refer to Figure No. 34.

f. For flexible (yielding) retaining walls, the resultant seismic force on the wall is $10H^2$. This force has been estimated using the Mononobe-Okabe method of analysis as modified by Whitman (1990), and assumes a yielding wall condition. **Note that the resultant seismic force should be assumed to act at a point 0.33H up from the base of the wall.**

g. For rigid (non-yielding) retaining walls, the resultant seismic force on the wall is $14H^2$. **Note that the resultant seismic force should be assumed to act at a point 0.33H up from the base of the wall.**

Please note: Should the slope behind the retaining walls be other than shown in Table No.4, supplemental design criteria will be provided for the active earth or at rest pressures for the particular slope angle.

68. The above criteria are based on **fully drained conditions**. Therefore, we recommend that permeable material meeting the State of California Standard Specification Section 68-1.025, Class 1, Type A, be placed behind the wall, with a minimum width of 12 inches and extending for the full height of the wall to within 1 foot of the ground surface. The permeable material should be covered with Mirafi 140N filter fabric or equivalent and then compacted native soil placed to the ground surface. A 4 inch diameter perforated rigid plastic drain pipe should be installed within 3 inches of the bottom of the permeable material and be discharged to a suitable, approved location such as the project storm drain system. The perforations should be located and oriented on the lower half of the pipe. Neither the

pipe nor the permeable material should be wrapped in filter fabric. Please refer to Figure No. 35, Typical Retaining Wall Drain Detail.

69. The area behind the wall and beyond the permeable material should be compacted with approved material to a minimum relative dry density of 90%.

SURFACE DRAINAGE

70. Following completion of the project we recommend that storm drainage provisions and performance of permanent erosion control measures be closely observed through the first season of significant rainfall, to determine if these systems are performing adequately and, if necessary, resolve any unforeseen issues.

71. Surface water must not be allowed to pond or be trapped adjacent to the building foundations nor on the building pad nor in the parking areas.

72. All roof eaves should be guttered, with the outlets from the downspouts provided with adequate capacity to carry the storm water from the structures to reduce the possibility of soil saturation and erosion. The connection should be in a closed conduit which discharges at an approved location away from the structures and the graded area. The discharge location should not be located at the top of, or on the face of any topographic slopes. We would recommend a discharge point which is at least 10 feet down slope of any foundation or fill areas.

73. Final grades should be provided with a positive gradient away from all foundations in order to provide for rapid removal of the surface water from the foundations to an adequate discharge point. Soil grades should slope away from foundation areas at least 5 percent for the first 10 feet. Impervious surface areas should slope away from foundations at least 2 percent for the first 10 feet. Concentrations of surface water runoff should be handled by providing necessary structures, such as paved ditches, catch basins, etc.

74. Cut and fill slopes shall be constructed so that surface water will not be allowed to drain over the top of the slope face. This may require berms along the top of fill slopes and surface drainage ditches above cut slopes. All cut, fill and disturbed native slope areas should be hydro-seeded or other means of erosion control provided, as determined by the Project Civil Engineer.

75. Irrigation activities at the site should not be done in an uncontrolled or unreasonable manner.

76. The building and surface drainage facilities must not be altered nor any filling or excavation work performed in the area without first consulting Pacific Crest Engineering Inc. Surface drainage improvements developed by the project civil engineer must be maintained by the property owner at all times, as improper drainage provisions can produce undesirable affects.

PAVEMENT DESIGN

77. Although subgrade soil R-values ranged from 68 to 72, these values exceed the maximum R-value of 50 as recommended by the Caltrans Highway Design Manual. Therefore, our design is limited to a maximum assumed R-value of 50 for the subgrade soils.

78. For design purposes, the following traffic indices are suggested:
   a. Parking stalls T.I. = 4½
   b. Traffic aisles T.I. = 5
   c. Truck usage areas T.I. = 6½

*Pacific Crest Engineering Inc. has not performed a site specific traffic study to determine the actual traffic indices associated with this project. These values are for general design purposes only and the values may need modification. Traffic volume and equivalent axle loads that exceed the assumed TI could be destructive to the pavement, resulting in an accelerated rate of deterioration and the need for increased maintenance.

79. The following table provides a flexible pavement design which is based on the Caltrans Highway Design Manual – Chapter 600 (last updated November 2, 2013).

The following pavement sections are suggested:

TABLE No.5, Recommended Pavement Sections

Material	Traffic Index		
	4½	5	6½
Asphalt Concrete	2.5 inches	3.0 inches	3.5 inches
Class 2 Aggregate Base, R=78 min.	5.0 inches	5.0 inches	7.0 inches

80. To have the selected pavement sections perform to their greatest efficiency, it is very important that the following items be considered:

   a. Properly scarify and moisture condition the upper 12 inches of the subgrade soil and compact it to a minimum of 95% of its maximum dry density, at a moisture content 1 to 3% over the optimum moisture content for the soil.

   b. Provide sufficient gradient to prevent ponding of water.

   c. Use only quality materials of the type and thickness (minimum) specified. All aggregate base and subbase must meet Caltrans Standard Specifications for Class 2 materials, and be angular in shape. All Class 2 aggregate base should be ¾ inch maximum in aggregate size.

   d. Compact the base and subbase uniformly to a minimum of 95% of its maximum dry density.

e. Use ½ inch maximum, Type "A" medium graded asphaltic concrete. Place the asphaltic concrete only during periods of fair weather when the free air temperature is within prescribed limits by Cal Trans Specifications.

f. Place ¼ gallon per square yard of SG-70 prime coat over the aggregate base section, prior to placement of the asphaltic concrete.

g. Porous pavement systems which consist of porous paving blocks, asphaltic concrete or concrete are generally not recommended due to the potential for saturation of the subgrade soils and resulting increased potential for a shorter pavement life. At a minimum, porous pavement systems should include a layer of Mirafi HP370 geotextile fabric placed on the subgrade soil beneath the porous paving section. These pavement systems should only be used with the understanding by the Owner of the increased potential for pavement cracking, rutting, potholes, etc.

h. Maintenance should be undertaken on a routine basis.

SOIL CORROSIVITY

81. Corrosivity tests were run on two representative surface soil samples collected on the project site. These results are summarized as follows:

TABLE No.5, Corrosivity Test Summary

Sample	Soil Resistivity	Chloride	Sulfate (water soluble)	pH
	Ohm-cm	mg/kg	mg/kg	
1-1-2	11,853	12	3	7.0
2-2	10,900	3	2	7.6
3-1-2	4,826	19	17	6.6
4-1-1	20,850	5	3	6.2
5-1-3	21,350	7	3	6.1
6-1-3	16,644	7	2	6.0
7-1-3	8,993	10	12	6.2
8-1-3	30,958	3	2	6.2
9-2	10,580	3	<2	7.8
10-1-2	9,618	8	5	6.9
B-14@GS	8,362	5	5	6.9

82. Soil resistivity is a measure of the ability of a soil to conduct electrical current. Lower resistivity generally indicates higher corrosivity. Levels between 0 and 1,000 ohm-cm are

correlated to very corrosive soils, while levels of 10,000 and above are considered to have a negligible degree of corrosivity. The resistivity results from the collected samples indicate the native soils to be negligibly to mildly corrosive. In general, ASTM A-674 considers soils with resistivity less than 1,500 ohm-cm to be corrosive to cast iron alloys and ductile iron pipe.

83. The concentration of chloride and sulfate in soils can also have a corrosive effect on buried utilities and foundation elements. Soil chloride concentrations over 1,500 mg/kg are considered to have a severe degree of corrosivity, while levels below 300 mg/kg are considered negligible. Sulfate levels over 5,000 mg/kg are considered as having a severe degree of corrosivity, while levels below 1,000 mg/kg are considered negligible.

84. Another factor influencing corrosion potential is pH. Values below a pH of 6 indicate an increasing potential for significant acid attack on concrete and steel. Cal Trans recommends that, for highly acidic sites (pH is less than 5.5), additional concrete cover over steel reinforcement or a protective coating on concrete surfaces be used as mitigation measures.

85. Cal Trans considers a site to be corrosive to foundation elements if one or more of the following conditions exist at the site:

a. The soil resistivity is **less than** 1,000 ohm-cm
b. Chloride concentration is **greater than** or equal to 500 mg/Kg (ppm)
c. Sulfate concentration is **greater than** or equal to 2000 mg/Kg (ppm)
d. The soil pH is 5.5 **or less**

Refer to Cal Trans Corrosion Guidelines, version 1.0 (September, 2003) for additional information.

86. Based on the results of the chloride, sulfate and pH, it appears that the conditions in the shallow existing soil may be assumed to be non-corrosive based on Cal Trans guidelines. The corrosion potential for any imported select fill should also be checked for corrosivity.

87. Please refer to Figure No. 36 in Appendix A for the specific corrosivity results by the analytical laboratory.

PERCOLATION CHARACTERISITICS

As part of our geotechnical investigation, our firm performed a percolation study to ascertain infiltration rates of the native soils in the areas of the proposed bio-retention planter and reclamation basins. The study utilized a combination of drilled borings, grain size analyses and falling head percolation tests to document the general subsurface conditions at each test location. This information was then used to develop infiltration rates and identify subsurface layers that might inhibit or promote percolation of stormwater runoff.

A total of four (4) percolation tests were performed at depths ranging between 6 and 15 feet below the ground surface. Please refer to Figure No. 2 in Appendix A for the percolation test locations.

Subsurface Conditions

The test boring for percolation test location **B-12** encountered medium grained, brown sand with a trace amount of binder in the upper 5 feet. From 5 feet to the maximum explored depth of 7 feet, the soil was described as fine to medium grained, strong brown silty sand with approximately 23.4% passing the No. 200 sieve.

The test boring for percolation test location **B-13** encountered brown, medium to coarse grained, poorly graded sand in the upper 4½ feet. Strong brown, well graded, fine to coarse grained sand was noted from 4½ to 9½ feet. From 9½ feet to the maximum explored depth of 15 feet, the boring encountered very pale brown, medium grained, clean sand with about 5.5% passing the No. 200 sieve.

The test boring for percolation test location **B-15** encountered brown, medium to coarse grained, poorly graded sand in the upper 4½ feet. From 4½ feet to the maximum explored depth of 17 feet, the boring encountered pale brown, medium to coarse grained, poorly graded, clean sand with approximately 3.8% passing the No. 200 sieve.

The test boring for percolation test location **B-16** encountered medium to coarse grained, brown, poorly graded sand in the upper 4 ½ feet. From 4 ½ feet to the maximum explored depth of 10 feet, the boring encountered strong brown, fine to coarse grained, poorly graded sand with silt. About 6.4% passed the No. 200 sieve.

Groundwater was not encountered in any of the percolation test borings to the maximum explored depth of 17 feet.

Preparation of Percolation Test Holes

All percolation test holes were drilled using a 6-inch diameter mechanically operated continuous flight auger. A geologist from Pacific Crest Engineering Inc. was present during the drilling operations to log the soil encountered and to choose percolation test depths. Upon completion of drilling, a 4-inch diameter perforated pipe was then placed within each test hole and the annular space between the perforated pipe and boring sidewall was backfilled with clean, crushed ½-inch drain rock.

Percolation Test Procedure

The testing was performed based on the Central Coast Regional Water Quality Control Board's (RWQCB) guidance on percolation testing for "shallow infiltration-based storm water control measures." This testing method utilizes a 30-minute period in which a constant head is maintained at the planned elevation of the planter or pond. The volume of water that entered the test boring during the 30-minute period is noted on the percolation data sheets. Immediately following the 30-minute period of constant head, a falling head percolation test commenced. Depending on the rate of fall, measurements were recorded at intervals ranging from 30 seconds to 10 minutes, over periods ranging from 35 minutes to 2 hours.

The rates of fall were typically rapid, as indicated by the quick measurement intervals and relatively short testing periods. The rapid fall rates are directly related to the clean, granular soils typical of the site, especially at depths below 6 feet. It should be noted that due to the rapid infiltration it was impossible to maintain a constant head at test locations B-13, B-15, and B-16; a water level approximately 2 to 3 feet above the bottom of the deeper percolation holes was the greatest amount of head that could be achieved. As a result, the volume of water required to achieve 2 to 3 feet of head was recorded prior to the commencement of the percolation test. Once the test boring ran dry, the water level was refilled to the "maximum head" level and the measurements were continued for a period of approximately 40 minutes. Only B-12 had rates of fall slow enough to run the "Quick Infiltration Testing" in full accordance with RWQCB recommendations.

The Porchet Method (Inverse Borehole Method) was used to calculate the infiltration rate of each test boring. This method provides a calculation to determine the field saturated hydraulic conductivity (K_{fs}) in units of inches/hour. The infiltration rate is then divided by a factor of safety of 2.0 in order to determine a design infiltration rate (K_d). To account for surficial clogging of the pond and other factors, we have also established a recommended long term saturated hydraulic conductivity value (K_{LT}) for to be used for design of the ponds. The results are summarized below:

Percolation Test	Approximate Boring Elevation (feet)	Depth of Test Boring (feet)	Test Elevation (feet)	K_{FS} Field Saturated Hydraulic Conductivity (in/hr)	K_d (FS = 2.0)	K_{LT} Design Long Term Saturated Hydraulic Conductivity (in/hr)
B-12	101.5	6.00	95.5	1.6	0.8	0.0
B-13	93.5	11.75	81.75	16.7	8.4	5.0
B-15	100	15.02	84.98	58.3	29.2	5.0
B-16	93	9.15	83.85	24.1	12.0	5.0

Please refer to Appendix E for the data sheet for each percolation test site.

Limitations of Test Procedure

With the exception of a relatively shallow surface stratum of silty sand, the project area appears to be predominately underlain by poorly graded, clean sands with discontinuous and fingering interbeds of silty sand. As a result, water infiltrates into these soils rapidly and a copious amount of water or groundwater table is necessary for the soils to be considered partially or completely saturated. The percolation testing was conducted in accordance with the Central Coast RWQCB guidelines for shallow based storm water control measures to the best of our ability. Nonetheless, the rapid infiltration rates at B13, B15 and B16 limited our ability to completely follow the guidelines as maintaining a constant head for a 30 minute period was impossible for the percolation test holes deeper than 6 feet below ground surface. As a result, it is possible that measured infiltration rates will be slightly less for the deeper locations if all criteria, as outlined in the Central Coast RWQCB guidelines, are met. In

consideration of these issues, as well as the potential for surface clogging of the ponds during extended use, we recommend limiting the design long term saturated hydraulic conductivity rate to 5 inches per hour. The near surface silty sand materials are not suitable for infiltration of stormwater runoff.

Conclusions

In general, percolation rates tend to decrease as the percentage of fine grained soil increases. The Unified Soil Classification System defines fine grained soils as material with 50 percent or more passing the No. 200 sieve. In addition, fine grained soil can be divided into two sub-groups, silt and clay. The deviation between silt and clay is also dependent on the materials respective particle size, with silt being coarser grained than clay. Therefore, percolation rates also tend to decrease as a soil transitions from silt to clay.

The near surface soils across the site contained the highest percentage of fine grained soils. These soils were generally described as silty sand. Below a depth of approximately 6 feet below ground surface, the percentage of fines typically decreased and the soils were classified as sand or sand with silt. An occasional interbed of silty sand was encountered within several of the test borings. Test depths of approximately 6, 9, 12, and 15 feet yielded percolation rates of 1.6, 16.7, 58.3, and 24.1 inches per hour, respectively. In our opinion the large degree of variability is directly related to the amount of fines present within each test location. The testing holes encountering interbeds of fine grained silty sand typically had slower measured infiltration rates than those that encountered predominately medium to coarse grained soils. Based upon the results of our percolation testing, the maximum saturated hydraulic conductivity rate was noted at approximately 15 feet below ground surface (approximate Elevation 85 feet).

We recommend that all soils within the proposed bio-retention/detention basin area be properly classified during the construction process by a representative of Pacific Crest Engineering, Inc.

Maintenance of the basins will be critical in order to maintain the design percolation rates. The bottoms of the basins should be cleaned on a routine basis following each winter season to remove accumulated fines that could reduce the permeability of the basin soils.

PLAN REVIEW

88. We respectfully request an opportunity to review the project plans and specifications during preparation and before bidding to insure that the recommendations of this report have been included and to provide additional recommendations, if needed. These plan review services are also typically required by the reviewing agency. Misinterpretation of our recommendations or omission of our requirements from the project plans and specifications may result in changes to the project design during the construction phase, with the potential for additional costs and delays in order to bring the project into conformance with the requirements outlined within this report. Services performed for review of the project plans and specifications are considered “post-report” services and billed on a “time and materials” fee basis in accordance with our latest Standard Fee Schedule.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. This Geotechnical Investigation was prepared specifically for CDM Smith and for the specific project and location described in the body of this report. This report and the recommendations included herein should be utilized for this specific project and location exclusively. This Geotechnical Investigation should not be applied to nor utilized on any other project or project site. Please refer to the ASFE "Important Information about Your Geotechnical Engineering Report" attached with this report.

2. The recommendations of this report are based upon the assumption that the soil conditions do not deviate from those disclosed in the borings. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that planned at the time, our firm should be notified so that supplemental recommendations can be provided.

3. This report is issued with the understanding that it is the responsibility of the owner, or his representative, to insure that the information and recommendations contained herein are called to the attention of the Architects and Engineers for the project and incorporated into the plans, and that the necessary steps are taken to insure that the Contractors and Subcontractors carry out such recommendations in the field.

4. The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural process or the works of man, on this or adjacent properties. In addition, changes in applicable or appropriate standards occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or partially, by changes outside of our control. This report should therefore be reviewed in light of future planned construction and then current applicable codes. This report should not be considered valid after a period of two (2) years without our review.

5. This report was prepared upon your request for our services in accordance with currently accepted standards of professional geotechnical engineering practice. No warranty as to the contents of this report is intended, and none shall be inferred from the statements or opinions expressed.

6. The scope of our services mutually agreed upon for this project did not include any environmental assessment or study for the presence of hazardous or toxic materials in the soil, surface water, groundwater, or air, on or below or around this site.

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you —* should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

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APPENDIX A

Regional Site Map
Site Map Showing Test Borings
Site Map Showing Recommended Redensification Areas
Boring Log Explanation
Log of Test Borings
Direct Shear Test Results
Typical Keyway Detail
Surcharge Pressure Diagram
Typical Retaining Wall Drain Detail
Corrosivity Test Summary

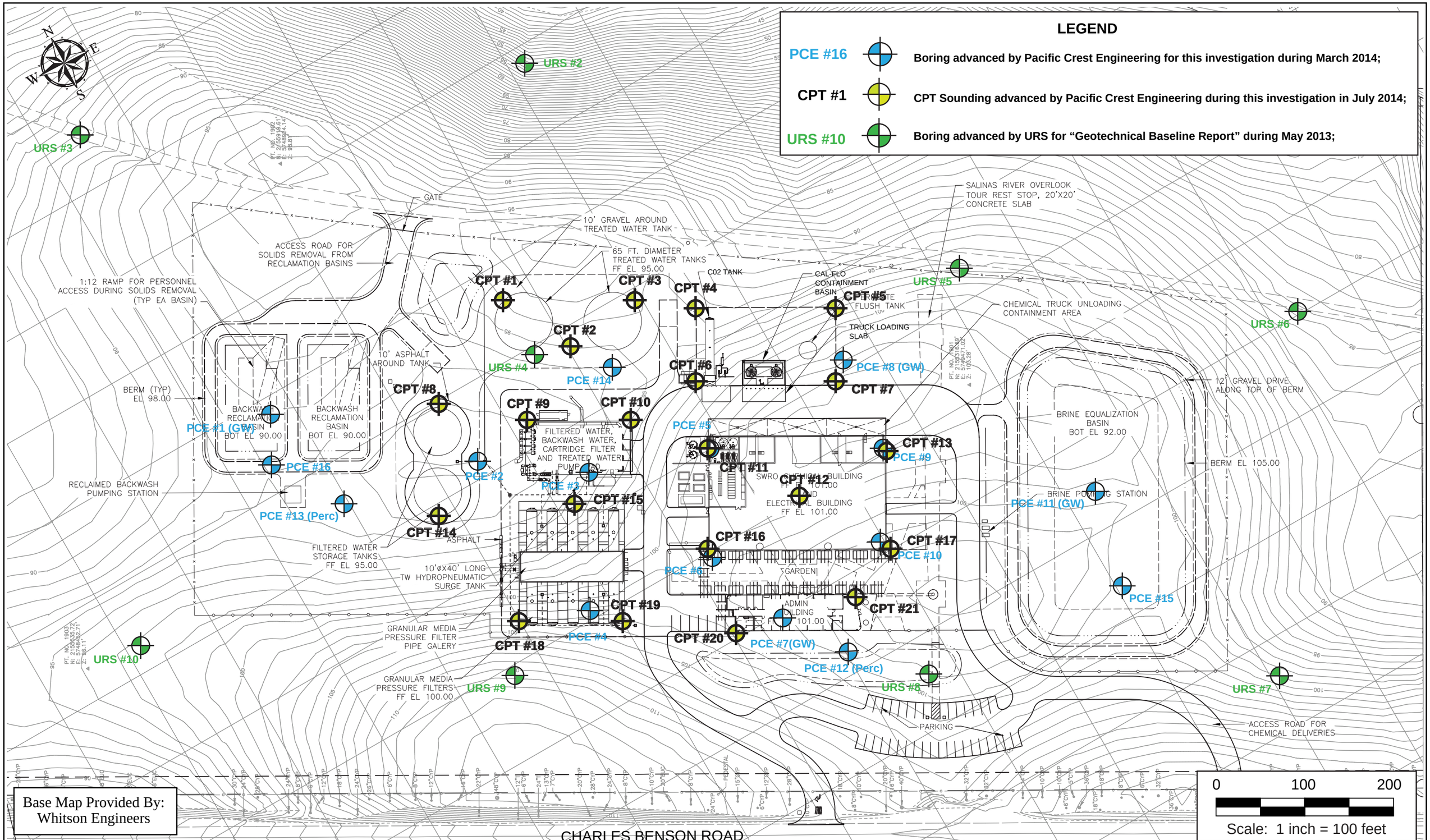
miles 1
km 2

0 2416 ft.
Approximate Scale

N

Base Map from Google Maps

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Regional Site Map** Monterey Peninsula Desalination Plant Monterey County, California	Figure No. 1 Project No. 1405 Date: 9/2/14



Base Map Provided By:
Whitson Engineers

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Site Map Showing Test Boring and CPT Locations** Monterey Peninsula Desalination Plant Monterey County, California	Figure No. 2 Project No. 1405 Date: 9/2/14

Base Maps Provided by:
Whitson Engineers

Treated Water Tanks
30 inches below bottom of footing elevation
5 feet beyond tank foundation

Equipment Pad/Cal-Flo Containment Basin
48 inches below bottom of slab
5 feet beyond pad footprint

Filtered Water Tanks
Upper 72 inches, as measured from existing ground
5 feet beyond tank foundation

SWRO/Electrical Building
48 inches below bottom of footing elevation
5 feet beyond building footprint

Pressure Filters/Pipe Gallery/Pump Pad
48 inches below bottom of footing
5 feet beyond pad footprint

Administration Building
48 inches below bottom of footing elevation
5 feet beyond building footprint

BIORETENTION POND #2
BASIN BOTTOM EL.: 89.0
MAX WSE 91.5

TREATED WATER TANK NO. 2 PAD 100.5

TREATED WATER TANK NO. 1 PAD 100.5

FILTERED WATER TANK NO. 2 PAD 95.0

FILTERED WATER TANK NO. 1 PAD 95.0

PUMPS PAD 98.0

PRESSURE FILTERS PAD 100.0

SWRO CHEMICAL BUILDING AND ELECTRICAL BUILDING FF 101.0

ADMIN BUILDING FF 101.0

DAYLIGHT LIMITS, TYP

BASIN BOTTOM EL.: 90.9
BASIN TOP EL.: 104.0
MAX WSE 101.0
VOL @ MAX WSE 3 MG

BACKWASH RECLAMATION BASINS
BOTTOM BASIN EL.: 89.0
TOP BASIN EL.: 98.0
USABLE POND VOLUME (EL 95.0 TO EL 91.0)
USABLE VOL 252,000 GAL (EA. BASIN)

BIORETENTION POND #1
BOTTOM 98.0
MAX WSE 98.9
VOL @ MAX WSE 0.17 AC-FT

CHARLES BENSON LANE

<1"

EXPLANATION

Recommended ground improvement area - includes 5-foot horizontal offset

0 100 200

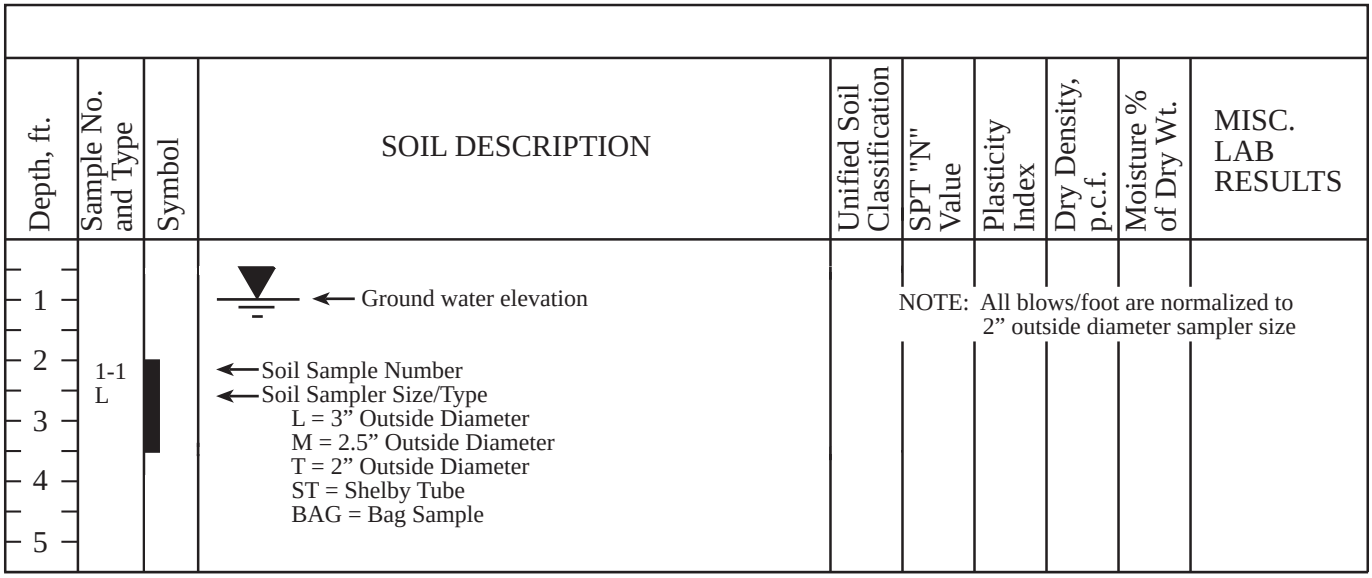
Scale: 1 inch = 100 feet

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Site Map Showing Recommended Ground Improvement Areas** Monterey Peninsula Desalination Plant Monterey County, California	Figure No. 2A Project No. 1405 Date: 9/2/2014

UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2488 (Modified)

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN #200 SIEVE SIZE	**GRAVELS** MORE THAN HALF OF COARSE FRACTION IS LARGER THAN #4 SIEVE	**CLEAN GRAVELS** (LESS THAN 5% FINES)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravels-sand mixtures, little or no fines
		GRAVELS (MORE THAN 12% FINES)	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN #4 SIEVE	**CLEAN SANDS** (LESS THAN 5% FINES)	SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
		SANDS (MORE THAN 12% FINES)	SM	Silty sands, sand-silt mixtures, non-plastic fines
			SC	Clayey sands, sand-clay mixtures, plastic fines
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE	**SILTS AND CLAYS** LIQUID LIMIT IS LESS THAN 35%		ML	Inorganic silts and very fine clayey sand silty sands, with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly, sand, silty or lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS LIQUID LIMIT IS BETWEEN 35% AND 50%		MI	Inorganic silts, clayey silts and silty fine sands of intermediate plasticity
			CI	Inorganic clays, gravelly/sandy clays and silty clays of intermediate plasticity
			OI	Organic clays and silty clays of intermediate plasticity
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Organic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils

BORING LOG EXPLANATION



RELATIVE DENSITY

SANDS AND GRAVELS	BLOWS/FOOT
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

CONSISTENCY

SILTS AND CLAYS	BLOWS/FOOT
VERY SOFT	0-2
SOFT	2-4
FIRM	4-8
STIFF	8-16
VERY STIFF	16-32
HARD	OVER 32

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Boring Log Explanation** Monterey Peninsula Desalination Plant Monterey County, California	Figure No. 3 Project No. 1405 Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/12/14 BORING DIAMETER 8" HS BORING NO. 1

Depth (feet)	Sample No. and Type	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1	1-1 L	Brown (7.5YR 4/3) Clayey SAND, medium to coarse grained, sub-rounded to rounded shaped, poorly graded, trace rootlets near 1 1/2 feet, damp, very loose	SC	3		112.5	6.3	% Gravel = 0.0 % Sand = 85.5 % Fines = 14.5
3	1-2 T	Strong brown (7.5YR 4/6) Silty SAND, clean, fine to coarse grained, sub-rounded to rounded shaped, poorly graded, quartz rich, massive, trace rootlets randomly distributed thorughout the sample, slightly damp, loose	SM	5			3.0	14.5% Passing #200 Sieve
5	1-3 L	Color change to reddish yellow (7.5YR 6/6) as sample grades to SAND with Silt, trace very coarse grains, well graded, trace very small mica flakes scattered throughout the sample, slightly cemented, slightly damp, loose	SW-SM	7		113.3	3.3	% Gravel = 0.0 % Sand = 89.6 % Fines = 10.4
10	1-4 T	Light yellowish brown (10YR 6/4) grading to pale brown (10YR 7/4) SAND, clean, medium to coarse grained with trace fine grains, sub-rounded to rounded shape, poorly graded, quartz rich, massive, slightly damp, medium dense	SP	23			3.3	
15	1-5 L	Color change to mottled very pale brown (10YR 7/3) and yellowish brown (10YR 5/8), slight decrease in coarseness of sand, medium grained, slightly damp to dry, medium dense		18		109.3	5.0	% Gravel = 0.0 % Sand = 97.0 % Fines = 3.0
20	1-6 T	Slightly damp, medium dense		26			3.2	

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Log of Test Borings
Monterey Peninsula Desalination Plant
Monterey County, California

Figure No. 4
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/12/14 BORING DIAMETER 8" HS BORING NO. 1

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
25	1-7 L		Very pale brown (7.5YR 7/3) SAND, clean, medium grained with trace fine grains and trace coarse grains, sub-rounded to rounded shaped, poorly graded, quartz rich, massive, slightly damp to dry, dense	SP	31		109.4	7.6	% Gravel = 0.0 % Sand =97.8 % Fines = 2.2
30	1-8 L		Color change to light yellowish brown (10YR 6/4), slight increase in coarseness of sand, slightly damper than the previous sample, medium dense		27			2.5	
35	1-9 L		Sample fines slight with depth as it grades to SAND with Silt, damp, medium dense	SP-SM	29		112.8	7.6	% Gravel = 0.0 % Sand = 89.5 % Fines = 10.5
40	1-10 T		Increase in moisture content, damp to slightly moist, medium dense		29			9.5	
45									
48									

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Log of Test Borings
Monterey Peninsula Desalination Plant
Monterey County, California

Figure No. 5
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/12/14 BORING DIAMETER 8" HS BORING NO. 1

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
49			Very pale brown (7.5YR 7/4) SAND with Silt, clean, medium grained with trace fine grains and trace coarse grains, sub-rounded to rounded shaped, poorly graded, quartz rich, massive, slightly damp to dry, very dense	SP-SM					
50	1-11 L				50/6"		106.4	6.1	% Gravel = 0.0 % Sand = 94.0 % Fines = 6.0
51									
52									
53									
54									
55									
56									
57									
58									
59									
60	1-12 T		▽ Wet, very dense						
61					56			22.7	
62									
63									
64									
65									
			Boring terminated at 65 feet. Groundwater initially encountered at 60 feet.						
66									
67									
68									
69									
70									
71									
72									

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Log of Test Borings
Monterey Peninsula Desalination Plant
Monterey County, California

Figure No. 6
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/12/14 BORING DIAMETER 8" HS BORING NO. 2

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1	2-1 L		Brown (7.5YR 4/3) Silty SAND, trace binder, fine to medium grained, sub-rounded to rounded shaped, poorly graded, trace rootlets randomly distributed throughout the sample, damp, very loose	SM					
2					3		109.5	5.0	14.7% Passing #200 Sieve
3	2-2 T		Color change to brown (7.5YR 5/3) near 4 feet, trace coarse grains, slightly damp, loose						
4					8			6.7	
5	2-3 L		Color change to brown (7.5YR 5/4), slightly cemented, slightly damp, medium dense						
6					14		109.9	3.4	
7									
8									
9									
10	2-4 T		Very pale brown (10YR 7/4) SAND, medium to coarse grained, sub-rounded to rounded shaped, poorly graded, quartz rich, massive, slightly damp, medium dense	SP					
11					11			2.9	2.5% Passing #200 Sieve
12									
13									
14									
15	2-5 L		Less than 10% lithics, slight increase in moisture content, damp, medium dense						
16					17		110.8	4.1	
17			Boring terminated at 16 1/2 feet. No groundwater encountered.						
18									
19									
20									
21									
22									
23									
24									

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Log of Test Borings
Monterey Peninsula Desalination Plant
Monterey County, California

Figure No. 7
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/12/14 BORING DIAMETER 8" HS BORING NO. 3

Depth (feet)	Sample No. and Type	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1	3-1 L	Brown (7.5YR 4/2) SAND, trace binder, medium grained, poorly graded, sub-rounded to rounded shaped, trace rootlets randomly distributed throughout the sample, damp, very loose	SM					Direct Shear: C_p = 50 psf ϕ_p = 38° C_r = 40 psf ϕ_p = 37°
2				2		112.0	5.7	
3	3-2 T	Color change to brown (7.5YR 4/3), slight decrease in coarseness of sand, fine to medium grained, sand fines with depth, slightly damp, very loose						
4				4			6.3	
5	3-3 L	Very pale brown (10YR 7/3) Silty SAND, fine to medium grained with trace coarse grains, sub-rounded to rounded shaped, poorly graded, slightly cemented, damp to dry, loose	SM					19.1% Passing #200 Sieve
6				9		104.6	2.1	
7								
8								
9								
10	3-4 T	Light yellowish brown (10YR 6/4) SAND, clean, medium grained with trace fine and trace coarse grains, sub-rounded to rounded shaped, poorlygraded, quartz rich, massive, slightly damp, medium dense	SP					
11				13			4.8	
12								
13								
14								
15	3-5 L	Sand coarsens slightly near 16 feet then fines to medium grained with trace fine and trace coarse grained, slightly damp, medium dense						3.2% Passing #200 Sieve
16				14		107.9	3.6	
17								
18								
19								
20	3-6 T	Trace brownish yellow (10YR 6/8) oxidation patches randomly distributed throughout the sample, slightly damp, medium dense						
21				17			4.1	
22		Boring terminated at 21 1/2 feet. No groundwater encountered.						
23								
24								

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Log of Test Borings
Monterey Peninsula Desalination Plant
Monterey County, California

Figure No. 8
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/12/14 BORING DIAMETER 8" HS BORING NO. 4

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1	4-1 L		Brown (7.5YR 4/2) SAND, trace binder, medium grained with trace fine grains and trace coarse grains, poorly graded, quartz rich, trace rootlets randomly distributed throughout the sample, damp, very loose	SP			102.2	6.7	
2					2				
3	4-2 T		Color change to brown (7.5YR 4/3) slightly damp, very loose						
4					1			6.8	
5	4-3 L		Light yellowish brown (10YR 6/4) Silty SAND, medium grained with trace fine grains and trace coarse grains, sub-rounded to rounded shaped, poorly graded, quartz rich sand, slightly cemented, slightly damp, loose	SM					Direct Shear: C_p = 0 psf Φ_p = 34° C_r = 0 psf Φ_r = 33°
6					10		106.7	2.7	
7									
8									
9									
10	4-4 T		Very pale brown (10YR 7/4) SAND, medium to coarse grained, sub-rounded to rounded shaped, poorly graded, quartz rich, massive, slightly damp, medium dense	SP					
11					15			3.4	
12									
13									
14									
15	4-5 L		Less than 10% lithics, slight increase in moisture content, damp, medium dense						
16					14		111.0	2.8	
17			Boring terminated at 16 1/2 feet. No groundwater encountered.						
18									
19									
20									
21									
22									
23									
24									

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Log of Test Borings
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Figure No. 9
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/13/14 BORING DIAMETER 8" HS BORING NO. 5

Depth (feet)	Sample No. and Type	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1	5-1 L	Brown (7.5YR 4/3) SAND, medium to coarse grained, sub-rounded to rounded shaped, poorly graded, quartz rich, massive, rootlets scattered throughout the upper 2 feet, slightly damp, very loose	SP					C_p = 0 psf ϕ_p = 39° C_r = 0 psf ϕ_r = 37°
2				3		108.2	3.9	
3	5-2 T	Slight increase in coarseness of sand, trace rootlets from 2 1/2 to 3 feet, damp, very loose						
4				3			5.3	
5	5-3 L	Pink (7.5YR 7/4) SAND, clean, fine to coarse grained, sub-rounded to rounded shaped, well graded, quartz rich, massive, trace lithics, slightly damp, loose	SW					
6				6		108.8	2.9	
7								
8								
9								
10	5-4 T	Light brown (7.5YR 6/4) SAND, clean, medium to coarse grained with trace fine grains, sub-rounded to rounded shaped, poorly graded, quartz rich, massive, trace lithics, slightly damp, medium dense	SP					
11				16			3.3	
12								
13								
14								
15	5-5 L	Color change to light yellowish brown (10YR 6/4), slight increase in coarseness of sand, sand coarsens with depth from medium grained to fine to medium grained, damp, medium dense						
16				13		107.7	5.2	
17		Boring terminated at 16 1/2 feet. No groundwater encountered.						
18								
19								
20								
21								
22								
23								
24								

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Log of Test Borings
Monterey Peninsula Desalination Plant
Monterey County, California

Figure No. 10
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/13/14 BORING DIAMETER 8" HS BORING NO. 6

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1	6-1 L		Brown (7.5YR 4/3) Silty SAND, trace binder, medium to coarse grained, sub-rounded to rounded shaped, poorly graded, damp, very loose	SM					
2					1		108.2	6.1	16.3% Passing #200 Sieve
3	6-2 T		Color change to brown (7.5YR 4/4), slight increase in coarseness of sand, sample coarsens with depth, trace rootlets randomly distributed throughout the sample, damp, very loose						
4					1			7.0	
5	6-3 L		Reddish yellow (7.5YR 6/6) SAND with Silt, clean, fine to coarse grained, sub-rounded to rounded shaped, well graded, quartz rich, massive, trace rootlets randomly distributed throughout the sample, trace lithics, slightly damp, loose	SW-SM					
6					6		110.2	2.1	5.8% Passing #200 Sieve
7									
8									
9									
10	6-4 T		Light yellowish brown (10YR 6/4) SAND, clean, medium to coarse grained with trace fine grains, sub-rounded to rounded shaped, poorly graded, quartz rich, massive, slightly damp, medium dense	SP					
11					15			3.8	
12									
13									
14									
15	6-5 L		Trace brownish yellow (10YR 6/6) oxidation patches randomly distributed throughout the sample, slightly damp, medium dense						
16					15		106.6	3.0	
17									
18									
19									
20	6-6 T		Lack of oxidation patches, slightly damp, medium dense						
21					21			2.7	
22			Boring terminated at 21 1/2 feet. No groundwater encountered.						
23									
24									

LOGGED BY CLA DATE DRILLED 3/13/14 BORING DIAMETER 8" HS BORING NO. 7

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1	7-1 L		Brown (7.5YR 4/3) Clayey SAND, medium grained with trace fine grains and trace coarse grains, sub-rounded to rounded shaped, poorly graded, trace rootlets randomly distributed throughout the sample, damp, very loose	SM					% Gravel = 0.0 % Sand = 82.5
2					2		110.2	7.2	% Fines = 17.5
3	7-2 T		Slightly damp, very loose						
4					1			7.5	R_{value} = 68
5	7-3 L		Pink (7.5YR 7/4) Silty SAND, fine to coarse grained, sub-rounded to rounded shaped, poorly graded, slightly cemented, trace rootlets randomly distributed throughout the sample, trace mottling (light brown 7.5YR 6/4) from 5 1/2 to 6 feet, slightly damp, medium dense	SM					% Gravel = 0.0 % Sand = 77.2
6					15		112.5	3.6	% Fines = 22.8
7									
8									
9									
10	7-4 T		Reddish yellow (7.5YR 6/6) SAND, clean, medium to coarse grained, sub-rounded to rounded shaped, poorly graded, quartz rich, massive, slightly damp, medium dense	SP					
11					12			3.1	
12									
13									
14									
15	7-5 L		Slightly damp, medium dense						
16					14		106.1	3.7	
17									
18									
19									
20	7-6 T		Slightly finer grained than the previous sample, medium grained, slightly damp, medium						
21					27			4.4	
22									
23									
24									

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Log of Test Borings
Monterey Peninsula Desalination Plant
Monterey County, California

Figure No. 12
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/13/14 BORING DIAMETER 8" HS BORING NO. 7

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
25	7-7 L		Reddish yellow (7.5YR 6/6) SAND, clean, medium grained, sub-rounded to rounded shaped, poorly graded, quartz rich, massive, sample coarsens with depth to medium to coarse grained, damp, dense	SP	32		111.2	6.0	% Gravel = 0.0 % Sand = 95.5 % Fines = 4.4
30	7-8 T		Color change to light yellowish brown (10YR 6/4), slightly finer grained than the previous sample, fine grained, damp, medium dense		22			6.0	
35	7-9 L		Mottled yellowish brown (10YR 5/8) and very pale brown (10YR 7/4) Silty SAND, medium grained with trace fine grains and trace coarse grains, quartz rich, slightly sticky, damp, loose	SM	10		117.9	16.4	% Gravel = 0.0 % Sand = 76.6 % Fines = 23.4
40	7-10 T		Color change to yellowish brown (10YR 5/6), sample coarsens with depth and grades to medium to coarse grained near 41 1/2 feet, damp, medium dense		25			12.1	

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Log of Test Borings
Monterey Peninsula Desalination Plant
Monterey County, California

Figure No. 13
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/13/14 BORING DIAMETER 8" HS BORING NO. 7

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
49				SM					
50	7-11 L		Yellowish brown (10YR 5/8) Silty SAND, clean, fine grained, sub-rounded to rounded shaped, poorly graded, quartz rich, massive, trace lithics, damp, dense		38		111.2	8.0	% Gravel = 0.0 % Sand = 87.3 % Fines = 12.7
51									
52									
53									
54									
55									
56									
57									
58									
59									
60	7-12 T		Sample coarsens slightly with depth as it grades to SAND with Silt, trace very small mica flakes scattered through-out the sample, slightly damp, dense		46			6.4	
61									
62									
63									
64									
65									
66									
67									
68									
69									
70	7-13 T		▽ Color change to laminated yellowish brown (10 YR 5/8) & brownish yellow (10YR 6/8). Color change to brown (10YR 4/3) at 71 feet, wet, very dense		50/5"			22.1	% Gravel = 0.0 % Sand = 92.4 % Fines = 7.6
71									
72			Boring terminated at 71 1/2 feet. Groundwater initially encountered at 70 feet.						

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Log of Test Borings
Monterey Peninsula Desalination Plant
Monterey County, California

Figure No. 14
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/14/14 BORING DIAMETER 8" HS BORING NO. 8

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1	8-1 L		Brown (7.5YR 4/4) SAND with Clay, medium grained coarsening with depth to medium to coarse grained, sub-rounded to rounded shaped, poorly graded, rootlets scattered throughout the upper 2 feet, trace rootlets from 2-2 1/2 feet, damp, very loose	SP-SC	3		109.9	4.2	% Gravel = 0.0 % Sand = 89.2 % Fines = 10.8
3	8-2 T		Yellowish brown (10YR 5/4 grading to 10YR 5/6) SAND, clean, fine to coarse grained, sub-rounded to rounded shaped, well graded, quartz rich, trace lithics, trace rootlets randomly distributed throughout the sample, damp, very loose	SW	2			4.8	
5	8-3 L		Brownish yellow (10YR 6/6) SAND, clean, coarse grained with trace medium grains, sub-rounded to rounded shaped, poorly graded, quartz rich, trace lithics, massive, slightly damp, loose	SP	6		111.0	3.9	% Gravel = 0.0 % Sand = 97.5 % Fines = 2.5
10	8-4 T		Color change to light brownish yellow (10YR 6/4), sample is slightly finer grained than the previous sample, medium to coarse grained, slightly damp, medium dense		12			2.6	
15	8-5 L		Color change to pale brown (2.5Y 7/4), slightly damp, medium dense		13		105.7	2.6	% Gravel = 0.0 % Sand = 98.6 % Fines = 1.4
20	8-6 T		Sample coarsens slightly with depth and is predominately coarse grained near 21 1/2 feet, slightly damp, medium dense		16			3.2	

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Log of Test Borings
Monterey Peninsula Desalination Plant
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Figure No. 15
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/14/14 BORING DIAMETER 8" HS BORING NO. 8

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
25	8-7 L		Pale brown (2.5Y 7/4) SAND, clean, coarse grained with medium grains fining to medium grained with trace coarse grains with depth, sub-rounded to rounded shaped, poorly graded, quartz rich, massive, slightly damp, medium dense	SP	17		100.5	2.5	% Gravel = 0.0 % Sand = 98.0 % Fines = 2.0
30	8-8 T		Trace yellow (2.5Y 7/6) mottling randomly distributed throughout the sample, slight decrease in coarseness of sand, slightly damp, dense		34			3.2	
35	8-9 L		Color grades to yellow (2.5Y 7/6) as sample fines slightly with depth to SAND with Silt, poorly graded, slightly damp, medium dense	SP-SM	29		109.7	3.3	% Gravel = 0.0 % Sand = 93.5 % Fines = 6.5
40	8-10 T		Color change to pale brown (2.5Y 7/4) to yellowish brown (10YR 5/6), sample fines slightly with depth, fine to medium grained with a trace amount of silt, damp to moist, medium dense		30			12.0	

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Log of Test Borings
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Figure No. 16
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/14/14 BORING DIAMETER 8" HS BORING NO. 8

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
49				SP-SM					
50	8-11 L		Yellowish brown (10YR 5/6) SAND with Silt, clean, fine to medium grained, sub-rounded to rounded shaped, poorly graded, trace lithics, quartz rich, trace small mica flakes randomly distributed throughout the sample, massive, damp to moist, very dense		50/6"		112.8	10.9	% Gravel = 0.0 % Sand = 89.0 % Fines = 11.0
51									
52									
53									
54									
55									
56									
57									
58									
59									
60	8-12 T		Damp to moist, dense						
61					46			7.6	
62									
63									
64									
65									
66									
67									
68									
69									
70	8-13 T		Color change to yellowish brown (10YR 5/4), wet, dense						% Gravel = 0.0 % Sand = 93.6 % Fines = 6.4
71			▽		45			21.7	
72									

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Log of Test Borings
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Figure No. 17
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/14/14 BORING DIAMETER 8" HS BORING NO. 8

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
73			Yellowish brown (10YR 5/4) SAND, clean, fine to medium grained, trace Silt, sub-rounded to rounded shaped, poorly graded, trace lithics, quartz rich, trace small mica flakes randomly distributed throughout the sample, massive, wet	SP					
74									
75			Boring terminated at 75 feet. Groundwater initially encountered at 71 feet.						
76									
77									
78									
79									
80									
81									
82									
83									
84									
85									
86									
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									

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Log of Test Borings
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Figure No. 18
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/11/14 BORING DIAMETER 8" HS BORING NO. 9

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1–4	9-1 L 9-2 T		Brown (7.5YR 4/4) SAND, trace Silt, fine to medium grained with trace coarse grains, sub-rounded to rounded shaped, poorly graded, trace rootlets randomly distributed throughout the sample, damp, very loose Slight increase in coarseness of sand, medium to coarse grained, trace mica flakes randomly distributed throughout the sample, damp, loose	SP	1 8		113.3	6.5	R_{value} = 72
5–9	9-3 L		Light brown (7.5YR 6/4) SAND, clean, fine to very coarse grained, sub-rounded to rounded shaped, well graded, quartz rich, slightly damp, medium dense	SW	11		110.0	2.2	
10–14	9-4 T		Brownish yellow (10YR 6/6) SAND, clean, medium grained, sub-rounded to rounded shaped, poorly graded, quartz rich, massive, slightly damp, medium dense	SP	15			4.3	
15–19	9-5 L		Color change to very pale brown (10YR 7/4), trace fine grains and trace coarse grains, slightly damp, medium dense		22		109.7	2.7	2.8% Passing #200 Sieve
20–21	9-6 T		Trace amount of lithics, less than 10%, slightly damp, medium dense		30			2.3	
22			Boring terminated at 21 1/2 feet. No groundwater encountered.						

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Log of Test Borings
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Figure No. 19
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/11/14 BORING DIAMETER 8" HS BORING NO. 10

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1	10-1 L		Brown (7.5YR 4/3) SAND, fine to medium grained with trace coarse grains, sub-rounded to rounded shaped, trace Clay, poorly graded, slightly damp, very loose	SP					
2					1		111.9	7.3	
3	10-2 T		Slight increase in coarseness of sand, medium to coarse grained, trace mica flakes randomly distributed throughout the sample, damp, loose						
4					5			7.3	
5	10-3 L		Mottled light brown (7.5YR 6/4) and pinkish gray (7.5YR 7/2) Silty SAND, medium to coarse grained, sub-rounded to rounded shaped, poorly graded, very small mica flakes scattered throughout the sample, slightly cemented, slightly damp, medium dense	SM					Direct Shear C_p = 0 psf Φ_p = 36° C_r = 0 psf Φ_r = 36°
6					14		108.9	3.3	
7									
8									
9									
10	10-4 T		Light yellowish brown (10YR 6/4) SAND, clean, medium to coarse grained, sub-rounded to rounded shaped, poorly grade, massive, quartz rich, slightly damp, loose	SP					
11					9			2.7	
12									
13									
14									
15	10-5 L		Slight increase in coarse grained sand, slightly damp, medium dense						
16					16		105.1	3.6	
17									
18									
19									
20	10-6 T		Trace brownish yellow (10YR 6/8) oxidation patches randomly distributed throughout the sample, slightly damp, dense						
21					31			6.5	
22			Boring terminated at 21 1/2 feet. No groundwater encountered.						
23									
24									

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Log of Test Borings
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Figure No. 20
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/11/14 BORING DIAMETER 8" HS BORING NO. 11

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1	11-1 L		Brown (7.5YR 4/3) SAND with Silt, medium to coarse grained with trace fine grains, sub-rounded shaped, poorly graded, quartz rich, trace rootlets scattered throughout the upper 2 feet, damp, very loose	SP-SM					% Gravel = 0.0 % Sand = 90.4 % Fines = 9.6
2					2		105.2	5.6	
3	11-2 T		Slightly damp, very loose						
4					2			7.0	
5	11-3 L		Slightly damp, loose						
6			Brownish yellow (10YR 6/6) SAND, clean, medium to coarse grained, sub-rounded to rounded shaped, poorly graded, quartz rich, massive, slightly damp, loose	SP	7		108.0	2.5	
7									
8									
9									
10	11-4 T		Sub-horizontal light yellowish brown (10YR 6/4) lamina approximately 1/2 inch thick from 10 1/2 to 11 1/2 feet, color grades to light yellowish brown near 11 1/2 feet, slightly damp, medium dense						
11					26			3.6	
12									
13									
14									
15	11-5 L		Color change to very pale brown (10YR 7/4), yellowish brown (10YR 5/4), round shaped oxidation patch near 16 feet, pocket of rounded to well rounded coarse grained sand near 16 1/2 feet, slightly damp, medium dense						
16					23		105.2	4.6	
17									
18									
19									
20	11-6 T		Slight decrease in coarseness of sand, still medium to coarse grained, slightly damp, dense						% Gravel = 0.0 % Sand = 97.3 % Fines = 2.7
21					37			2.3	
22									
23									
24									

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Log of Test Borings
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Figure No. 21
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/11/14 BORING DIAMETER 8" HS BORING NO. 11

Depth (feet)	Sample No. and Type	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
25	11-7 L	Very pale brown (10YR 7/4) SAND with Silt, clean, medium to coarse grained, sub-rounded to rounded shaped, grades to fine grained with depth, poorly graded, trace brownish yellow (10YR 6/6) oxidation patches randomly distributed throughout the sample, slightly damp, very dense	SP-SM	50/6"		105.2	3.2	
30	11-8 T	Slightly coarser grained than the previous sample, medium to coarse grained, sub-rounded to rounded shaped, slightly damp, medium dense		29			4.7	% Gravel = 0.0 % Sand = 90.5 % Fines = 9.5
35	11-9 L	Color change to strong brown (7.5YR 5/6) as the sample grades to Silty SAND, fine to medium grained with trace coarse grains, sub-rounded to rounded shaped, trace Silt, damp, medium dense	SM	29		121.5	11.3	18.0% Passing #200 Sieve
40	11-10 T	Trace lithics present within the sample, damp, dense		36			10.8	
45	11-11 L	Sample fines with depth as it grades to SAND with Silt, fine to medium grained, color grades to light yellowish brown (10YR 6/4), lenses of very coarse grained sub-rounded shaped sand randomly distributed throughout the sample from 45 to 46 feet, trace binder from 45 to 46 feet, damp, very dense	SP-SM	50/5"		104.7	8.4	% Gravel = 0.0 % Sand = 88.7 % Fines = 11.3

LOGGED BY CLA DATE DRILLED 3/11/14 BORING DIAMETER 8" HS BORING NO. 11

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
49				SP					
50	11-12 T		Brownish yellow (10YR 6/6) SAND, clean, fine to medium grained, sub-rounded to rounded shaped, poorly graded, quartz rich, massive, trace very small mica flakes scattered throughout the sample, slightly damp, dense		33			6.3	
51									
52									
53									
54									
55	11-13 L		Color change to yellowish brown (10YR 5/6) as the sample grades to Silty SAND, fine grained, slightly damp, medium dense	SM	25		108.9	10.4	% Gravel = 0.0 % Sand = 84.5 % Fines = 15.5
56									
57									
58									
59									
60									
61									
62									
63									
64									
65	11-14 T		▽ Slight increase in coarseness of sand as sample grades to SAND with Silt, fine grained with trace medium grains, wet, dense	SP-SM	33			21.6	% Gravel = 0.0 % Sand = 92.2 % Fines = 7.8
66									
67									
68									
69									
70									
71									
72			Boring terminated at 70 feet. Groundwater initially encountered at 65 1/2 feet.						

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Figure No. 23
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/12/14 BORING DIAMETER 6" SS BORING NO. 12

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1–5			Brown (7.5YR 4/3) SAND, trace binder, medium grained with trace fine grains and trace coarse grains, sub-rounded to rounded shaped, poorly graded, trace rootlets randomly distributed throughout the cuttings, damp	SP					
5–7	B12 @ 7'		Strong brown (7.5YR 4/6) Silty SAND, fine to medium grained, sub-rounded to rounded shaped, poorly graded, slightly damp	SM				4.9	% Gravel = 0.0 % Sand = 76.6 % Fines = 23.4
7			Boring terminated at 7 feet. No groundwater encountered.						

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Log of Test Borings
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Figure No. 24
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/12/14 BORING DIAMETER 6" SS BORING NO. 13

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
0			Brown (7.5YR 4/3) SAND, medium to coarse grained, sub-rounded to rounded shaped, poorly graded, trace rootlets randomly distributed throughout the cuttings, damp	SP					
5			Strong brown (7.5YR 4/6) SAND, clean, fine to coarse grained, sub-rounded to rounded shaped, quartz rich, well graded, damp	SW					
10			Very pale brown (10YR 7/4) SAND with Silt, clean, medium grained with trace coarse grains, sub-rounded to rounded shaped, quartz rich, poorly graded	SP-SM					
15	B13 @ 15'		Sample coarsens slightly, medium to coarse grained, slightly damp					3.0	% Gravel = 0.0 % Sand = 94.5 % Fines = 5.5
			Boring terminated at 15 feet. No groundwater encountered.						

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Log of Test Borings
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Figure No. 25
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/13/14 BORING DIAMETER 8" HS BORING NO. 14

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1	14-1 L		Brown (7.5YR 4/2) SAND, trace Silt, fine to medium grained, sub-rounded to rounded shaped, poorly graded, trace rootlets scattered throughout the sample from 1 to 2 feet below ground surface, damp, loose	SP					
2					7		116.0	6.1	
3	14-2 T		Color grades to light brown (7.5YR 6/3) near 4 feet, trace coarse grains, damp, loose						
4					5			5.2	
5	14-3 L		Pink (7.5YR 7/3) Silty SAND, fine to medium grained with trace coarse grains, sub-rounded to rounded shaped, poorly graded, slightly cemented, trace very small mica flakes scattered throughout the sample, slightly damp, medium dense	SM					
6					13		111.9	2.4	
7									
8									
9									
10	14-4 T		Strong brown (7.5YR 5/6) SAND, clean, medium grained, sub-rounded to rounded shaped, poorly graded, quartz rich, slightly damp, medium dense	SP					
11					14			4.9	
12									
13									
14									
15	14-5 L		Color change to light brown (7.5YR 6/4), slight increase in coarseness of sand, medium to coarse grained, sample fines with depth to fine to medium grained, slightly damp, medium dense						
16					18		109.4	4.0	
17									
18									
19									
20	14-6 T		Color change to slightly mottled light brown (7.5YR 6/4) and reddish yellow (7.5YR 6/6), slightly damp, medium dense						
21					24			6.1	
22			Boring terminated at 21 1/2 feet. No groundwater encountered.						
23									
24									

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Log of Test Borings
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Figure No. 26
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/12/14 BORING DIAMETER 6" SS BORING NO. 15

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
1–4			Brown (7.5YR 4/3) SAND, medium to coarse grained with trace fine grains, sub-rounded to rounded shaped, poorly graded, very small mica flakes scattered throughout the cuttings, damp	SP					
5–16			Brownish yellow (10YR 6/6) SAND, clean, medium to coarse grained, sub-rounded to rounded shaped, poorly graded, quartz rich, damp, loose	SP					
16–17	B15 @ 17'		Color change to pale brown (10YR 7/4), slightly damp					3.1	% Gravel = 0.0 % Sand = 96.2 % Fines = 3.8
17–24			Boring terminated at 17 feet. No groundwater encountered.						

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Log of Test Borings
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Figure No. 27
Project No. 1405
Date: 9/2/14

LOGGED BY CLA DATE DRILLED 3/12/14 BORING DIAMETER 6" SS BORING NO. 16

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
0			Brown (7.5YR 4/3) SAND, medium to coarse grained, sub-rounded to rounded shaped, poorly graded, trace rootlets randomly distributed throughout the cuttings, damp	SP					
5			Strong brown (7.5YR 4/6) SAND with Silt, clean, fine to coarse grained, sub-rounded to rounded shaped, quartz rich, well graded, damp	SW-SM					
9	B16 @ 10'		Trace lithics, slightly damp					3.9	% Gravel = 0.0 % Sand = 93.6 % Fines = 6.4
10			Boring terminated at 10 feet. No groundwater encountered.						

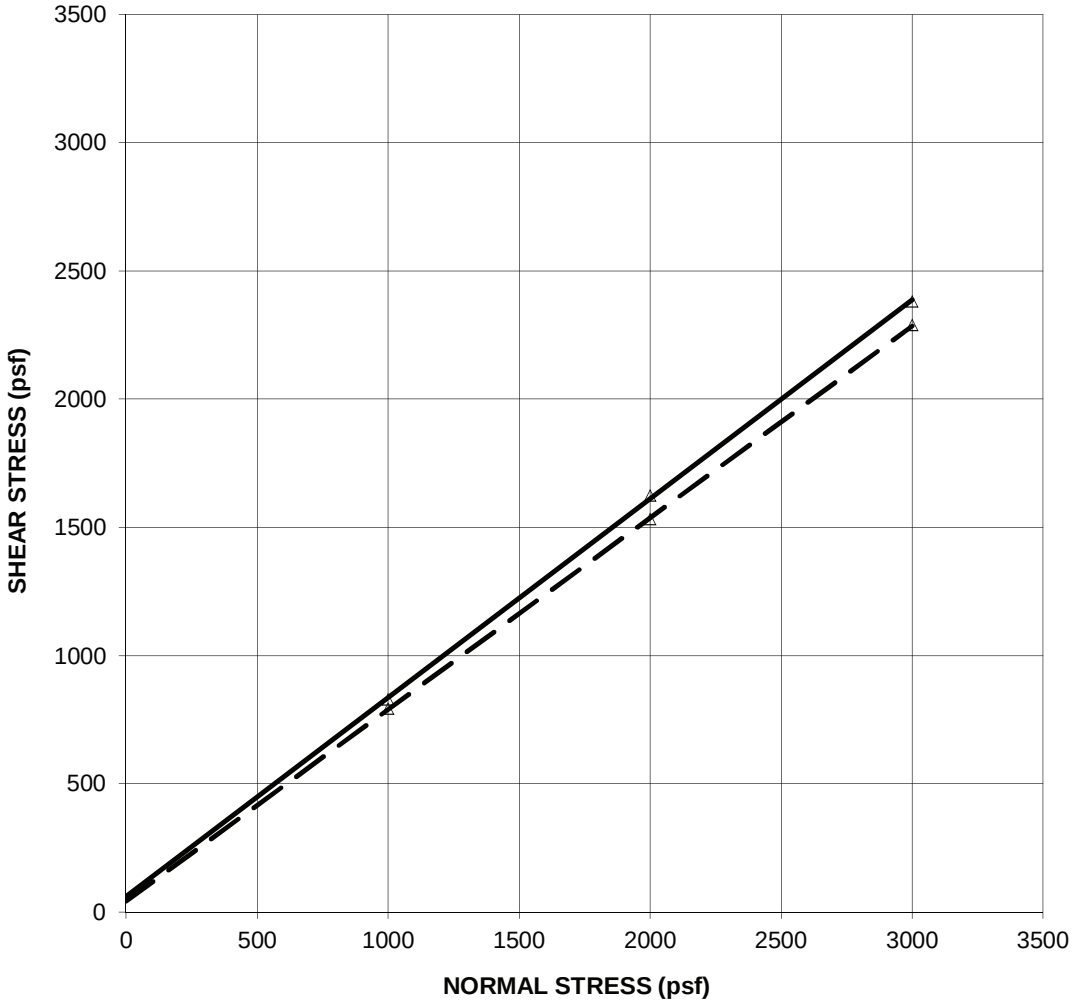
Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** Monterey Peninsula Desalination Plant Monterey County, California	Figure No. 28 Project No. 1405 Date: 9/2/14

DIRECT SHEAR TEST - ASTM D 3080

CLIENT:	PACIFIC CREST	DATE:	3/24/14
PROJECT:	DESAL PLANT-1405	TESTED:	SSC
SAMPLE DESCRIPTION:	Brown Silty SAND		

SAMPLE:	3-1-1		COHESION	FRICTION
SOIL TYPE:	SM		(psf)	ANGLE
		PEAK	50	38
		RESIDUAL	40	37

INITIAL WATER CONTENT:	7.0%
WATER CONTENT AT TEST:	15.1%



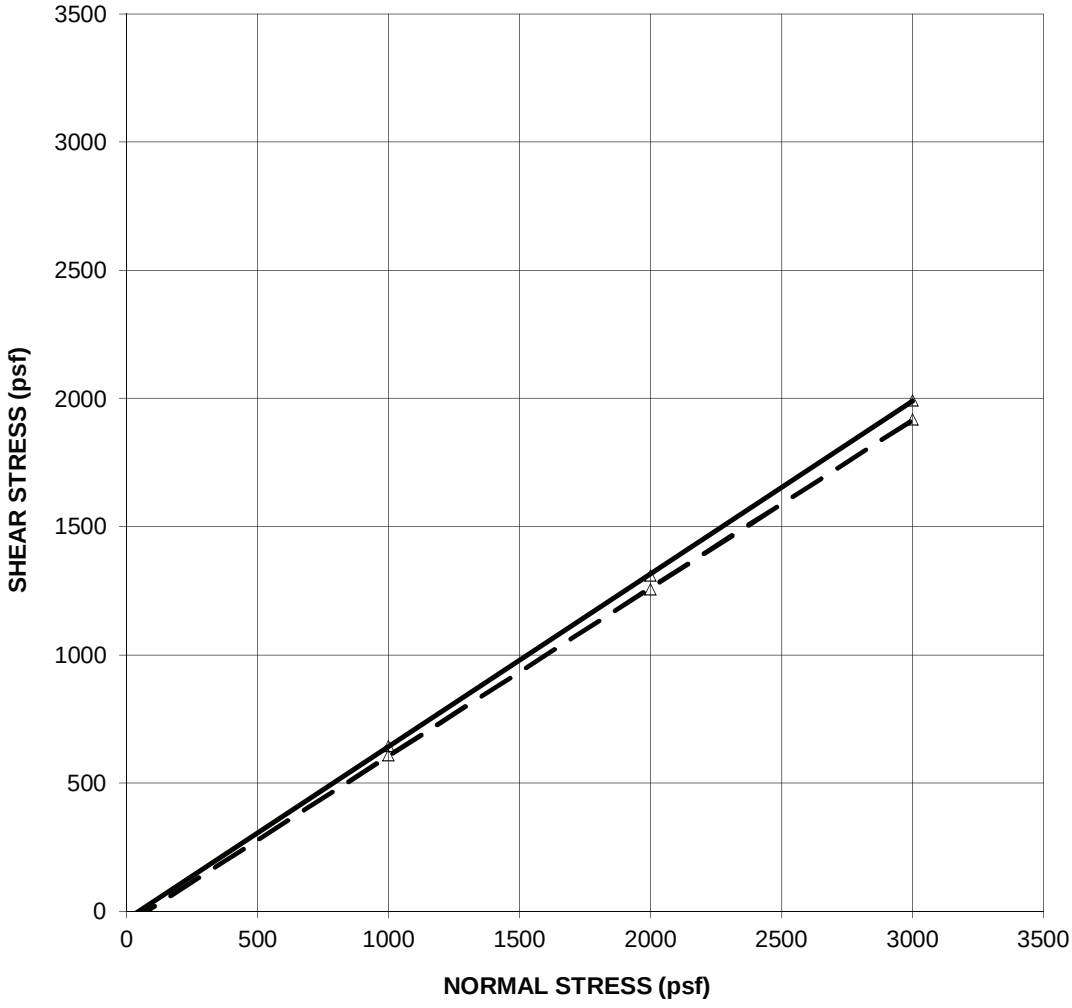
Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Direct Shear Test Result** Monterey Peninsula Desalination Plant Monterey County, California	Figure No. 29 Project No. 1405 Date: 9/2/14

DIRECT SHEAR TEST - ASTM D 3080

CLIENT: PACIFIC CREST	DATE: 3/24/14
PROJECT: DESAL PLANT-1405	TESTED: SSC
SAMPLE DESCRIPTION: Light Brown Silty SAND	

SAMPLE: 4-3-1		COHESION	FRICTION
SOIL TYPE: SM		(psf)	ANGLE
	PEAK	0	34
	RESIDUAL	0	33

INITIAL WATER CONTENT:	3.8%
WATER CONTENT AT TEST:	16.2%



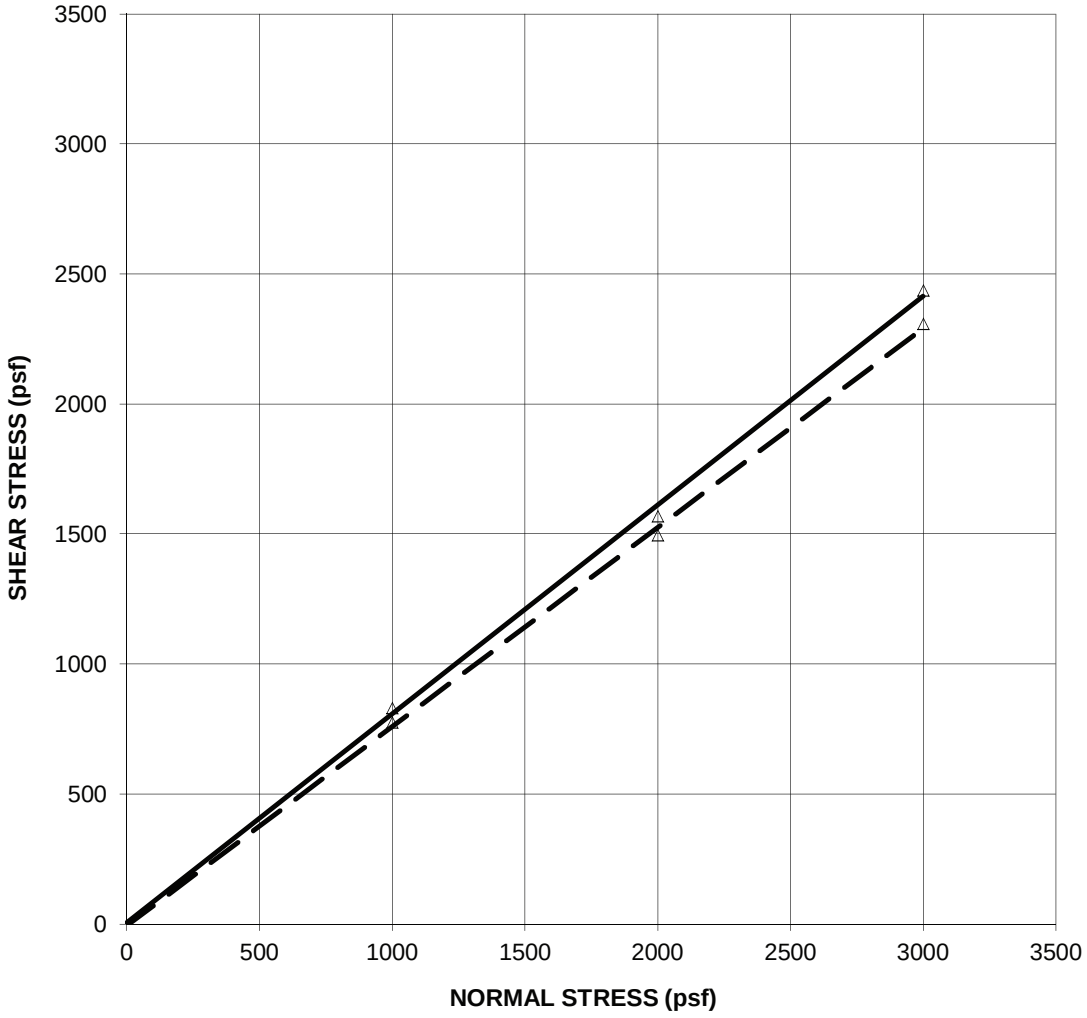
Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Direct Shear Test Result** Monterey Peninsula Desalination Plant Monterey County, California	Figure No. 30 Project No. 1405 Date: 9/2/14

DIRECT SHEAR TEST - ASTM D 3080

CLIENT: PACIFIC CREST	DATE: 3/24/14
PROJECT: DESAL PLANT-1405	TESTED: SSC
SAMPLE DESCRIPTION: Reddish Brown Silty SAND	

SAMPLE: 5-1-1		COHESION	FRICTION
SOIL TYPE: SM		(psf)	ANGLE
	PEAK	0	39
	RESIDUAL	0	37

INITIAL WATER CONTENT:	5.5%
WATER CONTENT AT TEST:	13.3%



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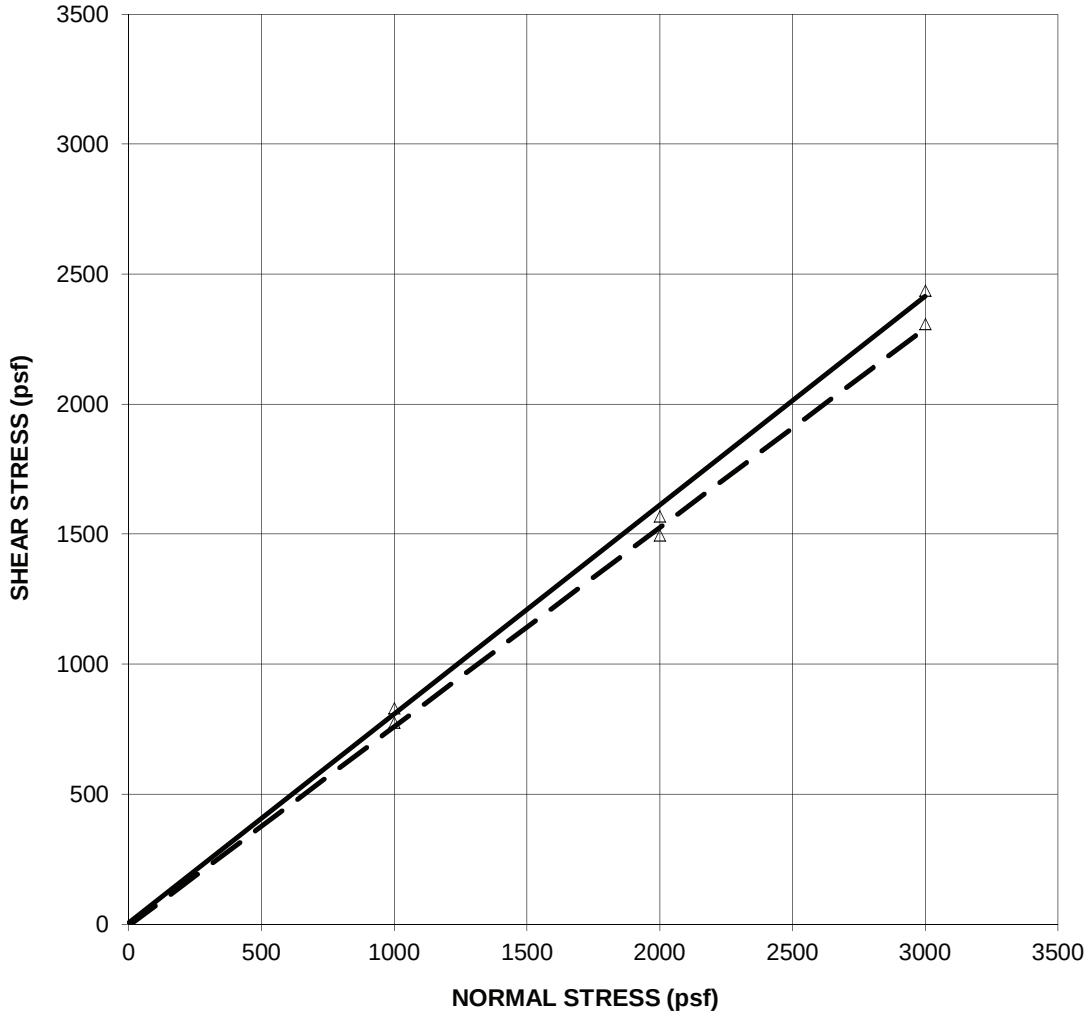
DIRECT SHEAR TEST - ASTM D 3080

CLIENT:	PACIFIC CREST	DATE:	3/24/14
PROJECT:	DESAL PLANT-1405	TESTED:	SSC
SAMPLE DESCRIPTION:	Light brown Silty SAND		

SAMPLE:	10-3-1		COHESION (psf)	FRICTION ANGLE
SOIL TYPE:	SM			
		PEAK	0	36
		RESIDUAL	0	36

INITIAL WATER CONTENT:	3.3%
WATER CONTENT AT TEST:	15.0%



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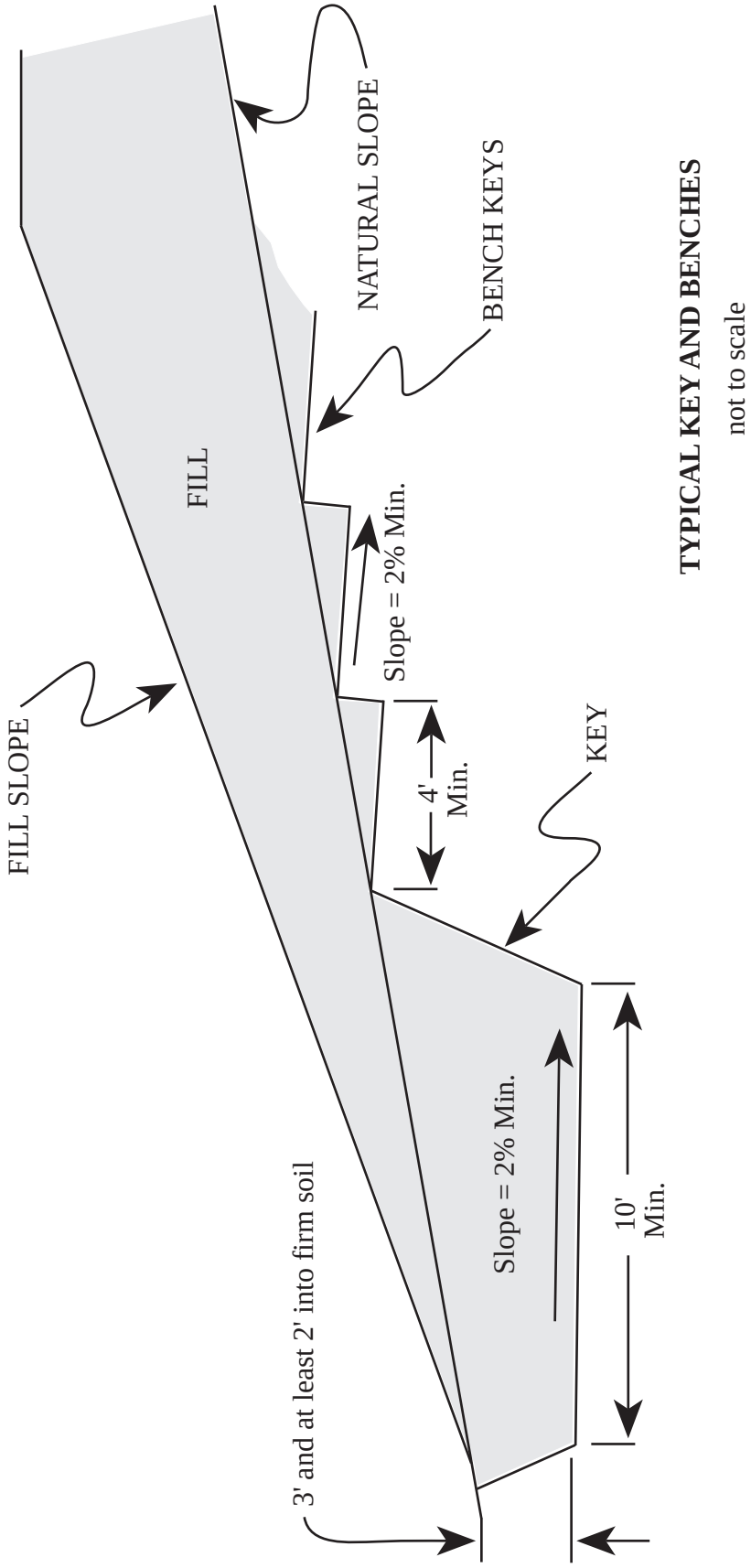
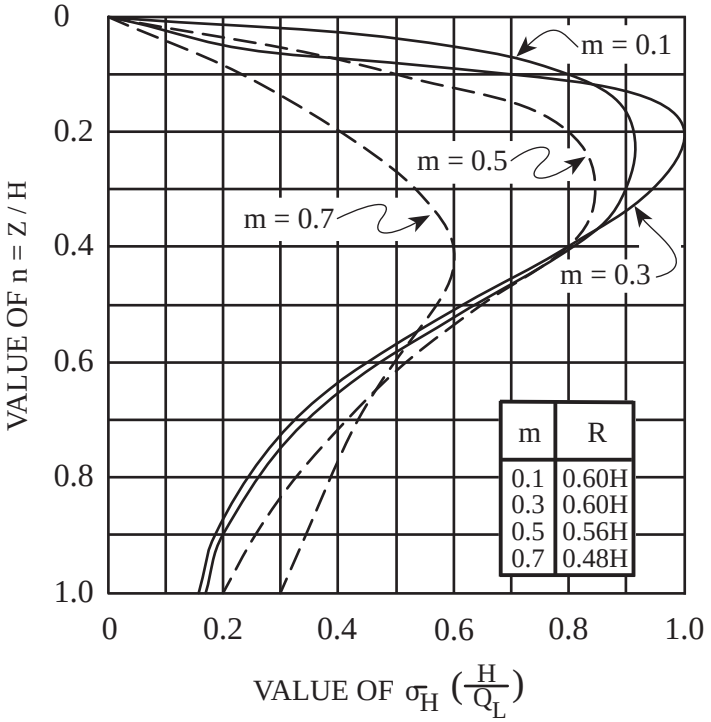


TYPICAL KEY AND BENCHES

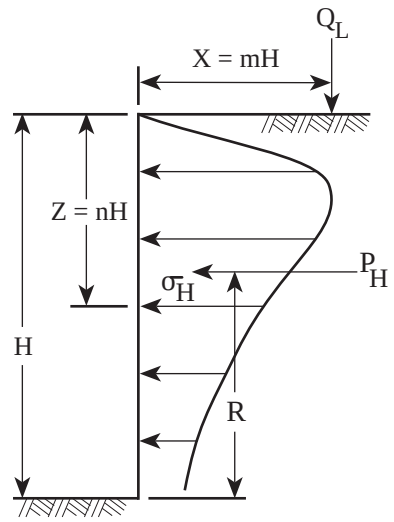
not to scale

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Keyway Detail** Monterey Peninsula Desalination Plant Monterey County, California	Figure No. 33 Project No. 1405 Date: 9/2/14

LINE LOAD



m	R
0.1	0.60H
0.3	0.60H
0.5	0.56H
0.7	0.48H



FOR $m \leqq 0.4$:

$$\sigma_H \left(\frac{H}{Q_L}\right) = \frac{0.20\,n}{(0.16 + n^2)^2}$$

$$P_H = 0.55\,Q_L$$

FOR $m > 0.4$:

$$\sigma_H \left(\frac{H}{Q_L}\right) = \frac{1.28\,m^2\,n}{(m^2 + n^2)^2}$$

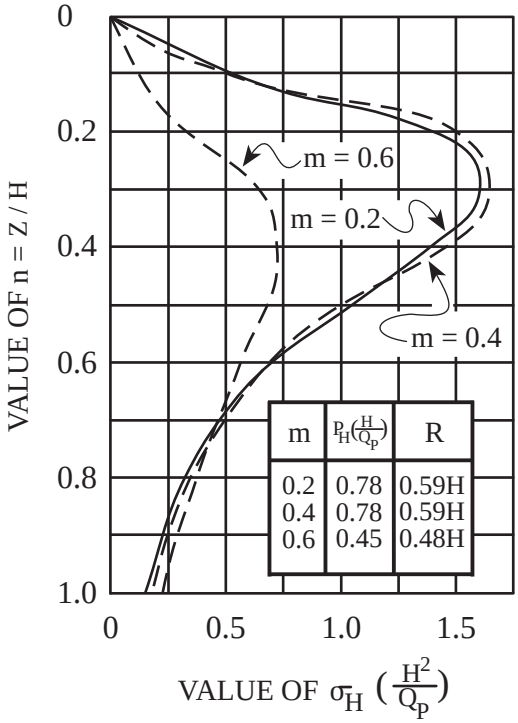
RESULTANT $P_H = \dfrac{0.64\,Q_L}{(m^2 + 1)}$

PRESSURES FROM LINE LOAD Q_L

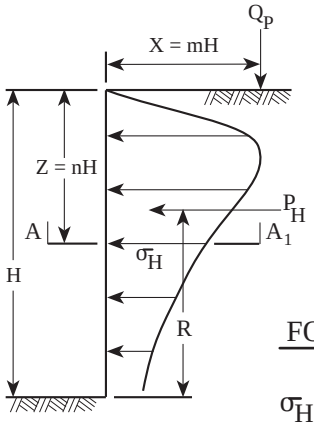
(BOISSINESQ EQUATION MODIFIED BY EXPERMENT)

REFERENCE: Design Manual
NAVFAC DM-7.02
Figure 11
Page 7.2-74

POINT LOAD



m	$P_H\left(\frac{H}{Q_P}\right)$	R
0.2	0.78	0.59H
0.4	0.78	0.59H
0.6	0.45	0.48H



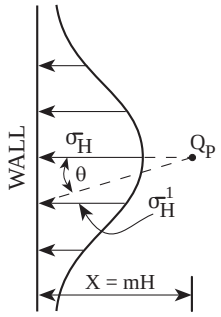
FOR $m \leqq 0.4$:

$$\sigma_H \left(\frac{H^2}{Q_P}\right) = \frac{0.28\,n^2}{(0.16 + n^2)^3}$$

FOR $m > 0.4$:

$$\sigma_H \left(\frac{H^2}{Q_P}\right) = \frac{1.77\,m^2\,n^2}{(m^2 + n^2)^3}$$

$$\sigma_H^1 = \sigma_H \cos^2(1.1\,\theta)$$

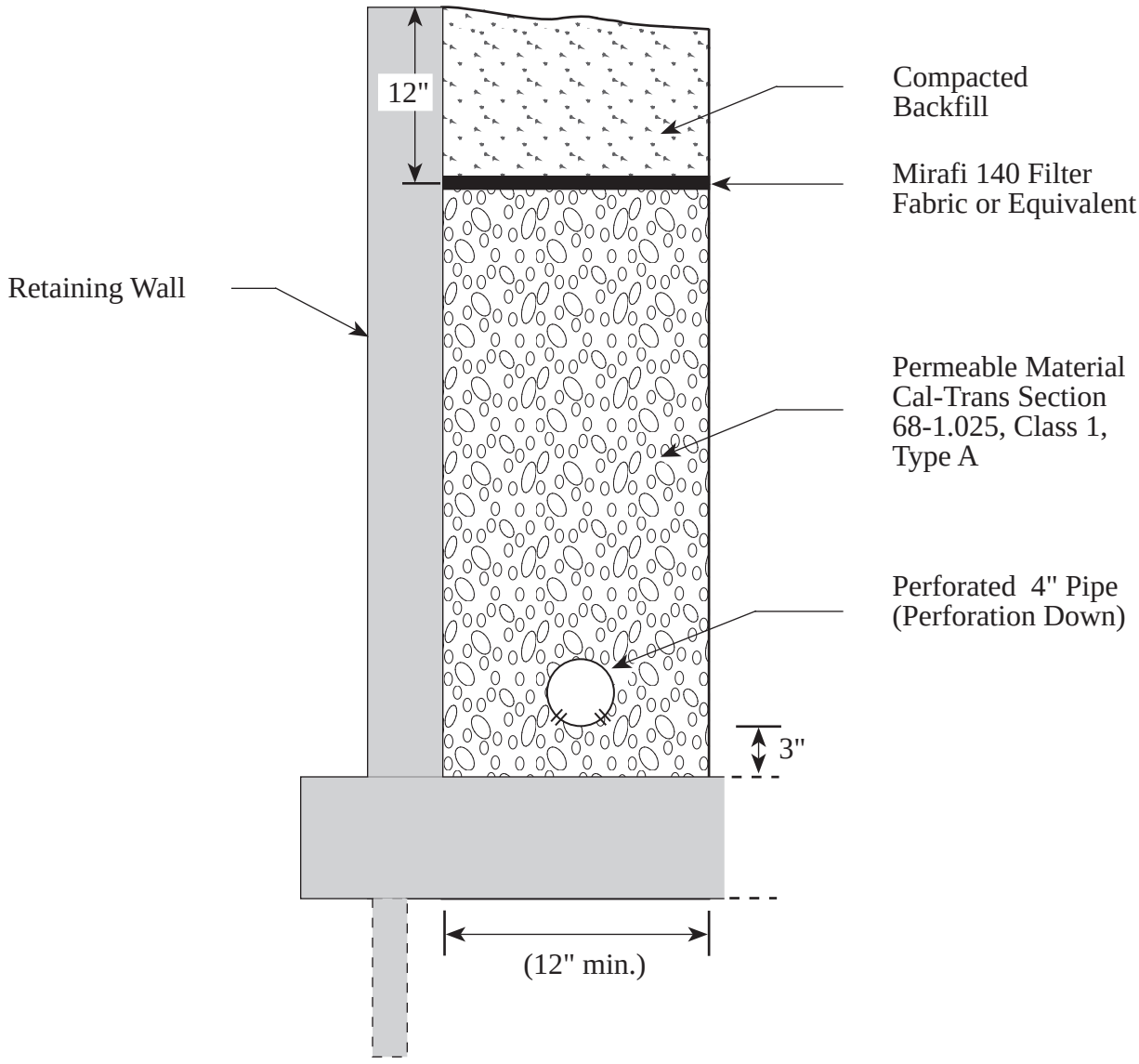


SECTION $A\text{-}A_1$

PRESSURES FROM POINT LOAD Q_P

(BOISSINESQ EQUATION MODIFIED BY EXPERMENT)

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Surcharge Pressure Diagram** Monterey Peninsula Desalination Plant Monterey County, California	Figure No. 34 Project No. 1405 Date: 9/2/14



Not to Scale

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Typical Retaining Wall Drain Detail** Monterey Peninsula Desalination Plant Monterey County, California	Figure No. 35 Project No. 1405 Date: 9/2/14

Corrosivity Test Summary

CTL # 416-517 **Date:** 3/24/2014 **Tested By:** PJ **Checked:** PJ
Client: Pacific Crest Engineering **Project:** Monterey Peninsula Desal Plant **Proj. No:** 1405
Remarks:

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate		pH	ORP	Moisture	Soil Visual Description
Boring	Sample, No.	Depth, ft.	As Rec.	Minimum	Saturated	mg/kg	mg/kg	%		(Redox)	At Test	
						Dry Wt.	Dry Wt.	Dry Wt.		mv	%	
			ASTM G57	Cal 643	ASTM G57	Cal 422-mod.	Cal 417-mod.	Cal 417-mod.	Cal 643	SM 2580B	ASTM D2216	
-	1-1-2	-	-	11853	-	12	3	0.0003	7	-	5.6	Dark Olive Brown Silty SAND
-	2-2	-	-	10900	-	3	2	0.0002	7.6	-	3.9	Light Brown Silty SAND
-	3-1-2	-	-	4826	-	19	17	0.0017	6.6	-	6.9	Dark Brown Silty SAND
-	4-1-1	-	-	20850	-	5	3	0.0003	6.2	-	6.7	Light Brown Silty SAND
-	5-1-3	-	-	21350	-	7	3	0.0003	6.1	-	3.8	Brown Silty SAND, trace organics
-	6-1-3	-	-	16644	-	7	2	0.0002	6.0	-	4.4	Brown Silty SAND, trace organics
-	7-1-3	-	-	8993	-	10	12	0.0012	6.2	-	5.8	Dark Brown Silty SAND, trace organics
-	8-1-3	-	-	30958	-	3	2	0.0002	6.2	-	3.2	Light Brown Silty SAND, trace organics
	9-2	-	-	10580	-	3	<2	<2	7.8	-	5.9	Dark Yellowish Brown Silty SAND
	10-1-2	-	-	9618	-	8	5	0.0005	6.9	-	7.1	Dark Olive Brown Silty SAND
-	B-14 @ GS	-	-	8362	-	5	5	0.0005	6.9	-	5.2	Brown Silty SAND, trace organics

Resistivity (ohm-cm)	
Very Corrosive	0-1,000
Corrosive	1,000-2,000
Fairly Corrosive	2,000-5,000
Midly Corrosive	5,000-10,000
Negligible	>10,000

Chloride Conc. (mg/kg)	
Severe	>1,500
Positive	300-1,500
Negligible	0-300

Sulfate Conc. (mg/kg)	
Severe	>5,000
Considerable	2,000-5,000
Positive	1,000-2,000
Negligible	0-1,000

pH	
potential for acid attack on concrete and steel	<6

Pacific Crest Engineering Inc.
444 Airport Blvd., Suite 106
Watsonville, CA 95076

Corrosivity Test Summary
Monterey Peninsula Desalination Plant
Monterey County, California

Figure No. 36
Project No. 1405
Date: 9/2/14

APPENDIX B

Engineering Geology Report
Prepared By Zinn Geology

23 March 2014 Job #2014002-G-MT

Pacific Crest Engineering
Attention: Elizabeth Mitchell
444 Airport Boulevard, Suite 106
Watsonville, California 95076

Re: Engineering geologic investigation
Proposed Desalination Infrastructure
Monterey Peninsula Water Supply Project
Marina, California

Dear Mrs. Mitchell:

Our geologic report on the property referenced above is attached. This report documents geologic conditions at the site and addresses potential geological hazards to the proposed infrastructure.

Based on the information gathered and analyzed in the steps outlined above, it is our opinion that the site for the proposed desalination plant infrastructure is geologically suitable, and will be subject to a "slightly higher than "Extremely Low" Level" of risk as outlined in Appendix B of this report, provided our recommendations are followed. Appendix B should be reviewed in detail by the developer and all property owners to determine whether a "Slightly higher than "Extremely Low" Level" of risk is acceptable. If this level of risk is unacceptable to the developer and the property owners, then the geologic hazards in question should be mitigated to reduce the corresponding risks to an acceptable level.

In our opinion, the primary geologic hazards that could potentially affect the building site are intense seismic shaking and dynamic compaction. Other hazards such as surface fault ground rupture, landsliding, liquefaction and flooding were considered, but in our opinion have a low potential to impact the site within the design life of the development.

In our opinion, the upper five feet of loose sandy soil on the site has the potential to undergo dynamic compaction if exposed to long duration large magnitude seismic shaking forces.

RECOMMENDATIONS

1. All analyses should consider the different seismic shaking parameters given in the Seismic Shaking Hazards section of this report. The project engineers and designer should review our seismic shaking parameters and choose a value appropriate for their particular analyses.

2. We recommend that the Project Geotechnical Engineer assess the dynamic compaction potential of loose blanket of sandy soils in the upper five feet and, where warranted, provide mitigation recommendations to lower any unacceptable risks to the proposed structures.

3. We recommend that our firm be provided the opportunity to review the final design and specifications in order that our recommendations may be properly interpreted and implemented in the design and specification. If our firm is not accorded the privilege of making the recommended review we can assume no responsibility for misinterpretation of our recommendations.

If you have any questions or comments regarding this report, please contact us at your earliest convenience.

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PLATE 1 - Geologic Site Map - In pocket at back of report.
PLATE 2 - Geologic Cross Sections - In pocket at back of report.

NOTE: Plates must accompany text of report in order for report to be considered complete.

INTRODUCTION

This report presents the results of our geologic investigation for the proposed desalination plant infrastructure development on undeveloped land near the southeastern terminus of Charles Benson Road in Marina, California. The site is located at 36.71566° north and longitude -121.77303° west. The site is located upon gently sloping ancient sand dune terrain, set back from the top of break in slope where the dunes were once eroded by the Salinas River (Figures 1 and 2 and Plate 1).

The purpose of this investigation is to provide the design team with the requested geological parameters needed for the plant infrastructure design. We have investigated and herein reported upon the potential geologic hazards and risks relevant to the proposed construction of the plant infrastructure.

SCOPE OF INVESTIGATION

Work performed during this study included:

1. A review of geologic and geotechnical engineering literature pertinent to the property and project.

2. Examination and interpretation of historical vertical stereo pair aerial photographs.

3. Geologic reconnaissance of the property and surrounding area

4. Review of small-diameter boring data obtained by Pacific Crest Engineering [PCE].

5. Calculation of the different spectral response accelerations utilizing several different prescriptive code-based publications..

6. Analysis and interpretation of the geologic data and preparation of this report.

REGIONAL GEOLOGIC SETTING

The subject property is located near northwestern terminus of the central Santa Lucia Range. The Santa Lucia Range is formed by a series of rugged, linear ridges and valleys following the pronounced northwest to southeast structural grain of central California geology. Underlying most of the Santa Lucia Range is a large, elongate prism of granitic and metamorphic basement rocks, known collectively as the Salinian Block (Figure 2). These rocks are separated from contrasting basement rock types to the northeast and southwest, respectively, by the San Andreas and San Gregorio strike-slip fault systems.

The Santa Lucia Range was uplifted in the early Pliocene, resulting in watersheds that drained southeastward from the range, creating a package of coarse clastic sediments called the Paso Robles Formation of the upper Salinas Valley. Streams draining the northern Santa Lucia Range during late Pliocene to early Pleistocene time deposited gravel, sand, and silt that form the foothills of the modern-day San Benancio Canyon and the southern part of the Fort Ord Reservation.

The ongoing sea-level high stands and low stands throughout the Pleistocene created a dynamic interfingering of the windborne and oceanic sediments with the sediments shed off of the Santa Lucia Range. Wind-blown sands formed dunes during multiple sea-level low stands in the Pleistocene in the eastern part of the present-day Monterey Bay and from the vicinity of Fort Ord to the northernmost part of Monterey county.

Throughout the Cenozoic Era, this portion of California has been dominated by tectonic forces associated with lateral or "transform" motion between the North American and Pacific lithospheric plates, producing long, northwest-trending faults such as the San Andreas and San Gregorio, with horizontal displacements measured in tens to hundreds of miles. Accompanying the horizontal (strike-slip) movement of the plates have been episodes of compressive stress, reflected by repeated uplift, deformation, erosion and deposition.

REGIONAL SEISMIC SETTING

California's broad system of strike-slip faulting has had a long and complex history. Some of these faults present a seismic shaking hazard to the proposed development. The most important of these are the San Gregorio, Rinconada and Monterey Bay-Tularcitos faults (Figures 3 and 4). These faults are either active or considered potentially active (Working Group On Northern California Earthquake Potential (WGONCEP), 1996; 1999 Working Group on California Earthquake Probabilities (WGOCEP), 1999; 2002 Working Group On California Earthquake Probabilities (WGOCEP), 2003; Cao et al., 2003). Each fault is discussed below. Locations of epicenters associated with the faults are shown in Figure 4.

San Gregorio Fault

The San Gregorio fault, as mapped by Greene (1977), Weber and Lajoie (1974), and Weber et al. (1995) skirts the coastline of Santa Cruz County northward from Monterey Bay, and trends onshore at Point Año Nuevo. Northward from Año Nuevo, it passes offshore again, to connect with the San Andreas fault near Bolinas. Southward from Monterey Bay, it may trend onshore north of Big Sur (Greene, 1977) to connect with the Palo Colorado fault, or continue southward through Point Sur to connect with the Hosgri fault in south-central California. Based on these two proposed correlations, the San Gregorio fault zone has a length of at least 100 miles and possibly as much as 250 miles.

The landward extension of the San Gregorio fault at Point Año Nuevo shows evidence of late Pleistocene (Buchanan-Banks et al., 1978) and Holocene displacement (Weber and Cotton, 1981). Although stratigraphic offsets indicate a history of horizontal and vertical displacements, the San Gregorio is considered predominantly right-lateral strike slip by most researchers (Greene, 1977; Weber and Lajoie, 1974; and Graham and Dickinson, 1978).

In addition to stratigraphic evidence for Holocene activity, the historical seismicity in the region is partially attributed to the San Gregorio fault (Greene, 1977). Due to inaccuracies of epicenter locations, even the magnitude 6+ earthquakes of 1926, tentatively assigned to the Monterey Bay fault zone, may have actually occurred on the San Gregorio fault (Greene, 1977).

The WGONCEP (1996) has divided the San Gregorio fault into the "San Gregorio" and "San Gregorio, Sur Region" segments. The segmentation boundary is located west of the Monterey Bay, where the fault appears to have a right step-over. The San Gregorio fault has been assigned a slip rate that results in a M_w 7.3 earthquake with a recurrence interval of 400 years. This is based on the preliminary results of a paleoseismic investigation at Seal Cove by Lettis and Associates (see WGONCEP, 1996) and on regional mapping by Weber et al. (1995). The Sur Region segment has been assigned a slip rate that results in a M_w 7.0 earthquake with an effective recurrence interval of 400 years (coinciding with the recurrence interval for the other segment). The Sur Region earthquake was derived from an assumed slip rate similar to that of the Hosgri fault.

WGOCEP, 2003 and Cao et al. (2003) have adopted a model similar to the WGONCEP (1996), essentially renaming the San Gregorio segment the “San Gregorio North” segment, and downgrading the forecasted earthquake on this segment to a Mw 7.2, and renaming the San Gregorio, Sur Region segment the San Gregorio South segment, retaining the forecasted earthquake of Mw 7.0.

Rinconada Fault

The Rinconada fault zone has been mapped by various researchers as stretching from Spreckels to King City, encompassing the Reliz fault. Durham (1965) and Dibblee (1976) have interpreted the Rinconada fault as a significant tectonic component of the Coast Ranges, with total right-lateral strike-slip displacement estimates ranging between 11 and 25 miles.

It appears that the fault has definitely moved in the late Quaternary, but evidence of Holocene surface rupture has never been conclusively demonstrated. Tinsley (1975) has interpreted the fault as deforming late Quaternary age Paso Robles Formation near Spreckels, while Dibblee (1976) cites right-lateral offset of streams near Espinosa Canyon. Hart (1985) has interpreted the fault as truncating probable late Pleistocene age alluvial fan deposits and surfaces near Williams Hill, which appears to be somewhat supported by work performed by Klaus (1999), which estimated as much as 16 feet of vertical offset of alluvial fan surfaces with an *estimated* age of 300,000 to 400,000 years.

In spite of the lack of evidence indicating Holocene activity, Petersen et al. (1996) and Cao et al. (2003) have adopted forecasted earthquake magnitudes of Mw 7.3 and 7.5, respectively.

Monterey Bay-Tularcitos Fault Zone

The Monterey Bay-Tularcitos fault zone is 6 to 9 miles wide, about 25 miles long, and consists of many en échelon faults identified during shipboard seismic reflection surveys (Greene, 1977). The fault zone trends northwest-southeast and intersects the coast in the vicinity of Seaside and Ford Ord. At this point, several onshore fault traces have been tentatively correlated with offshore traces in the heart of the Monterey Bay-Tularcitos fault zone (Greene, 1977; Clark et al., 1974; Burkland and Associates, 1975). These onshore faults are, from southwest to northeast, the Tularcitos-Navy, Berwick Canyon, Chupines, Seaside, and Ord Terrace faults. Only the larger of these faults, the Tularcitos-Navy and Chupines, are shown on Figure 2. It must be emphasized that these correlations between onshore and offshore portions of the Monterey Bay-Tularcitos fault zone are only tentative; for example, no concrete geologic evidence for connecting the Navy and Tularcitos faults under the Carmel Valley alluvium has been observed, nor has a direct connection between these two faults and any offshore trace been found.

Outcrop evidence indicates a variety of strike-slip and dip-slip movement associated with onshore and offshore traces. Earthquake studies suggest the Monterey Bay-Tularcitos fault zone is predominantly right-lateral, strike-slip in character (Greene, 1977). Stratigraphically, both offshore and onshore fault traces in this zone have displaced Quaternary beds and, therefore, are considered potentially active (Buchanan-Banks et al., 1978). One offshore trace, which aligns with the trend of the Navy fault, has displaced Holocene beds and is therefore active by definition (Buchanan-Banks et al., 1978).

Seismically, the Monterey Bay-Tularcitos fault zone may be historically active. The largest historical earthquakes *tentatively* located in the Monterey Bay-Tularcitos fault zone are two events, estimated at 6.2 on the Richter Scale, in October 1926 (Greene, 1977). Because of possible inaccuracies in locating the epicenters of these earthquakes, it is possible that they actually occurred on the nearby San Gregorio fault zone (Greene, 1977).

Another earthquake in April 1890 might be attributed to the Monterey Bay-Tularcitos fault zone (Burkland and Associates, 1975); this earthquake had an estimated Modified Mercalli Intensity of VII (Table 1) for Monterey County on a whole.

The WGONCEP (1996) has assigned an earthquake of M_w 7.1 with an effective recurrence interval of 2,600 years to the Monterey Bay-Tularcitos fault zone, based on Holocene offshore offsets. Petersen et al. (1996) have a similar earthquake magnitude, but for a recurrence interval of 2,841 years. Their earthquake is based on a composite slip rate of 0.5 millimeters per year (after Rosenberg and Clark, 1995).

TABLE 1
Modified Mercalli Intensity Scale

The modified Mercalli scale measures the intensity of ground shaking as determined from observations of an earthquake's effect on people, structures, and the Earth's surface. Richter magnitude is not reflected. This scale assigns to an earthquake event a Roman numeral from I to XII as follows:

I	Not felt by people, except rarely under especially favorable circumstances.
II	Felt indoors only by persons at rest, especially on upper floors. Some hanging objects may swing.
III	Felt indoors by several. Hanging objects may swing slightly. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.
IV	Felt indoors by many, outdoors by few. Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing automobiles rock. Windows, dishes, doors rattle. Wooden walls and frame may creak.
V	Felt indoors and outdoors by nearly everyone; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset; some dishes and glassware broken. Doors swing; shutters, pictures move. Pendulum clocks stop, start, change rate. Swaying of tall trees and poles sometimes noticed.
VI	Felt by all. Damage slight. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks and books fall off shelves; pictures off walls. Furniture moved or overturned. Weak plaster and masonry cracked.
VII	Difficult to stand. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary buildings; considerable in badly designed or poorly built buildings. Noticed by drivers of automobiles. Hanging objects quiver. Furniture broken. Weak chimneys broken. Damage to masonry; fall of plaster, loose bricks, stones, tiles, and unbraced parapets. Small slides and caving in along sand or gravel banks. Large bells ring.
VIII	People frightened. Damage slight in specially designed structures; considerable in ordinary substantial buildings, partial collapse; great in poorly built structures. Steering of automobiles affected. Damage or partial collapse to some masonry and stucco. Failure of some chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Decayed pilings broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.
IX	General panic. Damage considerable in specially designed structures; great in substantial buildings, with some collapse. General damage to foundations; frame structures, if not bolted, shifted off foundations and thrown out of plumb. Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground; liquefaction.
X	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Landslides on river banks and steep slopes considerable. Water splashed onto banks of canals, rivers, lakes. Sand and mud shifted horizontally on beaches and flat land. Rails bent slightly.
XI	Few, if any masonry structures remain standing. Bridges destroyed. Broad fissures in ground; earth slumps and landslides widespread. Underground pipelines completely out of service. Rails bent greatly.
XII	Damage nearly total. Waves seen on ground surfaces. Large rock masses displaced. Lines of sight and level distorted. Objects thrown upward into the air.

Cao et al. (2003) has developed a model for the Monterey Bay fault zone that combines slip rates of the different segments, resulting in a composite slip rate of 0.5 mm per year and a forecasted earthquake of Mw 7.3, with no stated recurrence interval. The Cao et al. (2003) model adopted implicitly assumes that all the assessed segments in the Monterey Bay fault zone each have an independent slip rate of 0.1 mm per year (based upon the one slip rate developed by Rosenberg and Clark, 1995 for the Tularcitos segment), and essentially assigns the composite slip rate to the Tularcitos trace of the Monterey Bay fault zone.

SITE GEOLOGIC SETTING

The Geologic Site Map (Plate 1) and Geologic Cross Sections (Plate 2) graphically depict relevant geologic information for the site. See also the attached figures for information of a more general nature.

Topography

The site sits atop an ancient dune field complex that overlooks the Salinas Valley near the mouth of the Salinas River. The ground at the site is flat to gently undulating, including small hills and hummocks ubiquitous to old dune fields (see Figure 2). Overall the site slopes to the northeast, toward the Salinas River Valley.

The upper elevations of the site will essentially be flattened by notching into the hillside to create a flat compound cut-fill pad. Cuts up to 20 feet high are currently being proposed and the extent of fills and fill slopes appear to be less than 10 feet high in general.

Excavations for planned ponds at the southeast and northwest sides of the development will generate compound cut-fill impoundment areas, with the floors of the ponds being imbedded within the native soils are planned.

Earth Materials

The most recent ***detailed*** regional mapping of earth materials (Rosenberg, 2001) depicts the development area as being underlain by the Older dune deposits, a blanket of Pleistocene age wind-blown sand sediments deposited atop the fluvial lithofacies member of the Aromas Formation (Figure 5).

Several rounds of small-diameter borings have been advanced on the site by two geotechnical engineering firms: A series of borings were drilled as deep as 100 feet below the ground surface in May 2013 by URS as part of their draft Geotechnical Baseline Report (dated 20 June 2013) and a series of borings were advanced as deep as 75 feet below the ground surface in March 2014 by the current Project Geotechnical Engineer of Record, PCE, Inc. All of the borings encountered a blanket of ancient dune sand composed predominantly of fine- to medium-grained sand that is well sorted (poorly graded) and sub-angular to sub-rounded. Varying amounts of a

small percentage of silt were found in the matrix of the sand at different depths in different borings. There were no distinct beds that could be linked between the borings, which is not unusual for eolian deposits, leading us to conclude that the package of dune deposits on the site should be regarded as structurally massive.

Both firms also encountered an older fluvial package, most likely belonging to the fluvial lithofacies of the Aromas Formation, that was composed of sand, silt and clay. It is likely that the materials in this formation are interbedded and interfingering, based upon our general experience with fluvial deposits and observation of exposures of the Aromas Formation to the north of the site in Santa Cruz County. The contact between the Aromas Formation and the overlying Older Dune Deposits is between about 72' and 107' below the ground surface in the vicinity of the proposed developments. The reason for this variation in depth is due to the nature of this unconformable contact, which appears to be canted gently to the south, as well as the "lumpy" nature of the original sand dunes that overlie the contact (see Plate 2 for a graphical depiction of this concept).

The standard penetration blow counts ranged between 1 and 50 for 5", with a very distinct pattern of loose sand in the upper 5 feet of the sediments. PCE has assigned a 2013 CBC Soil Site Class of D which seems reasonable from a geological perspective. We also noted that PCE has interpreted the soils as not being liquefiable under the proposed development area.

Drainage and Groundwater

Drainage across the site is primarily by sheet flow across the site to the northeast, toward the Salinas River Valley.

Groundwater was generally initially encountered in the deeper borings advanced by both PCE and URS just slightly above the contact between the Older Dune Deposits and the Aromas Formation (see Plate 2). It appears, based upon our analysis of the groundwater data procured by PCE in March 2014, that groundwater comes to within about 60 feet of ground surface in the development area. The groundwater does appear to be flowing to the south, away from the Salinas River Valley, which may indicate that it is structurally controlled and is perching on the contact between the Older Dune Deposits and the Aromas Formation.

We did note that the water levels varied widely between initial observation and final observation at time. This may be due to the cross communication in the borings between the two unconfined aquifers of different hyraulic conductivity.

It is important to note that both formations that underlie the site are in direct hydraulic communication with the ocean and are typically only saturated in the extreme coastal portion of the basin. These characteristics make them susceptible to water quality degradation, either from seawater intrusion or surface-derived contaminants.

Considering that both firms did their drilling during the onset and continuation of one of the driest rainfall seasons in recorded history, we did give some thought to the possibility that the water table may fluctuate under the site from season to season, depending upon seasonal rainfall in the region. There was no evidence, however, in the sediments encountered in the small-diameter borings that it rises significantly above where it was encountered in the past year, based upon the lack of mottling or gleying in the sediments above the current water table.

GEOLOGIC HAZARDS

In our opinion, the primary geologic hazard that could potentially affect the building site is intense seismic shaking and dynamic compaction. Other hazards such as surface fault ground rupture, liquefaction and flooding were considered, but in our opinion have a low potential to impact the site within design life of the structures, which corresponds to an acceptable risk.

Seismic shaking hazard analysis

Seismic shaking at the subject site will be intense during the next major earthquake along local fault systems, particularly the San Gregorio fault and the Monterey Bay Fault Zone. It is important that recommendations regarding seismic shaking be applied where deemed appropriate by the project engineers for the project design, as well as where dictated by minimum prescriptive requirements in the different codes and standards utilized for the project.

The following sections document the sequential procedures and reasoning used for arriving at the final calculated seismic shaking parameters for this project.

Site Class

We have assigned a site class assignment of "D" using the equations from Chapter 16 of the 2013 California Building Code and Chapter 20 of ACSE/SEI 7-10. Therefore we have used a designation of Site Class D for the upper 100 feet of earth materials at the site.

Risk Categories

It is our understanding that the storage tanks and related equipment are to be assigned a risk category of IV, while the balance of the other structures on the site are to be assigned a risk category of III. The AWWA standards utilized to generate some of the parameters do not utilize the current risk category system given in ASCE/SEI 7-10. Instead a system called the "Seismic Use Group" is utilized by AWWA. We assigned a Seismic Use Group value of III (the highest value) to the tanks, as that seemed to correspond best with the desired assignment of Risk Category IV for the tanks.

Table 2: Seismic Load Criteria Using ASCE 7-10 For Risk Category III

SEISMIC DESIGN PARAMETER	SHORT PERIOD	LONG PERIOD	MEANS AND METHODOLOGY
Mapped spectral acceleration	S_s = 1.582	S_1= 0.561	ASCE 7-10: Figure 22-1 & 22-2
Site Coefficients	F_a = 1.0	F_v = 1.5	ASCE 7-10: Section 11.4.3, Tables 11.4-1 and 11.4-2
Maximum considered earthquake acceleration	S_{MS} = 1.582	S_{M1} = 0.842	ASCE 7-10: Section 11.4, Equations 11.4-1 and 11.4-2
Design Acceleration	S_{DS} = 1.054	S_{D1} = 0.561	ASCE 7-10: Section 11.4.4., Equations 11.4-3 and 11.4-4
Site Class	D	D	ASCE 7-10
Seismic Design Category	D	D	
Design Response Spectrum		T_L = 12 seconds	ASCE 7-10: Section 11.4.5, Figure 22-12
Peak Ground Acceleration (PGA)	0.582 g		ASCE 7-10: Section 11.8.3 including Equation 11.8-1
Mapped Risk Coefficient C_{RS}	1.040		ASCE 7-10: Figure 22-17
Mapped Risk Coefficient C_{R1}	1.002		ASCE 7-10: Figure 22-18

Table 3: Seismic Load Criteria Using ASCE 7-10 For Risk Category IV

SEISMIC DESIGN PARAMETER	SHORT PERIOD	LONG PERIOD	MEANS AND METHODOLOGY
Mapped spectral acceleration	S_s = 1.582	S_1= 0.561	ASCE 7-10: Figure 22-1 & 22-2
Site Coefficients	F_a = 1.0	F_v = 1.5	ASCE 7-10: Section 11.4.3, Tables 11.4-1 and 11.4-2
Maximum considered earthquake acceleration	S_{MS} = 1.582	S_{M1} = 0.842	ASCE 7-10: Section 11.4, Equations 11.4-1 and 11.4-2
Design Acceleration	S_{DS} = 1.054	S_{D1} = 0.561	ASCE 7-10: Section 11.4.4., Equations 11.4-3 and 11.4-4
Site Class	D	D	ASCE 7-10
Seismic Design Category	D	D	
Design Response Spectrum		T_L = 12 seconds	ASCE 7-10: Section 11.4.5, Figure 22-12
Peak Ground Acceleration (PGA)	0.582 g		ASCE 7-10: Section 11.8.3 including Equation 11.8-1
Mapped Risk Coefficient C_{RS}	1.040		ASCE 7-10: Figure 22-17
Mapped Risk Coefficient C_{R1}	1.002		ASCE 7-10: Figure 22-18

Table 4: Seismic Load Criteria Using AWWA D100-11 (Welded Carbon Steel Tanks For Water Storage) For Seismic Use Group III

SEISMIC DESIGN PARAMETER	SHORT PERIOD	LONG PERIOD	MEANS AND METHODOLOGY
Mapped spectral acceleration	S_s = 1.582	S_1= 0.561	ASCE 7-10: Figure 22-1 & 22-2
Site Coefficients	F_a = 1.0	F_v = 1.5	ASCE 7-10: Section 11.4.3, Tables 11.4-1 and 11.4-2
Maximum considered earthquake acceleration	S_{MS} = 1.582	S_{M1} = 0.842	ASCE 7-10: Section 11.4, Equations 11.4-1 and 11.4-2
Design Response Spectra	S_{DS} = 1.054	S_{D1} = 0.561	AWWA D100-11: Section 13.2.7.3, Equations 13-7 and 13-8
Seismic Importance Factor I_E	1.50	1.50	AWWA D100-11: Section 13.2.1.1, Table 24
Site Class	D	D	AWWA D100-11: Section 13.2.4, Table 25
Response Modification Factor R_i	?		AWWA D100-11: Section 13.2.6, Table 28
Response Modification Factor R_c	?		AWWA D100-11: Section 13.2.6, Table 28
Design Response Spectrum		T_L = 12 seconds	ASCE 7-10: Section 11.4.5, Figure 22-12

Table 5: Seismic Load Criteria Using AWWA D103-09 (Factory-Coated Bolted Carbon Steel Tanks for Water Storage) For Seismic Use Group III

SEISMIC DESIGN PARAMETER	SHORT PERIOD	LONG PERIOD	MEANS AND METHODOLOGY
Mapped spectral acceleration	S_s = 1.582	S_1= 0.561	ASCE 7-10: Figure 22-1 & 22-2
Site Coefficients	F_a = 1.0	F_v = 1.5	ASCE 7-10: Section 11.4.3, Tables 11.4-1 and 11.4-2
Maximum considered earthquake acceleration	S_{MS} = 1.582	S_{M1} = 0.842	ASCE 7-10: Section 11.4, Equations 11.4-1 and 11.4-2
Design Response Spectra	S_{DS} = 1.054	S_{D1} = 0.561	AWWA D103-09: Section 14.2.7.3, Equations 14-7 and 14-8
Seismic Importance Factor I_E	1.50	1.50	AWWA D103-09: Section 14.2.1.1, Table 2
Site Class	D	D	AWWA D103-09: Section 14.2.4, Table 3
Response Modification Factor R_i	?		AWWA D103-09: Section 14.2.6, Table 6
Response Modification Factor R_c	?		AWWA D103-09: Section 14.2.6, Table 6
Design Response Spectrum		T_L = 12 seconds	ASCE 7-10: Section 11.4.5, Figure 22-12

Liquefaction

Liquefaction is a mechanism of ground failure resulting from increased pore pressures during undrained cyclical shearing of saturated cohesionless soils. The excess pore water pressure causes the effective stress and shear resistance to drop, producing a liquefied soil state. In general terms, when loose, saturated, coarse-grained soils (cohesionless soils) are subjected to earthquake shaking (cyclical shearing) the water pressure (pore pressure) increases. If the water can not escape fast enough (undrained) stress is transferred from the soil skeleton to the pore water, reducing the grain to grain contact (effective stress). This reduces the soil strength (shear

resistance) and if the reduction is great enough the soil deforms and is said to liquefy. Ultimately, sands and non-plastic silts consolidate when subjected to repeated liquefaction.

The Project Geotechnical Engineer Of Record, PCE, Inc., has concluded that the potential for liquefaction to occur at the site is low, corresponding to a "Slightly higher than "Extremely Low" Level" of risk as defined in Appendix B. Therefore, no further study for this hazard is needed and no special remedial measures are required to mitigate the risk level for this hazard.

Dynamic Compaction

Dynamic compaction typically occurs in unsaturated loose granular material or improperly compacted artificial fill. A distinctive horizon of loose sand approximately five feet thick appears to blanket the surface of site within the proposed development area, based upon small-diameter boring data procured by URS and PCE. In our opinion, the upper five feet of loose sandy soil on the site has the potential to undergo dynamic compaction if exposed to long duration, large magnitude seismic shaking forces. We therefore recommend that the Project Geotechnical Engineer assess this potential and mitigate the risks to the proposed structures where warranted.

CONCLUSIONS

Based on the information gathered and analyzed in the steps outlined above, it is our opinion that the site for the proposed desalination plant infrastructure is geologically suitable, and will be subject to a "slightly higher than "Extremely Low" Level" of risk as outlined in Appendix B of this report, provided our recommendations are followed. Appendix B should be reviewed in detail by the developer and all property owners to determine whether a "Slightly higher than "Extremely Low" Level" of risk is acceptable. If this level of risk is unacceptable to the developer and the property owners, then the geologic hazards in question should be mitigated to reduce the corresponding risks to an acceptable level.

In our opinion, the primary geologic hazards that could potentially affect the building site are intense seismic shaking and dynamic compaction. Other hazards such as surface fault ground rupture, landsliding, liquefaction and flooding were considered, but in our opinion have a low potential to impact the site within the design life of the development.

In our opinion, the upper five feet of loose sandy soil on the site has the potential to undergo dynamic compaction if exposed to long duration large magnitude seismic shaking forces.

RECOMMENDATIONS

1. All analyses should consider the different seismic shaking parameters given in the Seismic Shaking Hazards section of this report. The project engineers and designer should review our seismic shaking parameters and choose values appropriate for their particular analyses.

2. We recommend that the Project Geotechnical Engineer assess the dynamic compaction potential of loose blanket of sandy soils in the upper five feet and, where warranted, provide mitigation recommendations to lower any unacceptable risks to the proposed structures.

3. We recommend that our firm be provided the opportunity to review the final design and specifications in order that our recommendations may be properly interpreted and implemented in the design and specification. If our firm is not accorded the privilege of making the recommended review we can assume no responsibility for misinterpretation of our recommendations.

INVESTIGATIVE LIMITATIONS

1. Our services consist of professional opinions and recommendations made in accordance with generally accepted engineering geology principles and practices. No warranty, expressed or implied including any implied warranty of merchantability or fitness for the purpose is made or intended in connection with our services or by the proposal for consulting or other services, or by the furnishing of oral or written reports or findings.

2. The analysis and recommendations submitted in this report are based on the geologic information derived from the steps outlined in the scope of services section of this report. The information is derived from necessarily limited natural and artificial exposures. Consequently, the conclusions and recommendations should be considered preliminary.

3. The conclusions and recommendations noted in this report are based on probability and in no way imply the site will not possibly be subjected to ground failure or seismic shaking so intense that structures will be severely damaged or destroyed. The report does suggest that building structures at the subject site, in compliance with the recommendations noted in this report, will subject the structures to the level of "slightly higher than "Extremely Low" Level" of risk as defined in Appendix B.

4. This report is issued with the understanding that it is the duty and responsibility of the owner or his representative or agent to ensure that the recommendations contained in this report are brought to the attention of the architect and engineer for the project, incorporated into the plans and specifications, and that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

5. The findings of this report are valid as of the present date. However, changes in the conditions of property and its environs can occur with the passage of time, whether they be due to natural processes or to the works of man. In addition, changes in applicable or appropriate standards occur whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or partially, by changes outside our control. Therefore, the conclusions and recommendations contained in this report cannot be considered valid beyond a period of two years from the date of this report without review by a representative of this firm.

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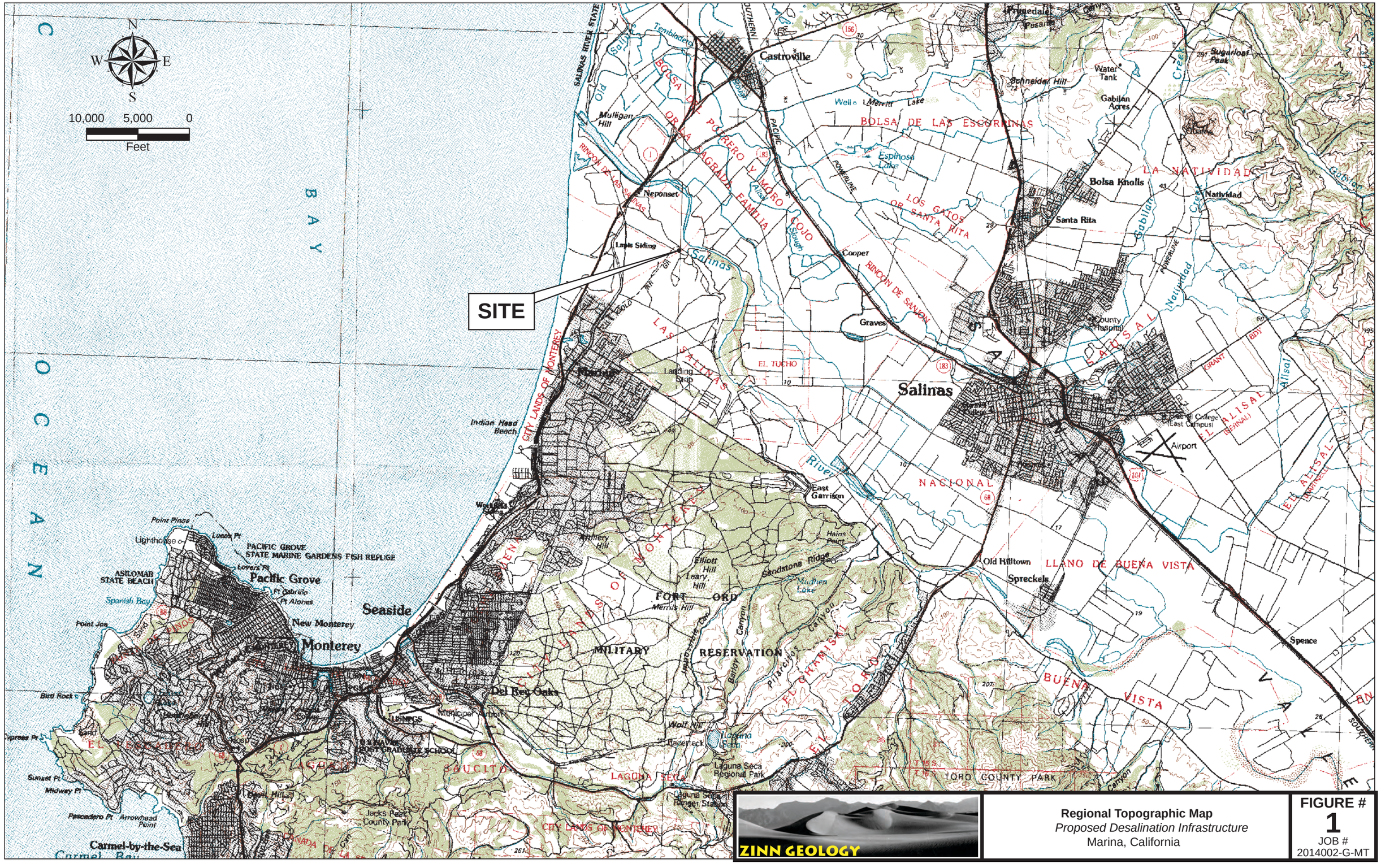
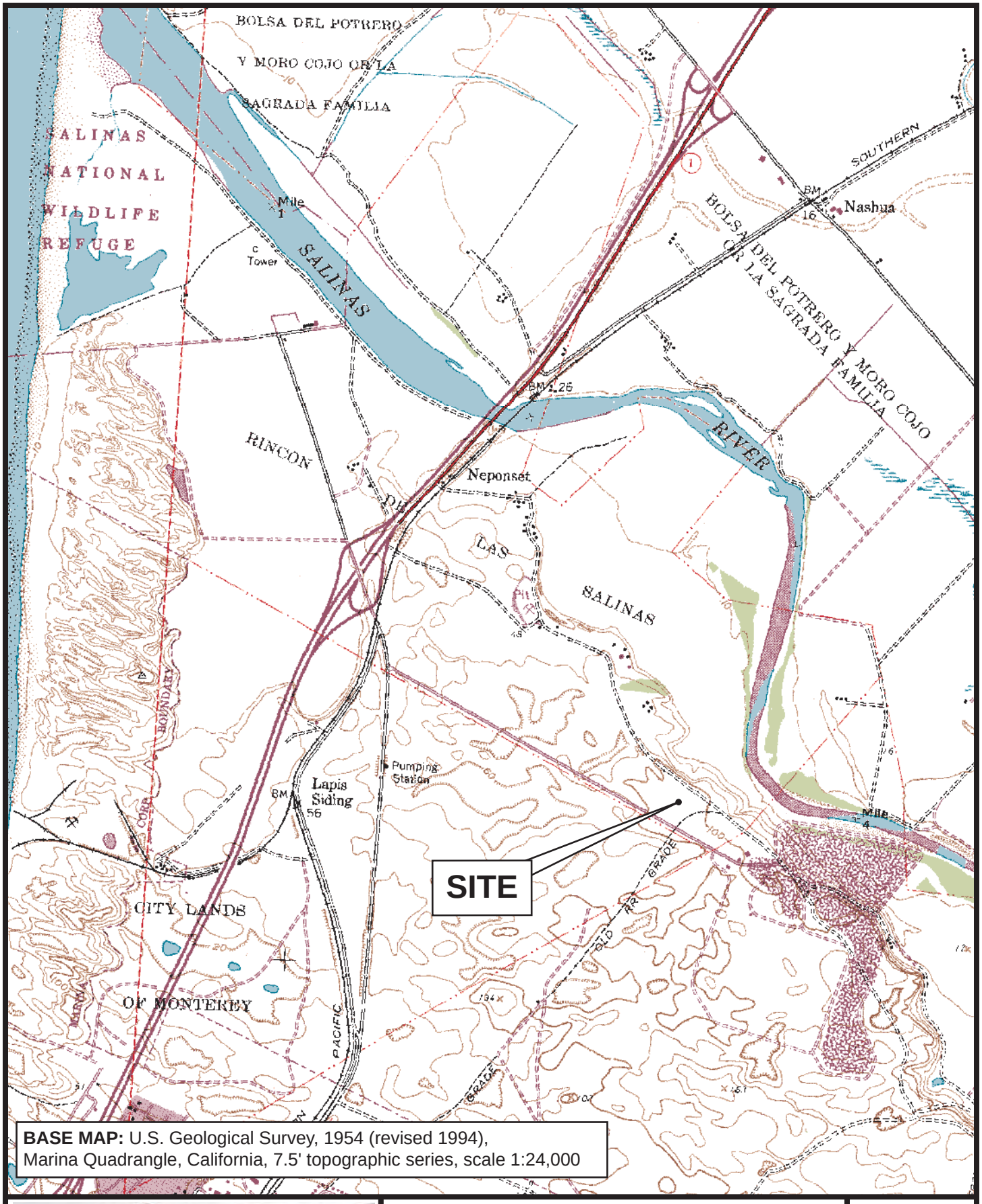
APPENDIX A

FIGURES



Regional Topographic Map
Proposed Desalination Infrastructure
Marina, California

FIGURE # 1
JOB # 2014002-G-MT



BASE MAP: U.S. Geological Survey, 1954 (revised 1994), Marina Quadrangle, California, 7.5' topographic series, scale 1:24,000

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Topographic Index Map

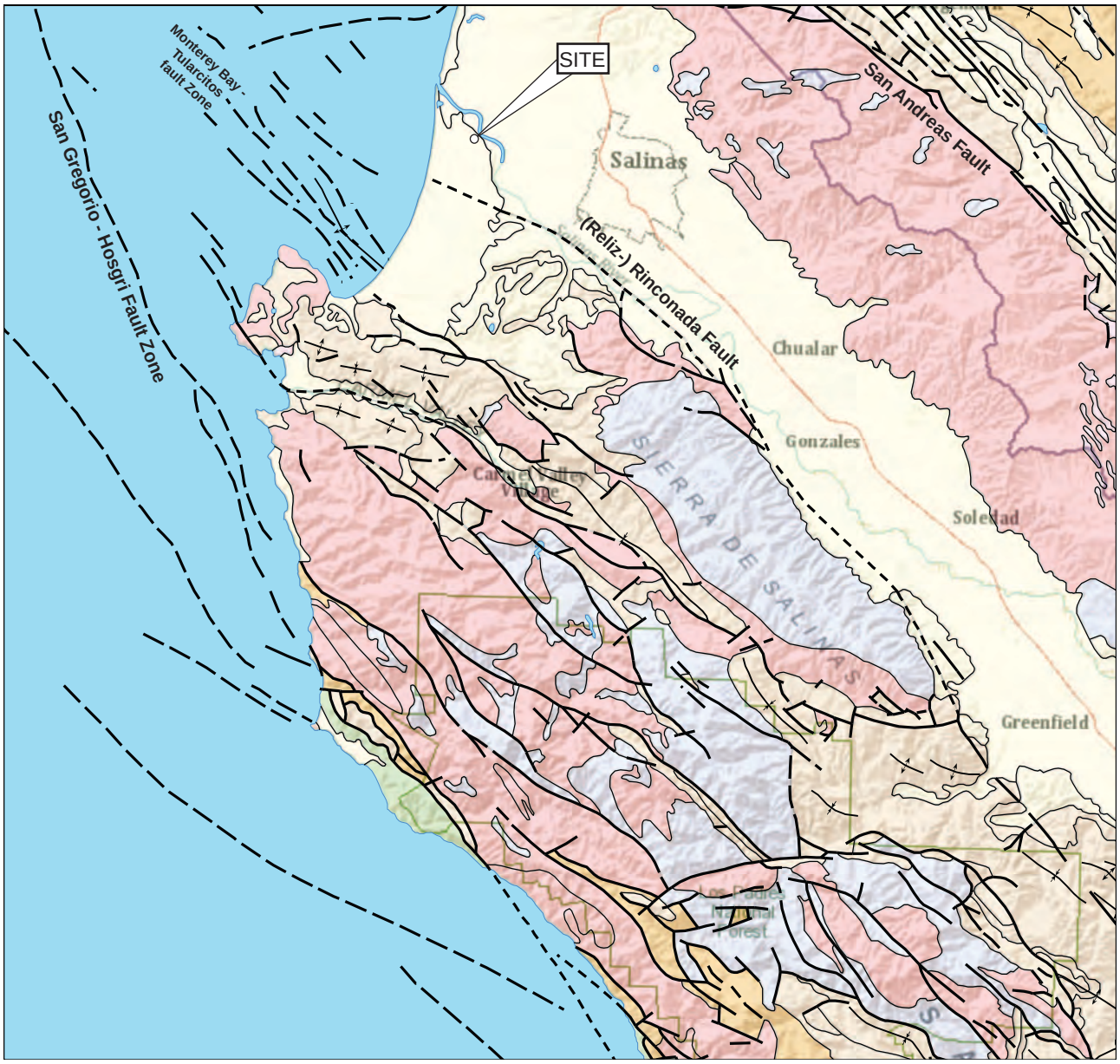
Proposed Desalination Infrastructure

Monterey Peninsula Water Supply Project

Marina, California

FIGURE # 2

JOB # 2014002-G-MT



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SCALE 1:500,000

10 Miles 0

Legend

Geologic Units

- Quaternary Deposits
- Quaternary Volcanics
- Tertiary Sedimentary Rocks
- Tertiary Volcanic Rocks
- Pre-Tertiary Sedimentary Rocks
- Pre-Tertiary Volcanic Rocks
- Grantic Intrusive Rocks
- Franciscan Complex
- Ultramafic Rocks
- Pre-Tertiary Metamorphic Rock
- Pre-Cambrian Metamorphic and Igneous Rocks

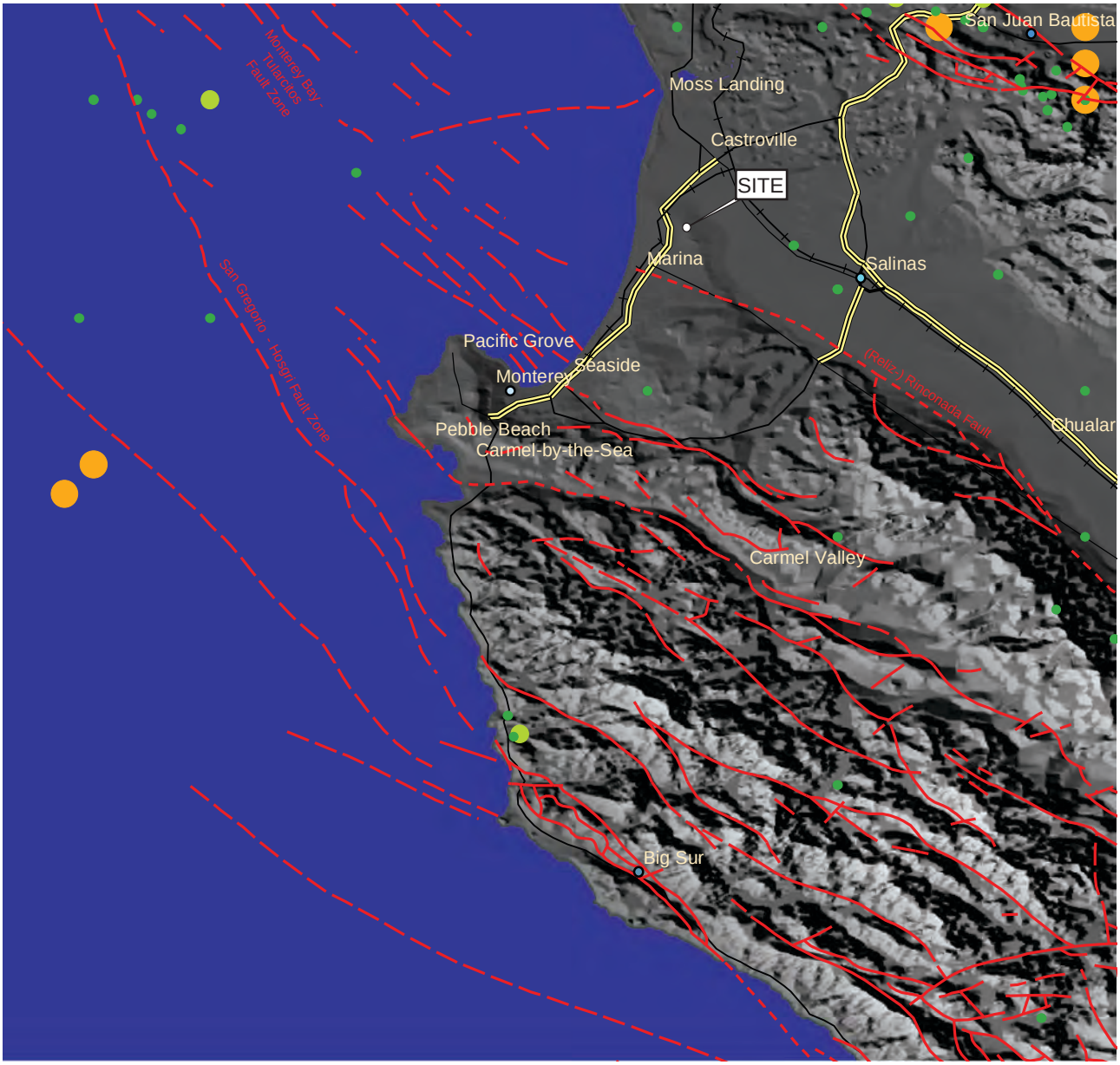
Symbols

- contact
- fault, certain
- fault,approx. located
- fault, concealed or inferred
- anticline
- monocline
- syncline

ZINN GEOLOGY

Regional Geologic Map
Proposed Desalination Infrastructure
Monterey Peninsula Water Supply Project
Marina, California

FIGURE # 3
JOB # 2014002-G-MT



Seismicity Information: Magnitude 4 and greater earthquakes, compiled from various sources, 1769 to 2000; available at www.consrv.cagov/CGS/rghm/quakes/cgs2000_fnl.txt
Fault Information: Jennings, C.W., 1977, Geologic map of California: California Department of Conservation, Division of Mines and Geology, scale 1:750,000

EXPLANATION

Symbols

- fault, certain
- fault,approx. located
- fault, concealed or inferred

Earthquake Magnitude

- 4.0 to 4.99
- 5.0 to 5.99
- 6.0 to 6.99
- 7.0 +

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W E
S

SCALE 1:500,000

0 5 10 20

Miles

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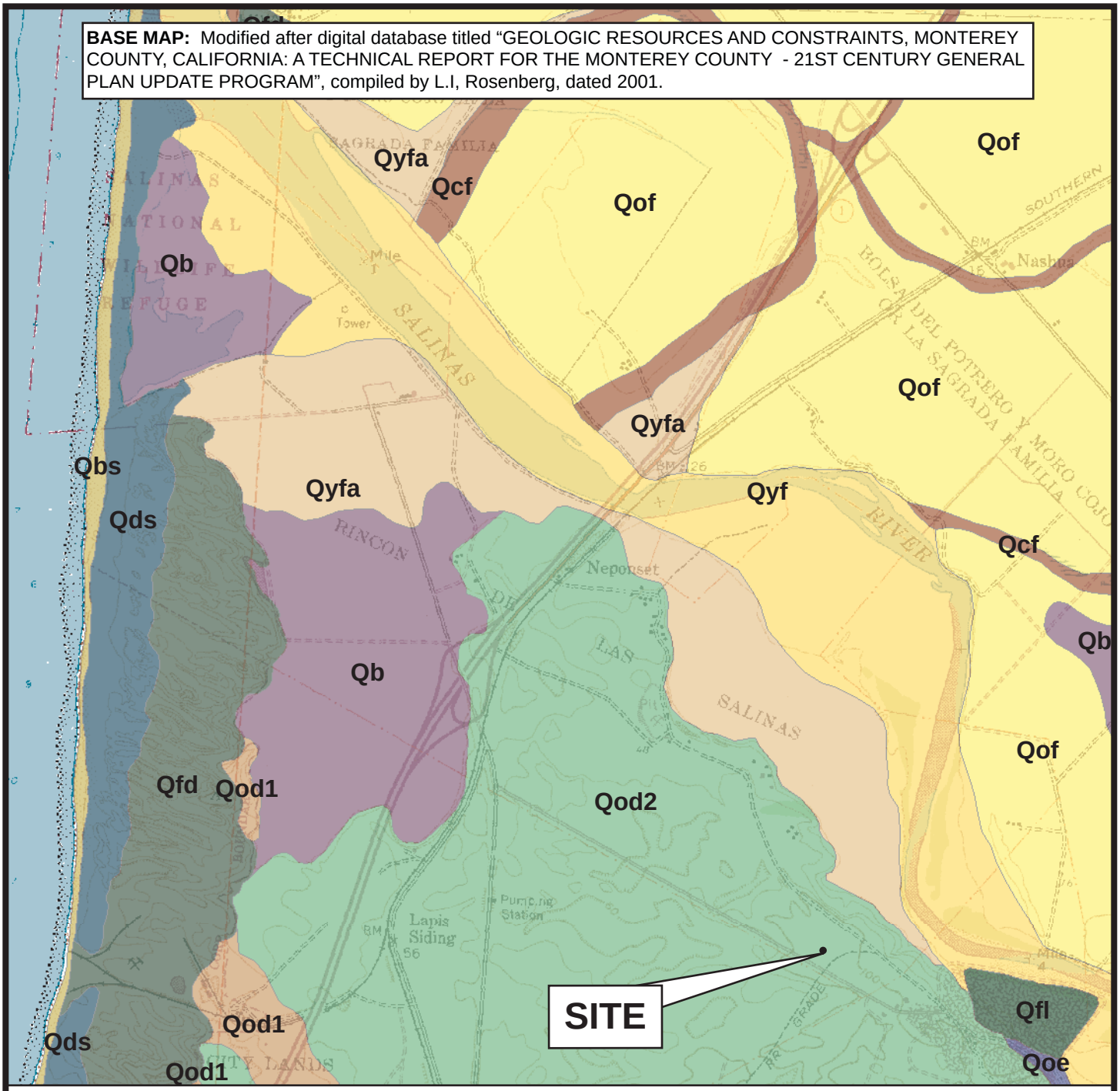
Regional Seismicity Map
Proposed Desalination Infrastructure
Monterey Peninsula Water Supply Project
Marina, California

FIGURE # 4
JOB # 2014002-G-MT



EXPLANATION

Qbs - Beach Sand
Qfl - artificial fill
Qyf - Younger flood plain deposits
Qyfa - Younger flood plain deposits, veneer
Qcf - Channel fill deposits
Qof - Older flood plain deposits
Qb - Basin deposits

Qds - Dune sand
Qfd - Flandrian dune deposits
Qod1 - Coastal dunes, younger
Qod2 - Coastal dunes, older
Qoe - older eolian deposits

N
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0 1000 2,000
Feet
Scale 1:24,000

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Local Geologic Index Map
Proposed Desalination Infrastructure
Monterey Peninsula Water Supply Project
Marina, California

FIGURE # 5
JOB # 2014002-G-MT

APPENDIX B

SCALE OF ACCEPTABLE RISKS FROM GEOLOGIC HAZARDS

SCALE OF ACCEPTABLE RISKS FROM SEISMIC GEOLOGIC HAZARDS		
Risk Level	Structure Types	Extra Project Cost Probably Required to Reduce Risk to an Acceptable Level
Extremely low[1]	Structures whose continued functioning is critical, or whose failure might be catastrophic: nuclear reactors, large dams, power intake systems, plants manufacturing or storing explosives or toxic materials.	No set percentage (whatever is required for maximum attainable safety).
Slightly higher than under "Extremely low" level.[1]	Structures whose use is critically needed after a disaster: important utility centers; hospitals; fire, police and emergency communication facilities; fire station; and critical transportation elements such as bridges and overpasses; also dams.	5 to 25 percent of project cost.[2]
Lowest possible risk to occupants of the structure.[3]	Structures of high occupancy, or whose use after a disaster would be particularly convenient: schools, churches, theaters, large hotels, and other high rise buildings housing large numbers of people, other places normally attracting large concentrations of people, civic buildings such as fire stations, secondary utility structures, extremely large commercial enterprises, most roads, alternative or non-critical bridges and overpasses.	5 to 15 percent of project cost.[4]
An "ordinary" level of risk to occupants of the structure.[3,5]	The vast majority of structures: most commercial and industrial buildings, small hotels and apartment buildings, and single family residences.	1 to 2 percent of project cost, in most cases (2 to 10 percent of project cost in a minority of cases).[4]

1 Failure of a single structure may affect substantial populations.

2 These additional percentages are based on the assumptions that the base cost is the total cost of the building or other facility when ready for occupancy. In addition, it is assumed that the structure would have been designed and built in accordance with current California practice. Moreover, the estimated additional cost presumes that structures in this acceptable risk category are to embody sufficient safety to remain functional following an earthquake.

3 Failure of a single structure would affect primarily only the occupants.

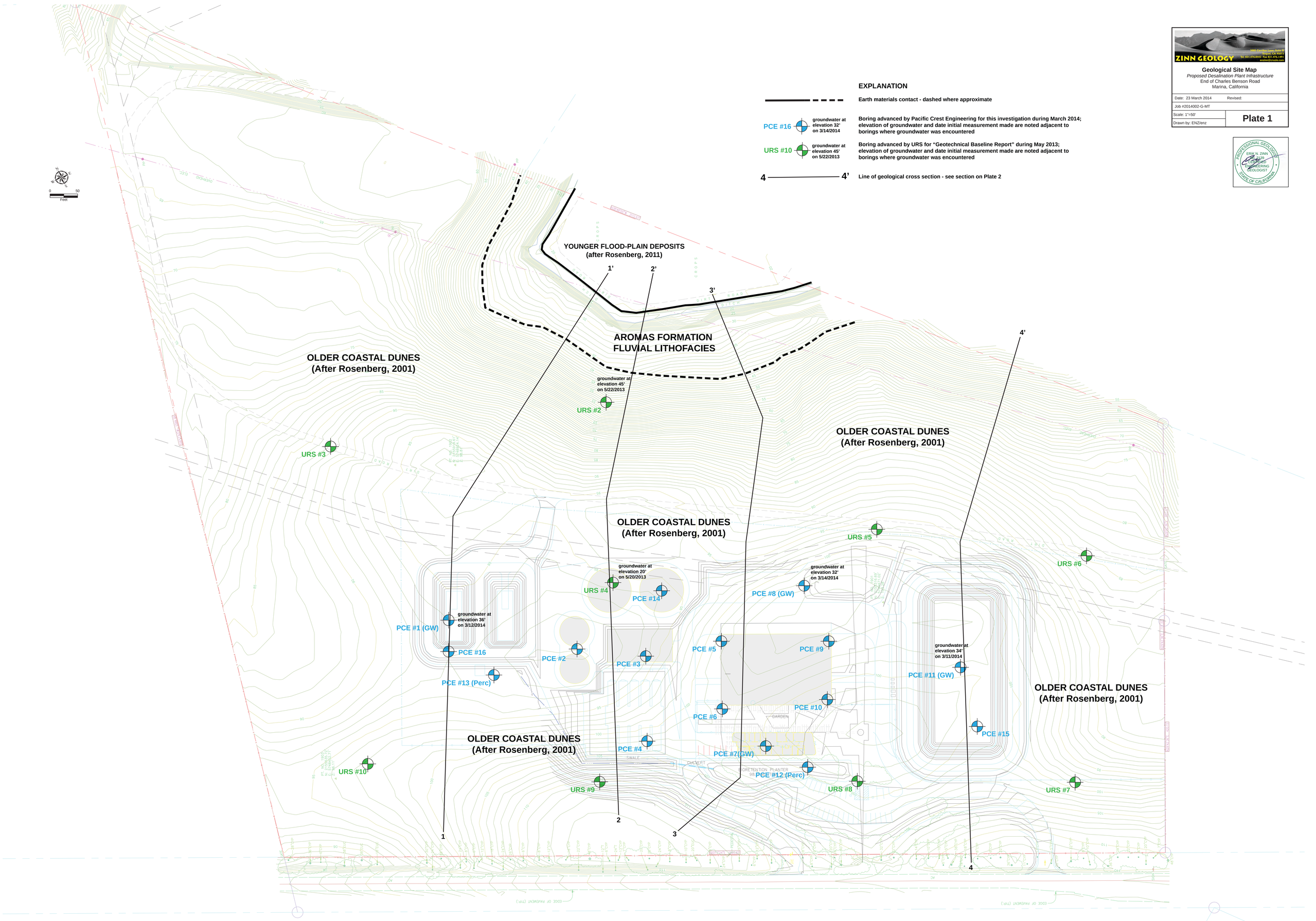
4 These additional percentages are based on the assumption that the base cost is the total cost of the building or facility when ready for occupancy. In addition, it is assumed that the structures would have been designed and built in accordance with current California practice. Moreover the estimated additional cost presumes that structures in this acceptable-risk category are to be sufficiently safe to give reasonable assurance of preventing injury or loss of life during and following an earthquake, but otherwise not necessarily to remain functional.

5 "Ordinary risk": Resist minor earthquakes without damage: resist moderate earthquakes without structural damage, but with some non-structural damage; resist major earthquakes of the intensity or severity of the strongest experienced in California, without collapse, but with some structural damage as well as non-structural damage. In most structures it is expected that structural damage, even in a major earthquake, could be limited to repairable damage. (Structural Engineers Association of California)

Source: *Meeting the Earthquake,* Joint Committee on Seismic Safety of the California Legislature, Jan. 1974, p.9.

SCALE OF ACCEPTABLE RISKS FROM NON-SEISMIC GEOLOGIC HAZARDS[6]		
Risk Level	Structure Type	Risk Characteristics
Extremely low risk	Structures whose continued functioning is critical, or whose failure might be catastrophic: nuclear reactors, large dams, power intake systems, plants manufacturing or storing explosives or toxic materials.	1. Failure affects substantial populations, risk nearly equals nearly zero.
Very low risk	Structures whose use is critically needed after a disaster: important utility centers; hospitals; fire, police and emergency communication facilities; fire station; and critical transportation elements such as bridges and overpasses; also dams.	1. Failure affects substantial populations. Risk slightly higher than 1 above.
Low risk	Structures of high occupancy, or whose use after a disaster would be particularly convenient: schools, churches, theaters, large hotels, and other high rise buildings housing large numbers of people, other places normally attracting large concentrations of people, civic buildings such as fire stations, secondary utility structures, extremely large commercial enterprises, most roads, alternative or non-critical bridges and overpasses.	1. Failure of a single structure would affect primarily only the occupants.
"Ordinary" risk	The vast majority of structures: most commercial and industrial buildings, small hotels and apartment buildings, and single family residences.	1. Failure only affects owners /occupants of a structure rather than a substantial population. 2. No significant potential for loss of life or serious physical injury. 3. Risk level is similar or comparable to other ordinary risks (including seismic risks) to citizens of coastal California. 4. No collapse of structures; structural damage limited to repairable damage in most cases. This degree of damage is unlikely as a result of storms with a repeat time of 50 years or less.
Moderate risk	Fences, driveways, non-habitable structures, detached retaining walls, sanitary landfills, recreation areas and open space.	1. Structure is not occupied or occupied infrequently. 2. Low probability of physical injury. 3. Moderate probability of collapse.

[6] Non-seismic geologic hazards include flooding, landslides, erosion, wave runup and sinkhole collapse



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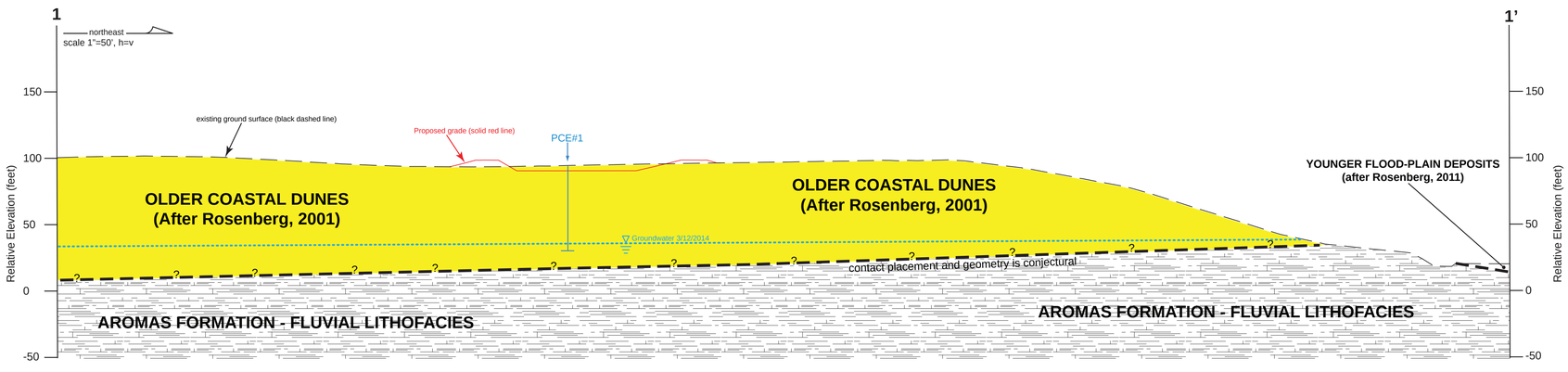
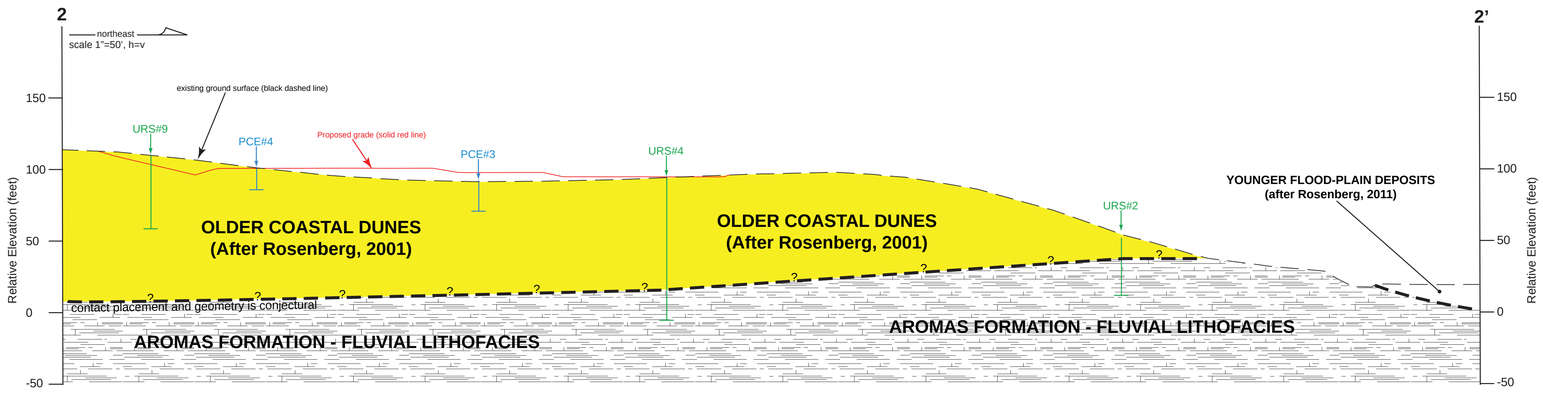
Geological Site Map
Proposed Desalination Plant Infrastructure
End of Charles Benson Road
Marina, California

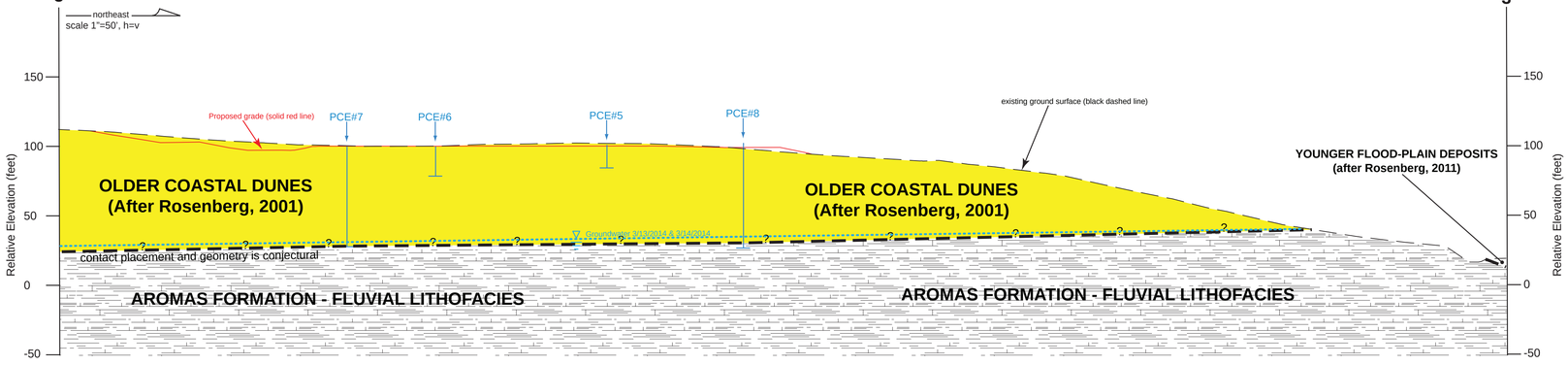
Date: 23 March 2014	Revised:
Job #2014002-G-MT	
Scale: 1"=50'	**Plate 1**
Drawn by: ENZ/enz	

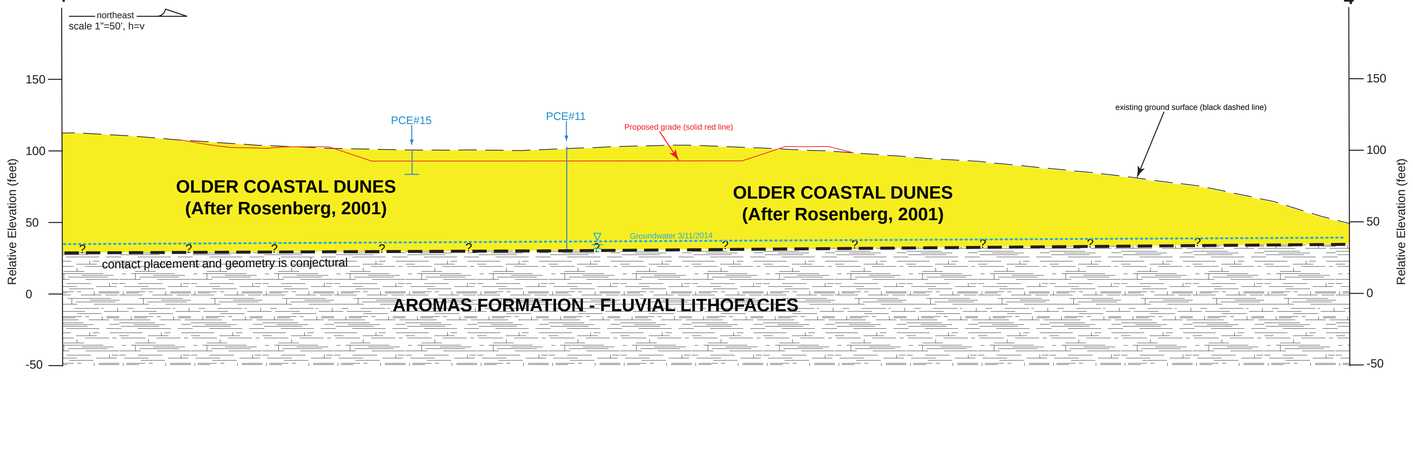
PROFESSIONAL GEOLOGIST
ERIK N. ZINN
No. 2139
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

BASE MAP: Topographic base map and proposed grading map were extracted from a digital file given to us by Whitson Engineers on 18 March 2014. Intended scale of publication displayed on digital map file is 1"=50'. The reader should check to ensure that this base map is current with respect to whatever future elements of the project are being referenced, since this base map is not the final design drawing.









EXPLANATION

?—? **Earth materials contact - dashed where approximate, queried where uncertain**

Groundwater 3/11/2014 **Groundwater elevation - initial observation during drilling**

PCE#15 **Boring advanced by Pacific Crest Engineering for this investigation during March 2014**

URS#10 **Boring advanced by URS for “Geotechnical Baseline Report” during May 2013**

PROFESSIONAL GEOLOGIST
ERIK N. ZINN
No. 8139
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

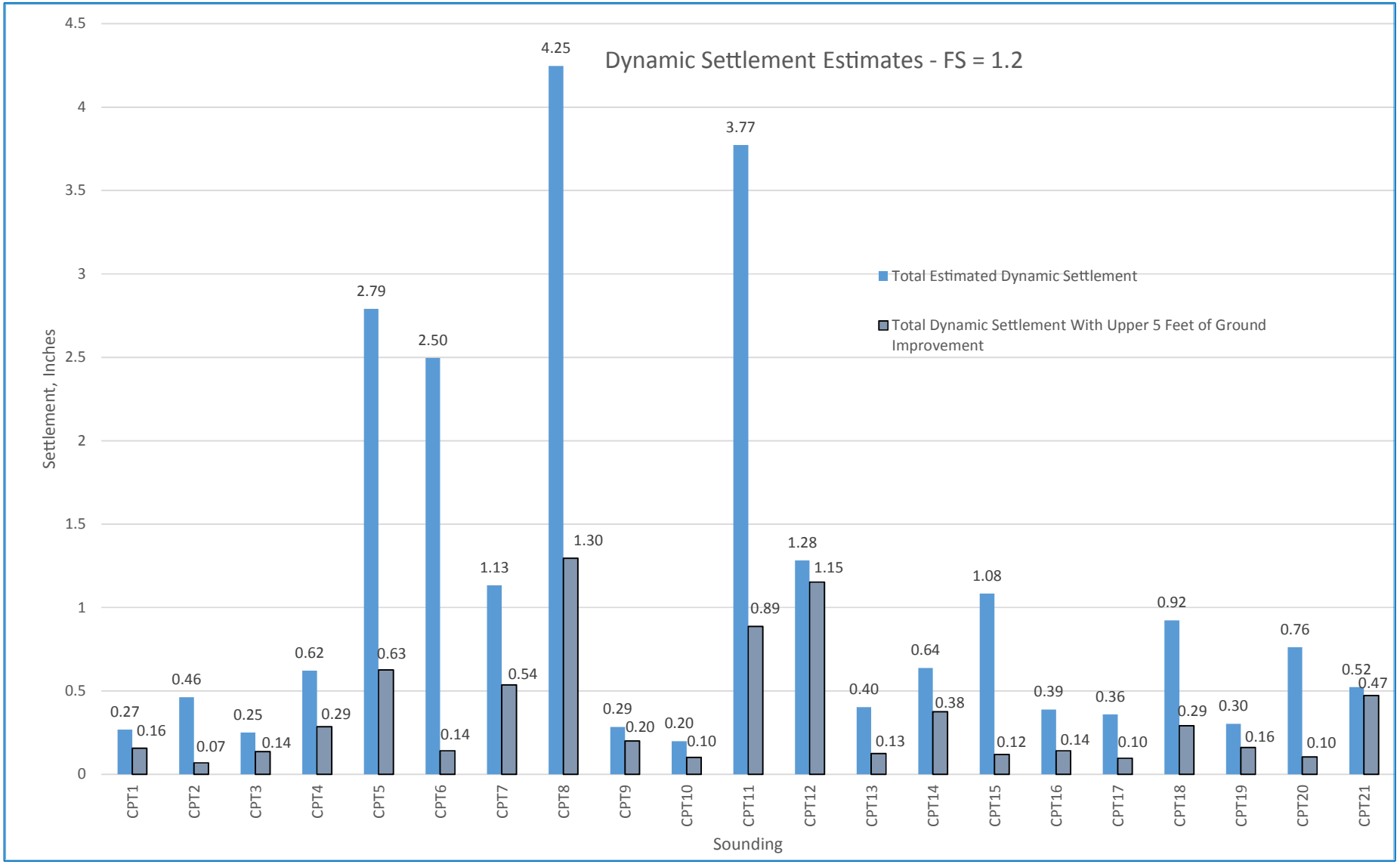
Zinn Geology
3005 Cambridge Lane, Suite B
Soquel, CA 95073
tel. 831.476.8443 Fax 831.476.1491
erzinn@cruzio.com

Geological Cross Sections
Proposed Desalination Plant Infrastructure
End of Charles Benson Road
Marina, California

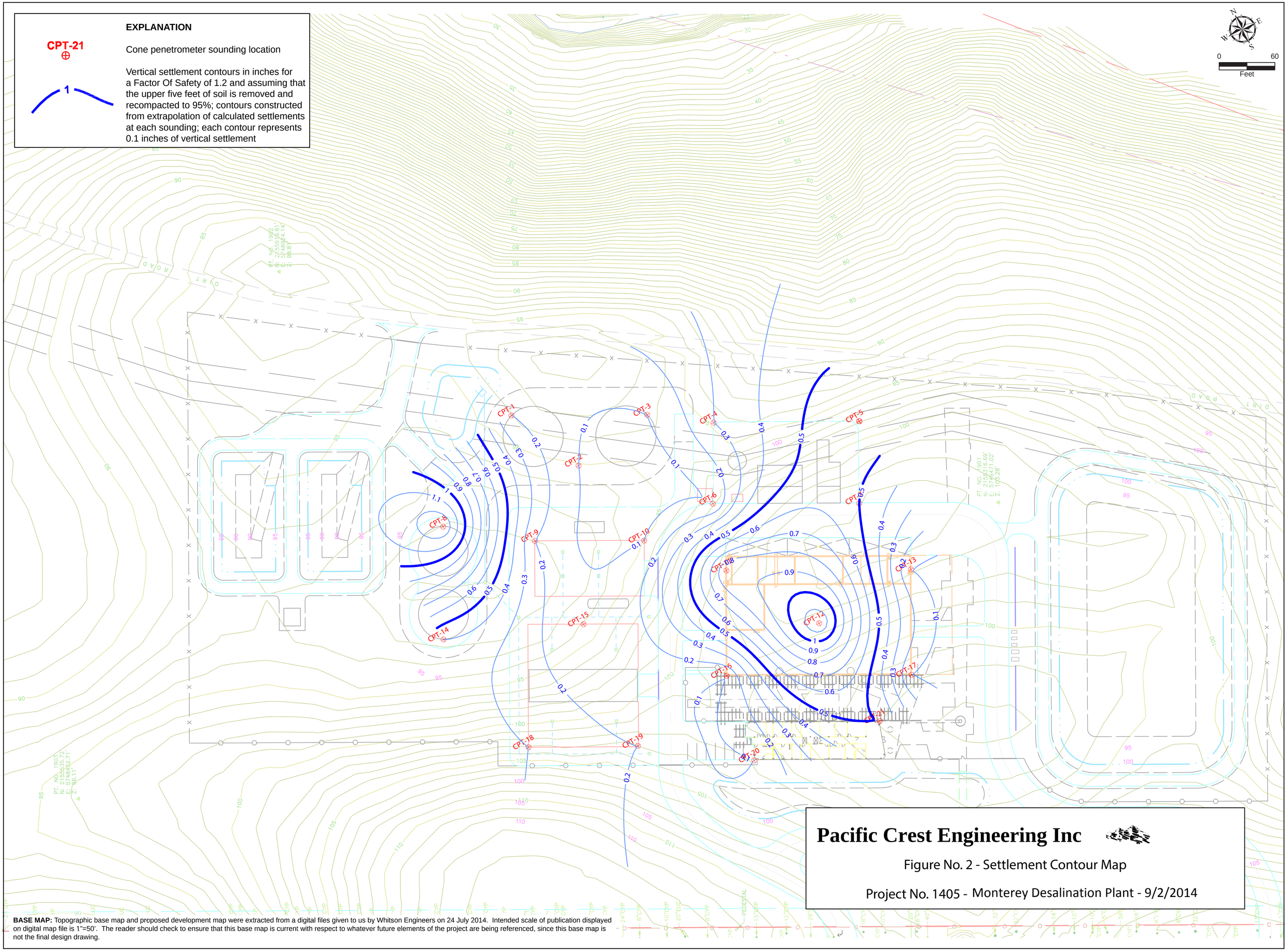
Date: 23 March 2014	Revised: 27 March 2014
Job #2014002-G-MT	
Scale: 1”=50’, h=v	**Plate 2**
Drawn by: ENZ/enz	

APPENDIX C

Seismic Settlement and Contour Map



Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Dynamic Settlement Estimates** Monterey Peninsula Desalination Plant Monterey County, California	Figure No. 1 Project No. 1405 Date: 9/4/2014



Pacific Crest Engineering Inc

Figure No. 2 - Settlement Contour Map

Project No. 1405 - Monterey Desalination Plant - 9/2/2014

BASE MAP: Topographic base map and proposed development map were extracted from a digital files given to us by Whitson Engineers on 24 July 2014. Intended scale of publication displayed on digital map file is 1"=50'. The reader should check to ensure that this base map is current with respect to whatever future elements of the project are being referenced, since this base map is not the final design drawing.

APPENDIX D

Water Quality Test Results

ANALYTICAL CHEMISTS
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BACTERIOLOGISTS
Approved by State of California

SOIL CONTROL LAB

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95076
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TEL: 831-724-5422
FAX: 831-724-3188

Pacific Crest Engineering Inc.
444 Airport Blvd., Suite 106
Watsonville, CA 95076
Attn: Cara Al-Lami

Work Order #: 4030354
Reporting Date: April 1, 2014

Date Received: March 12, 2014
Project # / Name: 1405 / Monterey Peninsula Desalination Plant
Sample Identification: B11, sampled 3/11/2014 12:50:00PM
Sampler Name / Co.: Cara Al-Lami / Pacific Crest Engineering, Inc.
Matrix: Water
Laboratory #: 4030354-01

	Results	Units	RL	Analysis Method	Date Analyzed	Flags
Total Alkalinity as CaCO3	820	mg/L	2.0	SM 2320B	03/12/14	
Total Organic Carbon	ND	mg/L	2.0	SM 5310B	03/14/14	
Bromide	0.45	mg/L	0.10	EPA 300.0	04/01/14	
Chloride	180	mg/L	1.0	EPA 300.0	03/12/14	
Hardness	2100	mg/L	120	SM 2340 B	03/14/14	
Turbidity	25000	NTU	20	SM 2130B	03/12/14	
Ammonia as N	ND	mg/L	0.28	EPA 350.2	03/27/14	
Nitrate as N	63	mg/L	0.10	EPA 300.0	03/12/14	
Nitrite as N	ND	mg/L	0.10	EPA 300.0	03/12/14	
Total Dissolved Solids	820	mg/L	26	SM2540C	03/17/14	
Total Arsenic (As)	340	ug/L	2.5	EPA 200.8	03/14/14	
Total Boron (B)	ND	ug/L	2500	EPA 200.7	03/14/14	
Total Iron (Fe)	1500000	ug/L	620	EPA 200.7	03/14/14	
Total Manganese (Mn)	16000	ug/L	500	EPA 200.7	03/14/14	
Total Sodium (Na)	130	mg/L	12	EPA 200.7	03/14/14	

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Attn: Cara Al-Lami

Work Order #: 4030354
Reporting Date: April 1, 2014

Date Received: March 12, 2014
Project # / Name: 1405 / Monterey Peninsula Desalination Plant
Sample Identification: B1, sampled 3/12/2014 1:10:00PM
Sampler Name / Co.: Cara Al-Lami / Pacific Crest Engineering, Inc.
Matrix: Water
Laboratory #: 4030354-02

	Results	Units	RL	Analysis Method	Date Analyzed	Flags
Total Alkalinity as CaCO3	290	mg/L	2.0	SM 2320B	03/12/14	
Total Organic Carbon	4.3	mg/L	2.0	SM 5310B	03/14/14	
Bromide	0.15	mg/L	0.10	EPA 300.0	04/01/14	
Chloride	43	mg/L	1.0	EPA 300.0	03/12/14	
Hardness	1200	mg/L	120	SM 2340 B	03/14/14	
Turbidity	11000	NTU	20	SM 2130B	03/12/14	
Ammonia as N	0.41	mg/L	0.28	EPA 350.2	03/27/14	
Nitrate as N	36	mg/L	0.10	EPA 300.0	03/12/14	
Nitrite as N	ND	mg/L	0.10	EPA 300.0	03/12/14	
Total Dissolved Solids	650	mg/L	25	SM2540C	03/17/14	
Total Arsenic (As)	160	ug/L	2.5	EPA 200.8	03/14/14	
Total Boron (B)	ND	ug/L	2500	EPA 200.7	03/14/14	
Total Iron (Fe)	730000	ug/L	620	EPA 200.7	03/14/14	
Total Manganese (Mn)	13000	ug/L	500	EPA 200.7	03/14/14	
Total Sodium (Na)	110	mg/L	12	EPA 200.7	03/14/14	

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Nitrogen - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40120 - Default Prep GenChem											
Blank (PC40120-BLK1)					Prepared & Analyzed: 12-Mar-14						
Nitrate as N	ND		0.10	mg/L							
Nitrite as N	ND		0.10	"							
Blank (PC40120-BLK2)					Prepared: 12-Mar-14 Analyzed: 13-Mar-14						
Nitrate as N	ND		0.10	mg/L							
Nitrite as N	ND		0.10	"							
LCS (PC40120-BS1)					Prepared & Analyzed: 12-Mar-14						
Nitrate as N	2.087		0.10	mg/L	2.26		92.3	80-120			
Nitrite as N	2.947		0.10	"	3.04		96.9	80-120			
LCS Dup (PC40120-BSD1)					Prepared & Analyzed: 12-Mar-14						
Nitrate as N	2.124		0.10	mg/L	2.26		94.0	80-120	1.77	20	
Nitrite as N	3.114		0.10	"	3.04		102	80-120	5.51	20	
Duplicate (PC40120-DUP1)		**Source: 4030252-01**			Prepared & Analyzed: 12-Mar-14						
Nitrate as N	1.708		0.10	mg/L		1.710			0.0793	20	
Nitrite as N	ND		0.10	"		ND				20	
Duplicate (PC40120-DUP2)		**Source: 4030360-01**			Prepared & Analyzed: 12-Mar-14						
Nitrate as N	0.09055		0.10	mg/L		0.09416			3.91	20	
Nitrite as N	ND		0.10	"		ND				20	
Matrix Spike (PC40120-MS1)		**Source: 4030252-01**			Prepared & Analyzed: 12-Mar-14						
Nitrate as N	3.751		0.10	mg/L	2.26	1.710	90.3	80-120			
Nitrite as N	3.007		0.10	"	3.04	ND	98.9	80-120			
Matrix Spike (PC40120-MS2)		**Source: 4030360-01**			Prepared: 12-Mar-14 Analyzed: 13-Mar-14						
Nitrate as N	2.146		0.10	mg/L	2.26	0.09416	90.8	80-120			
Nitrite as N	3.138		0.10	"	3.04	ND	103	80-120			

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Attn: Cara Al-Lami

Work Order #: 4030354
Reporting Date: April 1, 2014

Nitrogen - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40120 - Default Prep GenChem											
Matrix Spike Dup (PC40120-MSD1)		**Source: 4030252-01**			Prepared & Analyzed: 12-Mar-14						
Nitrate as N	3.766		0.10	mg/L	2.26	1.710	91.0	80-120	0.397	20	
Nitrite as N	3.014		0.10	"	3.04	ND	99.2	80-120	0.232	20	
Matrix Spike Dup (PC40120-MSD2)		**Source: 4030360-01**			Prepared: 12-Mar-14 Analyzed: 13-Mar-14						
Nitrate as N	2.241		0.10	mg/L	2.26	0.09416	95.0	80-120	4.33	20	
Nitrite as N	2.992		0.10	"	3.04	ND	98.4	80-120	4.77	20	
Reference (PC40120-SRM1)					Prepared & Analyzed: 12-Mar-14						
Nitrate as N	8.652		0.20	mg/L	8.99		96.2	80-120			
Reference (PC40120-SRM2)					Prepared & Analyzed: 12-Mar-14						
Nitrite as N	2.949		0.10	mg/L	3.04		97.0	80-120			
Reference (PC40120-SRM3)					Prepared: 12-Mar-14 Analyzed: 13-Mar-14						
Nitrate as N	8.758		0.20	mg/L	8.99		97.4	80-120			
Reference (PC40120-SRM4)					Prepared: 12-Mar-14 Analyzed: 13-Mar-14						
Nitrite as N	3.005		0.10	mg/L	3.04		98.8	80-120			
Batch PC40292 - Default Prep GenChem											
Blank (PC40292-BLK1)					Prepared & Analyzed: 27-Mar-14						
Ammonia as N	ND		0.28	mg/L							
Duplicate (PC40292-Dup1)		**Source: 4030481-02**			Prepared & Analyzed: 27-Mar-14						
Ammonia as N	ND		0.28	mg/L		ND				20	

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Nitrogen - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40292 - Default Prep GenChem											
Matrix Spike (PC40292-MS1)		**Source: 4030481-02**			Prepared & Analyzed: 27-Mar-14						
Ammonia as N	19.66		0.28	mg/L	20.0	ND	98.3	80-120			
Matrix Spike Dup (PC40292-MSD1)		**Source: 4030481-02**			Prepared & Analyzed: 27-Mar-14						
Ammonia as N	19.71		0.28	mg/L	20.0	ND	98.6	80-120	0.284	20	
Reference (PC40292-SRM1)					Prepared & Analyzed: 27-Mar-14						
Ammonia as N	10.43		0.28	mg/L	10.9		95.7	80-120			

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Classical Chemistry Parameters - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40120 - Default Prep GenChem											
Blank (PC40120-BLK1)					Prepared & Analyzed: 12-Mar-14						
Chloride	ND		1.0	mg/L							
Blank (PC40120-BLK2)					Prepared: 12-Mar-14 Analyzed: 13-Mar-14						
Chloride	ND		1.0	mg/L							
LCS (PC40120-BS1)					Prepared & Analyzed: 12-Mar-14						
Chloride	19.12		1.0	mg/L	20.0		95.6	80-120			
LCS Dup (PC40120-BSD1)					Prepared & Analyzed: 12-Mar-14						
Chloride	19.37		1.0	mg/L	20.0		96.8	80-120	1.29	20	
Duplicate (PC40120-DUP1)		**Source: 4030252-01**			Prepared & Analyzed: 12-Mar-14						
Chloride	36.94		1.0	mg/L		36.96			0.0623	20	
Duplicate (PC40120-DUP2)		**Source: 4030360-01**			Prepared & Analyzed: 12-Mar-14						
Chloride	9.666		1.0	mg/L		9.689			0.238	20	
Matrix Spike (PC40120-MS1)		**Source: 4030252-01**			Prepared & Analyzed: 12-Mar-14						
Chloride	54.41		1.0	mg/L	20.0	36.96	87.2	80-120			
Matrix Spike (PC40120-MS2)		**Source: 4030360-01**			Prepared: 12-Mar-14 Analyzed: 13-Mar-14						
Chloride	28.22		1.0	mg/L	20.0	9.689	92.7	80-120			
Matrix Spike Dup (PC40120-MSD1)		**Source: 4030252-01**			Prepared & Analyzed: 12-Mar-14						
Chloride	54.53		1.0	mg/L	20.0	36.96	87.8	80-120	0.220	20	
Matrix Spike Dup (PC40120-MSD2)		**Source: 4030360-01**			Prepared: 12-Mar-14 Analyzed: 13-Mar-14						
Chloride	29.00		1.0	mg/L	20.0	9.689	96.6	80-120	2.71	20	

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Work Order #: 4030354
Reporting Date: April 1, 2014

Classical Chemistry Parameters - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40120 - Default Prep GenChem											
Reference (PC40120-SRM1)					Prepared & Analyzed: 12-Mar-14						
Chloride	33.98		2.0	mg/L	34.4		98.8	80-120			
Reference (PC40120-SRM3)					Prepared: 12-Mar-14 Analyzed: 13-Mar-14						
Chloride	34.41		2.0	mg/L	34.4		100	80-120			
Batch PC40130 - Default Prep GenChem											
Blank (PC40130-BLK1)					Prepared & Analyzed: 12-Mar-14						
Total Alkalinity as CaCO3	1.600		1.0	mg/L							
Duplicate (PC40130-Dup1)		**Source: 4030345-01**			Prepared & Analyzed: 12-Mar-14						
Total Alkalinity as CaCO3	95.68		2.0	mg/L		94.80			0.924	20	
Batch PC40133 - Default Prep GenChem											
Blank (PC40133-BLK1)					Prepared & Analyzed: 12-Mar-14						
Turbidity	ND		0.10	NTU							
Duplicate (PC40133-Dup1)		**Source: 4030356-01**			Prepared & Analyzed: 12-Mar-14						
Turbidity	1.300		0.10	NTU		1.230			5.53	20	
Batch PC40139 - Default Prep GenChem											
Blank (PC40139-BLK1)					Prepared & Analyzed: 14-Mar-14						
Total Organic Carbon	ND		1.0	mg/L							

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Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40139 - Default Prep GenChem											
Blank (PC40139-BLK2)					Prepared & Analyzed: 14-Mar-14						
Total Organic Carbon	ND		1.0	mg/L							
Duplicate (PC40139-Dup1)		**Source: 4030001-01**			Prepared & Analyzed: 14-Mar-14						
Total Organic Carbon	27.24		4.0	mg/L		27.60			1.31	20	
Duplicate (PC40139-Dup2)		**Source: 4030003-04**			Prepared & Analyzed: 14-Mar-14						
Total Organic Carbon	4.000		2.0	mg/L		3.960			1.01	20	
Matrix Spike (PC40139-MS1)		**Source: 4030001-01**			Prepared & Analyzed: 14-Mar-14						
Total Organic Carbon	65.60		4.0	mg/L	40.0	27.60	95.0	80-120			
Matrix Spike (PC40139-MS2)		**Source: 4030003-04**			Prepared & Analyzed: 14-Mar-14						
Total Organic Carbon	24.46		2.0	mg/L	20.0	3.960	102	80-120			
Matrix Spike Dup (PC40139-MSD1)		**Source: 4030001-01**			Prepared & Analyzed: 14-Mar-14						
Total Organic Carbon	66.08		4.0	mg/L	40.0	27.60	96.2	80-120	0.729	20	
Matrix Spike Dup (PC40139-MSD2)		**Source: 4030003-04**			Prepared & Analyzed: 14-Mar-14						
Total Organic Carbon	24.30		2.0	mg/L	20.0	3.960	102	80-120	0.656	20	
Reference (PC40139-SRM1)					Prepared & Analyzed: 14-Mar-14						
Total Organic Carbon	62.28		4.0	mg/L	62.5		99.6	80-120			
Reference (PC40139-SRM2)					Prepared & Analyzed: 14-Mar-14						
Total Organic Carbon	60.04		4.0	mg/L				80-120			
Batch PC40152 - EPA 3005A											
Blank (PC40152-BLK1)					Prepared & Analyzed: 14-Mar-14						
Hardness	ND		5.0	mg/L							

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Classical Chemistry Parameters - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40152 - EPA 3005A											
Blank (PC40152-BLK2)					Prepared & Analyzed: 14-Mar-14						
Hardness	ND		5.0	mg/L							
LCS (PC40152-BS1)					Prepared & Analyzed: 14-Mar-14						
Hardness	165.1		5.0	mg/L	167		98.9	80-120			
LCS (PC40152-BS2)					Prepared & Analyzed: 14-Mar-14						
Hardness	163.2		5.0	mg/L	167		97.7	80-120			
Duplicate (PC40152-DUP1)		**Source: 4030309-01**			Prepared & Analyzed: 14-Mar-14						
Hardness	88.00		5.0	mg/L		88.66			0.745	20	
Duplicate (PC40152-DUP2)		**Source: 4030390-01**			Prepared & Analyzed: 14-Mar-14						
Hardness	531.0		5.0	mg/L		529.7			0.251	20	
Duplicate (PC40152-DUP3)		**Source: 4030368-01**			Prepared & Analyzed: 14-Mar-14						
Hardness	192.5		5.0	mg/L		197.5			2.55	20	
Matrix Spike (PC40152-MS1)		**Source: 4030309-01**			Prepared & Analyzed: 14-Mar-14						
Hardness	407.1		10	mg/L	334	88.66	95.4	80-120			
Matrix Spike (PC40152-MS2)		**Source: 4030390-01**			Prepared & Analyzed: 14-Mar-14						
Hardness	856.6		10	mg/L	334	529.7	97.9	80-120			
Matrix Spike (PC40152-MS3)		**Source: 4030368-01**			Prepared & Analyzed: 14-Mar-14						
Hardness	513.8		10	mg/L	334	197.5	94.7	80-120			
Matrix Spike Dup (PC40152-MSD1)		**Source: 4030309-01**			Prepared & Analyzed: 14-Mar-14						
Hardness	409.2		10	mg/L	334	88.66	96.0	80-120	0.519	20	

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Mike Galloway

ANALYTICAL CHEMISTS
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SOIL CONTROL LAB

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Pacific Crest Engineering Inc.
444 Airport Blvd., Suite 106
Watsonville, CA 95076
Attn: Cara Al-Lami

Work Order #: 4030354
Reporting Date: April 1, 2014

Classical Chemistry Parameters - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40152 - EPA 3005A											
Matrix Spike Dup (PC40152-MSD2)		**Source: 4030390-01**			Prepared & Analyzed: 14-Mar-14						
Hardness	855.3		10	mg/L	334	529.7	97.5	80-120	0.156	20	
Matrix Spike Dup (PC40152-MSD3)		**Source: 4030368-01**			Prepared & Analyzed: 14-Mar-14						
Hardness	517.5		10	mg/L	334	197.5	95.8	80-120	0.727	20	
Reference (PC40152-SRM1)					Prepared & Analyzed: 14-Mar-14						
Hardness	68.48		25	mg/L	69.5		98.5	80-120			
Reference (PC40152-SRM2)					Prepared & Analyzed: 14-Mar-14						
Hardness	69.80		25	mg/L	69.5		100	80-120			
Batch PC40174 - Default Prep GenChem											
Blank (PC40174-BLK1)					Prepared & Analyzed: 17-Mar-14						
Total Dissolved Solids	ND		10	mg/L							
Blank (PC40174-BLK2)					Prepared & Analyzed: 17-Mar-14						
Total Dissolved Solids	ND		10	mg/L							
Duplicate (PC40174-Dup1)		**Source: 4030346-02**			Prepared & Analyzed: 17-Mar-14						
Total Dissolved Solids	425.0		10	mg/L		426.0			0.235	20	
Duplicate (PC40174-Dup2)		**Source: 4030368-01**			Prepared & Analyzed: 17-Mar-14						
Total Dissolved Solids	296.0		10	mg/L		295.0			0.338	20	
Reference (PC40174-SRM1)					Prepared & Analyzed: 17-Mar-14						
Total Dissolved Solids	786.0		10	mg/L	746		105	80-120			

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Classical Chemistry Parameters - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40174 - Default Prep GenChem											
Reference (PC40174-SRM2)					Prepared & Analyzed: 17-Mar-14						
Total Dissolved Solids	788.0		10	mg/L				80-120			

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Reporting Date: April 1, 2014

Metals - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40152 - EPA 3005A											
Blank (PC40152-BLK1)					Prepared & Analyzed: 14-Mar-14						
Total Sodium (Na)	ND		0.50	mg/L							
Total Boron (B)	ND		100	ug/L							
Total Manganese (Mn)	ND		20	"							
Total Iron (Fe)	ND		25	"							
Blank (PC40152-BLK2)					Prepared & Analyzed: 14-Mar-14						
Total Iron (Fe)	ND		25	ug/L							
Total Sodium (Na)	ND		0.50	mg/L							
Total Boron (B)	ND		100	ug/L							
Total Manganese (Mn)	ND		20	"							
LCS (PC40152-BS1)					Prepared & Analyzed: 14-Mar-14						
Total Manganese (Mn)	410.0		20	ug/L	396		104	85-115			
Total Boron (B)	355.0		100	"	340		104	85-115			
Total Sodium (Na)	25.35		0.50	mg/L	25.0		101	85-115			
Total Iron (Fe)	135.0		25	ug/L	132		102	85-115			
LCS (PC40152-BS2)					Prepared & Analyzed: 14-Mar-14						
Total Sodium (Na)	25.10		0.50	mg/L	25.0		100	85-115			
Total Boron (B)	350.0		100	ug/L	340		103	85-115			
Total Manganese (Mn)	409.0		20	"	396		103	85-115			
Total Iron (Fe)	134.0		25	"	132		102	85-115			
Duplicate (PC40152-DUP1)		**Source: 4030309-01**			Prepared & Analyzed: 14-Mar-14						
Total Sodium (Na)	10.98		0.50	mg/L		11.15			1.54	20	
Total Iron (Fe)	17.10		25	ug/L		18.00			5.13	20	
Total Manganese (Mn)	ND		20	"		ND				20	
Total Boron (B)	29.80		100	"		31.40			5.23	20	

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Metals - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40152 - EPA 3005A											
Duplicate (PC40152-DUP2)		**Source: 4030390-01**			Prepared & Analyzed: 14-Mar-14						
Total Manganese (Mn)	ND		20	ug/L		ND				20	
Total Sodium (Na)	40.49		0.50	mg/L		40.38			0.272	20	
Total Boron (B)	85.40		100	ug/L		90.30			5.58	20	
Total Iron (Fe)	19.50		25	"		18.00			8.00	20	
Duplicate (PC40152-DUP3)		**Source: 4030368-01**			Prepared & Analyzed: 14-Mar-14						
Total Boron (B)	31.80		100	ug/L		35.60			11.3	20	
Total Iron (Fe)	151.0		25	"		155.0			2.61	20	
Total Sodium (Na)	18.64		0.50	mg/L		19.18			2.86	20	
Total Manganese (Mn)	56.90		20	ug/L		58.50			2.77	20	
Matrix Spike (PC40152-MS1)		**Source: 4030309-01**			Prepared & Analyzed: 14-Mar-14						
Total Boron (B)	700.0		200	ug/L	680	31.40	98.3	80-120			
Total Sodium (Na)	60.26		1.0	mg/L	50.0	11.15	98.2	80-120			
Total Manganese (Mn)	774.0		40	ug/L	792	ND	97.7	80-120			
Total Iron (Fe)	274.0		50	"	264	18.00	97.0	80-120			
Matrix Spike (PC40152-MS2)		**Source: 4030390-01**			Prepared & Analyzed: 14-Mar-14						
Total Sodium (Na)	91.42		1.0	mg/L	50.0	40.38	102	80-120			
Total Boron (B)	774.0		200	ug/L	680	90.30	101	80-120			
Total Manganese (Mn)	792.0		40	"	792	ND	100	80-120			
Total Iron (Fe)	288.0		50	"	264	18.00	102	80-120			
Matrix Spike (PC40152-MS3)		**Source: 4030368-01**			Prepared & Analyzed: 14-Mar-14						
Total Boron (B)	716.0		200	ug/L	680	35.60	100	80-120			
Total Iron (Fe)	414.0		50	"	264	155.0	98.1	80-120			
Total Sodium (Na)	69.64		1.0	mg/L	50.0	19.18	101	80-120			
Total Manganese (Mn)	846.0		40	ug/L	792	58.50	99.4	80-120			

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Work Order #: 4030354
Reporting Date: April 1, 2014

Metals - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40152 - EPA 3005A											
Matrix Spike Dup (PC40152-MSD1)		**Source: 4030309-01**			Prepared & Analyzed: 14-Mar-14						
Total Manganese (Mn)	774.0		40	ug/L	792	ND	97.7	80-120	0.00	20	
Total Iron (Fe)	278.0		50	"	264	18.00	98.5	80-120	1.45	20	
Total Sodium (Na)	60.56		1.0	mg/L	50.0	11.15	98.8	80-120	0.497	20	
Total Boron (B)	714.0		200	ug/L	680	31.40	100	80-120	1.98	20	
Matrix Spike Dup (PC40152-MSD2)		**Source: 4030390-01**			Prepared & Analyzed: 14-Mar-14						
Total Manganese (Mn)	790.0		40	ug/L	792	ND	99.7	80-120	0.253	20	
Total Iron (Fe)	286.0		50	"	264	18.00	102	80-120	0.697	20	
Total Sodium (Na)	91.24		1.0	mg/L	50.0	40.38	102	80-120	0.197	20	
Total Boron (B)	786.0		200	ug/L	680	90.30	102	80-120	1.54	20	
Matrix Spike Dup (PC40152-MSD3)		**Source: 4030368-01**			Prepared & Analyzed: 14-Mar-14						
Total Sodium (Na)	69.04		1.0	mg/L	50.0	19.18	99.7	80-120	0.865	20	
Total Manganese (Mn)	848.0		40	ug/L	792	58.50	99.7	80-120	0.236	20	
Total Boron (B)	704.0		200	"	680	35.60	98.3	80-120	1.69	20	
Total Iron (Fe)	414.0		50	"	264	155.0	98.1	80-120	0.00	20	
Reference (PC40152-SRM1)					Prepared & Analyzed: 14-Mar-14						
Total Sodium (Na)	21.62		2.5	mg/L	21.3		102	80-120			
Total Boron (B)	1540		500	ug/L	1540		100	85-115			
Total Manganese (Mn)	496.5		100	"	494		101	85-115			
Total Iron (Fe)	185.0		120	"	183		101	85-115			
Reference (PC40152-SRM2)					Prepared & Analyzed: 14-Mar-14						
Total Iron (Fe)	174.0		25	ug/L	183		95.1	85-115			
Total Sodium (Na)	22.06		2.5	mg/L	21.3		104	80-120			
Total Boron (B)	1580		500	ug/L	1540		103	85-115			
Total Manganese (Mn)	520.0		100	"	494		105	85-115			

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Metals - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40157 - EPA 3005A											
Blank (PC40157-BLK1)					Prepared & Analyzed: 14-Mar-14						
Total Arsenic (As)	ND		0.50	ug/L							
Blank (PC40157-BLK2)					Prepared & Analyzed: 14-Mar-14						
Total Arsenic (As)	ND		0.50	ug/L							
LCS (PC40157-BS1)					Prepared & Analyzed: 14-Mar-14						
Total Arsenic (As)	97.13		0.50	ug/L	98.2		98.9	85-115			
LCS Dup (PC40157-BSD1)					Prepared & Analyzed: 14-Mar-14						
Total Arsenic (As)	97.33		0.50	ug/L	98.2		99.1	85-115	0.206	20	
Duplicate (PC40157-DUP1)		**Source: 4030159-01**			Prepared & Analyzed: 14-Mar-14						
Total Arsenic (As)	5.067		0.50	ug/L		5.111			0.865	20	
Duplicate (PC40157-DUP2)		**Source: 4030368-01**			Prepared & Analyzed: 14-Mar-14						
Total Arsenic (As)	0.8680		0.50	ug/L		0.7540			14.1	20	
Duplicate (PC40157-DUP3)		**Source: 4030390-01**			Prepared & Analyzed: 14-Mar-14						
Total Arsenic (As)	0.6900		0.50	ug/L		0.7450			7.67	20	
Matrix Spike (PC40157-MS1)		**Source: 4030159-01**			Prepared & Analyzed: 14-Mar-14						
Total Arsenic (As)	99.24		0.50	ug/L	98.2	5.111	95.9	80-120			
Matrix Spike (PC40157-MS2)		**Source: 4030368-01**			Prepared & Analyzed: 14-Mar-14						
Total Arsenic (As)	97.87		0.50	ug/L	98.2	0.7540	98.9	80-120			
Matrix Spike (PC40157-MS3)		**Source: 4030390-01**			Prepared & Analyzed: 14-Mar-14						
Total Arsenic (As)	97.22		0.50	ug/L	98.2	0.7450	98.2	80-120			

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Work Order #: 4030354
Reporting Date: April 1, 2014

Metals - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40157 - EPA 3005A											
Matrix Spike Dup (PC40157-MSD1)		**Source: 4030159-01**			Prepared & Analyzed: 14-Mar-14						
Total Arsenic (As)	99.64		0.50	ug/L	98.2	5.111	96.3	80-120	0.402	20	
Matrix Spike Dup (PC40157-MSD2)		**Source: 4030368-01**			Prepared & Analyzed: 14-Mar-14						
Total Arsenic (As)	97.96		0.50	ug/L	98.2	0.7540	99.0	80-120	0.0919	20	
Matrix Spike Dup (PC40157-MSD3)		**Source: 4030390-01**			Prepared & Analyzed: 14-Mar-14						
Total Arsenic (As)	97.64		0.50	ug/L	98.2	0.7450	98.7	80-120	0.431	20	
Reference (PC40157-SRM1)					Prepared & Analyzed: 14-Mar-14						
Total Arsenic (As)	28.14		2.5	ug/L	26.6		106	85-115			
Reference (PC40157-SRM2)					Prepared & Analyzed: 14-Mar-14						
Total Arsenic (As)	27.99		2.5	ug/L	26.6		105	85-115			

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Soil Control Lab

42 Hangar Way Watsonville, CA 95076
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Chain-of-Custody

Soil Control Lab Use Only

Account #

Laboratory #: 4030354

Client/Company Name:	Pacific Crest Engineering, Inc.
Attn:	Cara Al-Lami
Address	444 Airport Blvd., Suite 106
	Watsonville, CA 95076
Phone:	831-722-9446
Fax:	831-722-9158
E-mail:	cara@pacengineering.net
Project #:	1405
Project Name:	Monterey Peninsula Desalination Plant

Water System # is assigned to you by the State if you are a water system

Water System #:	
Water System Name:	

Information for Bacteria Samples:

People to Contact for positives:

Name: _____ Phone #: _____

Name: _____ Phone #: _____

Name: _____ Phone #: _____

*If you have a positive and we are unable to speak directly to a live person on the phone we are required to fax the result automatically to the Health Department.

Sampling Period: _____

Sample Type: ☐ Routine ☐ Repeat ☐ Special ☐ Replacement

Sampler's Name (Print): Cara Al-Lami

Sampler's Company: Pacific Crest Engineering, Inc.

Sampler's Signature: Cara Al-Lami

Request to send results to other parties:

Copy to: ☐ EHS ☐ MCHD ☐ DOHS ☐ Other _____

☐ Electronic Data Transfer to State (for chemistry only)

Copies via email to:
(list up to 3 e-mails)

Comments/Special Instructions (i.e. Place billing address here if different than address above):

Sample Identification	Sampling Date	Sampling Time	Matrix	Field Notes (Optional) Cl_2 Residual	Analysis Requested: TOC + Ammonia	TDS, Chloride, Bromide, Total Alkalinity, Nitrates, Nitrites, Fluoride	Sodium, Total Hardness, Iron, Arsenic, Manganese, Boron		
B11 -01	3/11/14	1250	H_2O		X	X	X		
B1 -02	3/12/14	1310	H_2O		X	X	X		

Relinquished By (Signature and Print Name)	Date/Time	Received By (Signature and Print Name)	Date/Time
Cara Al-Lami Cara Al-Lami	3/12/14 1705	LONNIE NACATA	3/12/14, 1705

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Pacific Crest Engineering Inc.
444 Airport Blvd., Suite 106
Watsonville, CA 95076
Attn: Cara Al-Lami

Work Order #: 4030452
Reporting Date: April 8, 2014

Date Received: March 14, 2014
Project # / Name: 1405 / Monterey Peninsula Desalination Plant
Sample Identification: B7, sampled 3/13/2014 2:58:00PM
Sampler Name / Co.: Cara Al-Lami / Pacific Crest Engineering, Inc.
Matrix: Water
Laboratory #: 4030452-01

	Results	Units	RL	Analysis Method	Date Analyzed	Flags
Total Alkalinity as CaCO3	520	mg/L	2.0	SM 2320B	03/14/14	
Total Organic Carbon	4.8	mg/L	2.0	SM 5310B	04/07/14	
Bromide	0.52	mg/L	0.10	EPA 300.0	04/01/14	
Chloride	140	mg/L	1.0	EPA 300.0	03/14/14	
Hardness	1500	mg/L	25	SM 2340 B	03/21/14	
Turbidity	23000	NTU	20	SM 2130B	03/14/14	
Ammonia as N	0.94	mg/L	0.28	EPA 350.2	03/27/14	
Nitrate as N	63	mg/L	0.10	EPA 300.0	03/14/14	
Nitrite as N	0.28	mg/L	0.10	EPA 300.0	03/14/14	
Total Dissolved Solids	860	mg/L	25	SM2540C	03/17/14	
Total Arsenic (As)	390	ug/L	2.5	EPA 200.8	03/19/14	
Total Boron (B)	ND	ug/L	500	EPA 200.7	03/21/14	
Total Iron (Fe)	1300000	ug/L	120	EPA 200.7	03/21/14	
Total Manganese (Mn)	16000	ug/L	100	EPA 200.7	03/21/14	
Total Sodium (Na)	120	mg/L	2.5	EPA 200.7	03/21/14	

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Work Order #: 4030452
Reporting Date: April 8, 2014

Date Received: March 14, 2014
Project # / Name: 1405 / Monterey Peninsula Desalination Plant
Sample Identification: B8, sampled 3/14/2014 12:20:00PM
Sampler Name / Co.: Cara Al-Lami / Pacific Crest Engineering, Inc.
Matrix: Water
Laboratory #: 4030452-02

	Results	Units	RL	Analysis Method	Date Analyzed	Flags
Total Alkalinity as CaCO3	1200	mg/L	2.0	SM 2320B	03/14/14	
Total Organic Carbon	6.5	mg/L	2.0	SM 5310B	04/07/14	
Bromide	0.62	mg/L	0.10	EPA 300.0	04/01/14	
Chloride	160	mg/L	1.0	EPA 300.0	03/14/14	
Hardness	1700	mg/L	25	SM 2340 B	03/21/14	
Turbidity	31000	NTU	20	SM 2130B	03/14/14	
Ammonia as N	0.37	mg/L	0.28	EPA 350.2	03/27/14	
Nitrate as N	74	mg/L	0.10	EPA 300.0	03/14/14	
Nitrite as N	ND	mg/L	0.10	EPA 300.0	03/14/14	
Total Dissolved Solids	730	mg/L	26	SM2540C	03/17/14	
Total Arsenic (As)	230	ug/L	2.5	EPA 200.8	03/19/14	
Total Boron (B)	ND	ug/L	500	EPA 200.7	03/21/14	
Total Iron (Fe)	920000	ug/L	120	EPA 200.7	03/21/14	
Total Manganese (Mn)	18000	ug/L	100	EPA 200.7	03/21/14	
Total Sodium (Na)	150	mg/L	2.5	EPA 200.7	03/21/14	

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SOIL CONTROL LAB

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FAX: 831-724-3188

Pacific Crest Engineering Inc.
444 Airport Blvd., Suite 106
Watsonville, CA 95076
Attn: Cara Al-Lami

Work Order #: 4030452
Reporting Date: April 8, 2014

Nitrogen - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40155 - Default Prep GenChem											
Blank (PC40155-BLK1)					Prepared & Analyzed: 14-Mar-14						
Nitrate as N	ND		0.10	mg/L							
Nitrite as N	ND		0.10	"							
LCS (PC40155-BS1)					Prepared & Analyzed: 14-Mar-14						
Nitrate as N	2.067		0.10	mg/L	2.26		91.4	80-120			
Nitrite as N	2.928		0.10	"	3.04		96.3	80-120			
LCS Dup (PC40155-BSD1)					Prepared & Analyzed: 14-Mar-14						
Nitrate as N	2.103		0.10	mg/L	2.26		93.1	80-120	1.75	20	
Nitrite as N	3.117		0.10	"	3.04		103	80-120	6.24	20	
Duplicate (PC40155-DUP1)		**Source: 4030368-01**			Prepared & Analyzed: 14-Mar-14						
Nitrate as N	ND		0.10	mg/L		ND				20	
Nitrite as N	ND		0.10	"		ND				20	
Matrix Spike (PC40155-MS1)		**Source: 4030368-01**			Prepared & Analyzed: 14-Mar-14						
Nitrate as N	2.016		0.10	mg/L	2.26	ND	89.2	80-120			
Nitrite as N	2.962		0.10	"	3.04	ND	97.4	80-120			
Matrix Spike Dup (PC40155-MSD1)		**Source: 4030368-01**			Prepared & Analyzed: 14-Mar-14						
Nitrate as N	2.029		0.10	mg/L	2.26	ND	89.8	80-120	0.670	20	
Nitrite as N	2.971		0.10	"	3.04	ND	97.7	80-120	0.287	20	
Reference (PC40155-SRM1)					Prepared & Analyzed: 14-Mar-14						
Nitrate as N	8.669		0.20	mg/L	8.99		96.4	80-120			
Reference (PC40155-SRM2)					Prepared & Analyzed: 14-Mar-14						
Nitrite as N	2.953		0.10	mg/L	3.04		97.1	80-120			

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Nitrogen - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40292 - Default Prep GenChem											
Blank (PC40292-BLK1)					Prepared & Analyzed: 27-Mar-14						
Ammonia as N	ND		0.28	mg/L							
Duplicate (PC40292-Dup1)		**Source: 4030481-02**			Prepared & Analyzed: 27-Mar-14						
Ammonia as N	ND		0.28	mg/L		ND				20	
Matrix Spike (PC40292-MS1)		**Source: 4030481-02**			Prepared & Analyzed: 27-Mar-14						
Ammonia as N	19.66		0.28	mg/L	20.0	ND	98.3	80-120			
Matrix Spike Dup (PC40292-MSD1)		**Source: 4030481-02**			Prepared & Analyzed: 27-Mar-14						
Ammonia as N	19.71		0.28	mg/L	20.0	ND	98.6	80-120	0.284	20	
Reference (PC40292-SRM1)					Prepared & Analyzed: 27-Mar-14						
Ammonia as N	10.43		0.28	mg/L	10.9		95.7	80-120			

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Classical Chemistry Parameters - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40155 - Default Prep GenChem											
Blank (PC40155-BLK1)					Prepared & Analyzed: 14-Mar-14						
Chloride	ND		1.0	mg/L							
LCS (PC40155-BS1)					Prepared & Analyzed: 14-Mar-14						
Chloride	18.94		1.0	mg/L	20.0		94.7	80-120			
LCS Dup (PC40155-BSD1)					Prepared & Analyzed: 14-Mar-14						
Chloride	19.20		1.0	mg/L	20.0		96.0	80-120	1.36	20	
Duplicate (PC40155-DUP1)		**Source: 4030368-01**			Prepared & Analyzed: 14-Mar-14						
Chloride	7.722		1.0	mg/L		7.742			0.259	20	
Matrix Spike (PC40155-MS1)		**Source: 4030368-01**			Prepared & Analyzed: 14-Mar-14						
Chloride	26.05		1.0	mg/L	20.0	7.742	91.5	80-120			
Matrix Spike Dup (PC40155-MSD1)		**Source: 4030368-01**			Prepared & Analyzed: 14-Mar-14						
Chloride	26.16		1.0	mg/L	20.0	7.742	92.1	80-120	0.452	20	
Reference (PC40155-SRM1)					Prepared & Analyzed: 14-Mar-14						
Chloride	33.97		2.0	mg/L	34.4		98.7	80-120			
Batch PC40162 - Default Prep GenChem											
Blank (PC40162-BLK1)					Prepared & Analyzed: 14-Mar-14						
Total Alkalinity as CaCO3	2.120		1.0	mg/L							
Duplicate (PC40162-Dup1)		**Source: 4030454-01**			Prepared & Analyzed: 14-Mar-14						
Total Alkalinity as CaCO3	198.7		2.0	mg/L		198.5			0.121	20	

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Classical Chemistry Parameters - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40165 - Default Prep GenChem											
Blank (PC40165-BLK1)					Prepared & Analyzed: 14-Mar-14						
Turbidity	ND		0.10	NTU							
Duplicate (PC40165-Dup1)					Prepared & Analyzed: 14-Mar-14						
Turbidity	31400		20	NTU						20	
Batch PC40174 - Default Prep GenChem											
Blank (PC40174-BLK1)					Prepared & Analyzed: 17-Mar-14						
Total Dissolved Solids	ND		10	mg/L							
Blank (PC40174-BLK2)					Prepared & Analyzed: 17-Mar-14						
Total Dissolved Solids	ND		10	mg/L							
Duplicate (PC40174-Dup1)		**Source: 4030346-02**			Prepared & Analyzed: 17-Mar-14						
Total Dissolved Solids	425.0		10	mg/L		426.0			0.235	20	
Duplicate (PC40174-Dup2)		**Source: 4030368-01**			Prepared & Analyzed: 17-Mar-14						
Total Dissolved Solids	296.0		10	mg/L		295.0			0.338	20	
Reference (PC40174-SRM1)					Prepared & Analyzed: 17-Mar-14						
Total Dissolved Solids	786.0		10	mg/L	746		105	80-120			
Reference (PC40174-SRM2)					Prepared & Analyzed: 17-Mar-14						
Total Dissolved Solids	788.0		10	mg/L				80-120			
Batch PC40235 - EPA 3005A											
Blank (PC40235-BLK1)					Prepared & Analyzed: 21-Mar-14						
Hardness	ND		5.0	mg/L							

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Classical Chemistry Parameters - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40235 - EPA 3005A											
LCS (PC40235-BS1)					Prepared & Analyzed: 21-Mar-14						
Hardness	166.3		5.0	mg/L	167		99.6	80-120			
Duplicate (PC40235-DUP1)		**Source: 4030466-01**			Prepared & Analyzed: 21-Mar-14						
Hardness	48.10		5.0	mg/L		49.12			2.10	20	
Duplicate (PC40235-DUP2)		**Source: 4030506-01**			Prepared & Analyzed: 21-Mar-14						
Hardness	93.71		5.0	mg/L		92.77			1.01	20	
Matrix Spike (PC40235-MS1)		**Source: 4030466-01**			Prepared & Analyzed: 21-Mar-14						
Hardness	386.2		10	mg/L	334	49.12	101	80-120			
Matrix Spike (PC40235-MS2)		**Source: 4030506-01**			Prepared & Analyzed: 21-Mar-14						
Hardness	432.6		10	mg/L	334	92.77	102	80-120			
Matrix Spike Dup (PC40235-MSD1)		**Source: 4030466-01**			Prepared & Analyzed: 21-Mar-14						
Hardness	386.6		10	mg/L	334	49.12	101	80-120	0.0949	20	
Matrix Spike Dup (PC40235-MSD2)		**Source: 4030506-01**			Prepared & Analyzed: 21-Mar-14						
Hardness	429.8		10	mg/L	334	92.77	101	80-120	0.642	20	
Reference (PC40235-SRM1)					Prepared & Analyzed: 21-Mar-14						
Hardness	69.71		25	mg/L	69.5		100	80-120			
Batch PD40071 - Default Prep GenChem											
Blank (PD40071-BLK1)					Prepared & Analyzed: 07-Apr-14						
Total Organic Carbon	ND		1.0	mg/L							

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Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PD40071 - Default Prep GenChem											
Duplicate (PD40071-Dup1)		**Source: 4030927-03**			Prepared & Analyzed: 07-Apr-14						
Total Organic Carbon	5.810		1.0	mg/L		5.750			1.04	20	
Matrix Spike (PD40071-MS1)		**Source: 4030927-03**			Prepared & Analyzed: 07-Apr-14						
Total Organic Carbon	16.18		1.0	mg/L	10.0	5.750	104	80-120			
Matrix Spike Dup (PD40071-MSD1)		**Source: 4030927-03**			Prepared & Analyzed: 07-Apr-14						
Total Organic Carbon	15.91		1.0	mg/L	10.0	5.750	102	80-120	1.68	20	
Reference (PD40071-SRM1)					Prepared & Analyzed: 07-Apr-14						
Total Organic Carbon	66.64		4.0	mg/L	62.5		107	80-120			

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Metals - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40206 - EPA 3005A											
Blank (PC40206-BLK1)					Prepared & Analyzed: 19-Mar-14						
Total Arsenic (As)	ND		0.50	ug/L							
LCS (PC40206-BS1)					Prepared & Analyzed: 19-Mar-14						
Total Arsenic (As)	98.29		0.50	ug/L	98.2		100	85-115			
LCS Dup (PC40206-BSD1)					Prepared & Analyzed: 19-Mar-14						
Total Arsenic (As)	98.93		0.50	ug/L	98.2		101	85-115	0.649	20	
Duplicate (PC40206-DUP1)		**Source: 4030466-01**			Prepared & Analyzed: 19-Mar-14						
Total Arsenic (As)	1.540		0.50	ug/L		1.611			4.51	20	
Duplicate (PC40206-DUP2)		**Source: 4030506-01**			Prepared & Analyzed: 19-Mar-14						
Total Arsenic (As)	0.4610		0.50	ug/L		0.4650			0.864	20	
Matrix Spike (PC40206-MS1)		**Source: 4030466-01**			Prepared & Analyzed: 19-Mar-14						
Total Arsenic (As)	193.5		1.0	ug/L	196	1.611	97.7	80-120			
Matrix Spike (PC40206-MS2)		**Source: 4030506-01**			Prepared & Analyzed: 19-Mar-14						
Total Arsenic (As)	190.6		1.0	ug/L	196	0.4650	96.8	80-120			
Matrix Spike Dup (PC40206-MSD1)		**Source: 4030466-01**			Prepared & Analyzed: 19-Mar-14						
Total Arsenic (As)	191.9		1.0	ug/L	196	1.611	96.9	80-120	0.851	20	
Matrix Spike Dup (PC40206-MSD2)		**Source: 4030506-01**			Prepared & Analyzed: 19-Mar-14						
Total Arsenic (As)	189.7		1.0	ug/L	196	0.4650	96.4	80-120	0.463	20	
Reference (PC40206-SRM1)					Prepared & Analyzed: 19-Mar-14						
Total Arsenic (As)	28.74		2.5	ug/L	26.6		108	85-115			

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Metals - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40235 - EPA 3005A											
Blank (PC40235-BLK1)					Prepared & Analyzed: 21-Mar-14						
Total Iron (Fe)	ND		25	ug/L							
Total Boron (B)	ND		100	"							
Total Manganese (Mn)	ND		20	"							
Total Sodium (Na)	ND		0.50	mg/L							
LCS (PC40235-BS1)					Prepared & Analyzed: 21-Mar-14						
Total Iron (Fe)	123.0		25	ug/L	132		93.2	85-115			
Total Boron (B)	333.0		100	"	340		97.9	85-115			
Total Sodium (Na)	25.56		0.50	mg/L	25.0		102	85-115			
Total Manganese (Mn)	385.0		20	ug/L	396		97.2	85-115			
Duplicate (PC40235-DUP1)		**Source: 4030466-01**			Prepared & Analyzed: 21-Mar-14						
Total Sodium (Na)	206.0		0.50	mg/L		208.6			1.25	20	
Total Manganese (Mn)	130.0		20	ug/L		132.0			1.53	20	
Total Boron (B)	373.0		100	"		372.0			0.268	20	
Total Iron (Fe)	238.0		25	"		232.0			2.55	20	
Duplicate (PC40235-DUP2)		**Source: 4030506-01**			Prepared & Analyzed: 21-Mar-14						
Total Sodium (Na)	11.35		0.50	mg/L		11.26			0.796	20	
Total Manganese (Mn)	ND		20	ug/L		ND				20	
Total Boron (B)	ND		100	"		ND				20	
Total Iron (Fe)	ND		25	"		ND				20	
Matrix Spike (PC40235-MS1)		**Source: 4030466-01**			Prepared & Analyzed: 21-Mar-14						
Total Iron (Fe)	488.0		50	ug/L	264	232.0	97.0	80-120			
Total Manganese (Mn)	920.0		40	"	792	132.0	99.5	80-120			
Total Sodium (Na)	261.2		1.0	mg/L	50.0	208.6	105	80-120			
Total Boron (B)	1070		200	ug/L	680	372.0	103	80-120			

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Metals - Quality Control

Soil Control Lab

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch PC40235 - EPA 3005A											
Matrix Spike (PC40235-MS2)		**Source: 4030506-01**			Prepared & Analyzed: 21-Mar-14						
Total Iron (Fe)	254.0		50	ug/L	264	ND	96.2	80-120			
Total Manganese (Mn)	786.0		40	"	792	ND	99.2	80-120			
Total Boron (B)	694.0		200	"	680	ND	102	80-120			
Total Sodium (Na)	64.22		1.0	mg/L	50.0	11.26	106	80-120			
Matrix Spike Dup (PC40235-MSD1)		**Source: 4030466-01**			Prepared & Analyzed: 21-Mar-14						
Total Iron (Fe)	486.0		50	ug/L	264	232.0	96.2	80-120	0.411	20	
Total Boron (B)	1056		200	"	680	372.0	101	80-120	1.32	20	
Total Sodium (Na)	256.2		1.0	mg/L	50.0	208.6	95.2	80-120	1.93	20	
Total Manganese (Mn)	920.0		40	ug/L	792	132.0	99.5	80-120	0.00	20	
Matrix Spike Dup (PC40235-MSD2)		**Source: 4030506-01**			Prepared & Analyzed: 21-Mar-14						
Total Boron (B)	684.0		200	ug/L	680	ND	101	80-120	1.45	20	
Total Manganese (Mn)	782.0		40	"	792	ND	98.7	80-120	0.510	20	
Total Sodium (Na)	63.72		1.0	mg/L	50.0	11.26	105	80-120	0.782	20	
Total Iron (Fe)	256.0		50	ug/L	264	ND	97.0	80-120	0.784	20	
Reference (PC40235-SRM1)					Prepared & Analyzed: 21-Mar-14						
Total Sodium (Na)	23.56		2.5	mg/L	21.3		111	80-120			
Total Iron (Fe)	177.0		120	ug/L	183		96.7	85-115			
Total Manganese (Mn)	505.0		100	"	494		102	85-115			
Total Boron (B)	1540		500	"	1540		100	85-115			

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Soil Control Lab

42 Hangar Way : Watsonville, CA 95076
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Chain-of-Custody

Soil Control Lab Use Only
Account #: Laboratory # 4030452

Client/Company Name:	Pacific Crest Engineering, Inc.
Attn:	Cara Al-Lami
Address:	444 Airport Boulevard, Suite 106
City, State, Zip:	Watsonville, CA 95076
Phone:	831-722-9446
Fax:	831-722-9158
E-mail:	cara@pacengineering.net
Project #:	1405
Project Name:	Monterey Peninsula Desalination Plant
Please Provide the following (it is assigned to you by the State)	
Water System #:	
Water System Name:	

Information for Bacteria Samples:

People to Contact for positives:

Name: _____ Phone #: _____

Name: _____ Phone #: _____

Name: _____ Phone #: _____

*If you have a positive and we are unable to speak directly to a live person on the phone we are required to fax the result automatically to the Health Department.

Sampling Period: February 2013 (Sampled every 3 years)

Sample Type: ☐ Routine ☐ Repeat ☐ Special ☐ Replacement

Copy to: ☐ EHS ☐ MCHD ☐ DOHS ☐ Other _____

Sampler's Name and Company (Print): Cara Al-Lami / Pacific Crest Engineering

Sampler's Signature: Cara Al-Lami

Request to send results to other parties:

☐ Electronic Data Transfer to State (for chemistry only)

☐ Copies via e-mail to: _____

Comments/Special Instructions (i.e. Place billing address here if different than address above):

Sample Identification	Sampling Date	Sampling Time	Matrix	Field Notes (Optional) Cl_2 Residual	Analysis Requested: TOC	Ammonia	TDS, Chloride, Bromide, Total Alkalinity, Nitrates, Nitrites, Turbidity	Sodium, Total Hardness, Iron, Arsenic, Manganese, Boron	
B7 -01	3/13/14	1458	Water		x	x	x	x	
B8 -02	3/14/14	1220	Water		X	X	X	X	

Relinquished By (Signature and Print Name):	Date/Time:	Received By (Signature and Print Name):	Date/Time:
Cara Al-Lami Cara Al-Lami	3/14/14 1510	LENNE WAGATA	3/14/14, 1510

PACIFIC CREST ENGINEERING INC.

GROUNDWATER PURGING AND SAMPLING FORM

PROJECT NAME: DESALINATION PLANT	SAMPLE LOCATION: B1
PROJECT NO.: 1405	TIME: 1310
DATE: 3/12/14	SAMPLER: CLA

COMPLETED BORING DEPTH: 45.00'

MEASURED TOTAL DEPTH: 45.00'

INITIAL MEASURED DEPTH TO GROUNDWATER: 40.25'

NET WATER COLUMN HEIGHT IN WELL: 4.75'

ODOR? No SHEEN? No

SAMPLES COLLECTED: PRESERVED: (Y) N

BOTTLE TYPE: VOA LITER (PLASTIC BOTTLE) AG

SAMPLER TYPE: Bailer

TIME	GALLONS PURGED	NO. OF WELL VOLUMES	pH	TEMP (C)	CONDUCTIVITY (mmhos/cm)	TURBIDITY	D.O. (mg/L)
1310	N/A	N/A	7.44	20.2	851 µs	Cloudy	7.2

COMMENTS: _____

PACIFIC CREST ENGINEERING INC.

GROUNDWATER PURGING AND SAMPLING FORM

PROJECT NAME: DESALINATION PLANT	SAMPLE LOCATION: B7
PROJECT NO.: 1405	TIME: 1458
DATE: 3/13/14	SAMPLER: CLA

COMPLETED BORING DEPTH: 71.50'

MEASURED TOTAL DEPTH: 72.00'

INITIAL MEASURED DEPTH TO GROUNDWATER: 65.00'

NET WATER COLUMN HEIGHT IN WELL: 7.00'

ODOR? NO SHEEN? NO

SAMPLES COLLECTED: PRESERVED: (Y) N

BOTTLE TYPE: VOA LITER (PLASTIC BOTTLE) AG

SAMPLER TYPE: Bailer

TIME	GALLONS PURGED	NO. OF WELL VOLUMES	pH	TEMP (C)	CONDUCTIVITY (mmhos/cm)	TURBIDITY	D.O. (mg/L)
1458	N/A	N/A	7.28	25.9	1052 µs	Cloudy	5.5

COMMENTS: _____

PACIFIC CREST ENGINEERING INC.

GROUNDWATER PURGING AND SAMPLING FORM

PROJECT NAME: DESALINATION PLANT	SAMPLE LOCATION: B8
PROJECT NO.: 1405	TIME: 1220
DATE: 3/14/14	SAMPLER: CLA

COMPLETED BORING DEPTH: 75.00'

MEASURED TOTAL DEPTH: 75.85'

INITIAL MEASURED DEPTH TO GROUNDWATER: 72.65'

NET WATER COLUMN HEIGHT IN WELL: 5.85'

ODOR? NO SHEEN? NO

SAMPLES COLLECTED: PRESERVED: (Y) N

BOTTLE TYPE: VOA LITER (PLASTIC BOTTLE) ~~AG~~

SAMPLER TYPE: Bailer

TIME	GALLONS PURGED	NO. OF WELL VOLUMES	pH	TEMP (C)	CONDUCTIVITY (mmhos/cm)	TURBIDITY	D.O. (mg/L)
1220	N/A	N/A	7.29	22.6	1285 µs	Cloudy	5.0

COMMENTS: _____

PACIFIC CREST ENGINEERING INC.

GROUNDWATER PURGING AND SAMPLING FORM

PROJECT NAME: DESALINATION PLANT	SAMPLE LOCATION: B11
PROJECT NO.: 1405	TIME: 1250
DATE: 3/11/14	SAMPLER: CLA

COMPLETED BORING DEPTH: 70.00'

MEASURED TOTAL DEPTH: 71.65'

INITIAL MEASURED DEPTH TO GROUNDWATER: 65.43'

NET WATER COLUMN HEIGHT IN WELL: 6.22'

ODOR? No SHEEN? No

SAMPLES COLLECTED: PRESERVED: (Y) N

BOTTLE TYPE: VOA LITER (PLASTIC BOTTLE) AG

SAMPLER TYPE: Bailer

TIME	GALLONS PURGED	NO. OF WELL VOLUMES	pH	TEMP (C)	CONDUCTIVITY (mmhos/cm)	TURBIDITY	D.O. (mg/L)
1250	N/A	N/A	7.17	21.9	1105µs	Cloudy	4.7

COMMENTS: _____

APPENDIX E

Percolation Test Data

PACIFIC CREST ENGINEERING INC.
PERCOLATION TEST RESULTS

B-12

Borehole Radius	3 inches	Test Hole Elevation (feet)	101.5
Casing Radius	2 inches	Test Elevation (feet)	95.5
Rock Porosity	0.4		
Effective Radius	2.4 inches		
Bore Hole Depth	72 inches		

Reading	Time (min)	Δt (min)	Depth (in)	H_o (in)	ΔH (inches)	H_{avg} (inches)	K_{fs} (inches/hour)
0	0		12	60			
1	3.00	3.00	13.44	58.56	1.44	59.28	0.58
2	6.00	3.00	17.40	54.6	3.96	56.58	1.68
3	9.00	3.00	27.84	44.16	10.44	49.38	5.05
4	12.00	3.00	32.40	39.6	4.56	41.88	2.59
5	15.00	3.00	36.60	35.4	4.20	37.50	2.66
6	18.00	3.00	39.84	32.16	3.24	33.78	2.27
7	21.00	3.00	42.84	29.16	3.00	30.66	2.30
8	24.00	3.00	45.36	26.64	2.52	27.90	2.12
9	30.00	6.00	49.44	22.56	4.08	24.60	1.93
10	36.00	6.00	52.44	19.56	3.00	21.06	1.65
11	42.00	6.00	55.20	16.8	2.76	18.18	1.74
12	48.00	6.00	56.76	15.24	1.56	16.02	1.11
13	54.00	6.00	58.92	13.08	2.16	14.16	1.72
14	60.00	6.00	60.72	11.28	1.80	12.18	1.64
15	70.00	10.00	62.88	9.12	2.16	10.20	1.39
16	80.00	10.00	64.68	7.32	1.80	8.22	1.40
17	90.00	10.00	66.12	5.88	1.44	6.60	1.35
18	100.00	10.00	67.32	4.68	1.20	5.28	1.36
19	110.00	10.00	68.40	3.6	1.08	4.14	1.48
20	120.00	10.00	69.36	2.64	0.96	3.12	1.62

Average		**1.88**	**inches/hour**
Field Saturated Hydraulic Conductivity	**K_{fs}**	**1.62**	**inches/hour**
Design Rate - (FS = 2.0)	**K_d**	**0.81**	**inches/hour**

2.5 gallons used during the 30 minute Constant Head
Constant Head measured at 12 inches below the ground surface.

B-13

Borehole Radius	3 inches	Test Hole Elevation (feet)	93.5
Casing Radius	2 inches	Test Elevation (feet)	81.75
Rock Porosity	0.4		
Effective Radius	2.4 inches		
Bore Hole Depth	141 inches		

Reading	Time (min)	Δt (min)	Depth (in)	H_o (in)	ΔH (inches)	H_{avg} (inches)	K_{fs} (inches/hour)
0	0		123	18.00			
1	1.00	1.00	130.80	10.20	7.80	14.10	37.40
2	2.00	1.00	134.60	6.40	3.80	8.30	29.32
3	3.00	1.00	136.20	4.80	1.60	5.60	17.23
4	4.00	1.00	138.12	2.88	1.92	3.84	27.86
5	6.00	2.00	139.20	1.80	1.08	2.34	11.13
6	8.00	2.00	141.00	0.00	1.80	0.90	31.13
*	10.00	2.00	130.92	10.08	--	--	--
7	15.00	5.00	136.08	4.92	5.16	7.50	8.69
8	17.00	2.00	138.12	2.88	2.04	3.90	14.63
9	19.00	2.00	139.92	1.08	1.80	1.98	20.64
10	21.00	2.00	141.00	0.00	1.08	0.54	22.49
*	25.00	4.00	127.92	13.08	--	--	--
11	27.00	2.00	135.60	5.40	7.68	9.24	26.96
12	29.00	2.00	138.12	2.88	2.52	4.14	17.26
13	31.00	2.00	141.00	0.00	2.88	1.44	39.71
*	34.00	3.00	124.68	16.32	--	--	--
14	36.00	2.00	134.88	6.12	10.20	11.22	30.11
15	38.00	2.00	137.88	3.12	3.00	4.62	18.86
16	40.00	2.00	141.00	0.00	3.12	1.56	41.17
*	44.00	4.00	129.36	11.64	--	--	--
17	45.00	1.00	133.80	7.20	4.44	9.42	30.65
18	46.00	1.00	135.96	5.04	2.16	6.12	21.61
19	47.00	1.00	137.52	3.48	1.56	4.26	20.90
20	48.00	1.00	138.48	2.52	0.96	3.00	16.70
21	49.00	1.00	141	0.00	2.52	1.26	74.53

Average		**29.42**	**inches/hour**
Field Saturated Hydraulic Conductivity	**K_{fs}**	**16.70**	**inches/hour**
Design Rate - (FS = 2.0)	**K_d**	**8.35**	**inches/hour**

Could not maintain Constant Head for a 30 minute period. 53 gallons of water was placed in the hole during a 30 minute period. Unable to bring water level to 5 feet below ground surface. Water was not filled to the ground surface at the beginning of the test or when refilled during the test. The pipe could not be filled to the top during the test, thus it was only filled to the depth indicated on the data sheet (*) at the start of the test as well as when it ran dry.

B-15

Borehole Radius	3 inches	Test Hole Elevation (feet)	100
Casing Radius	2 inches	Test Elevation (feet)	84.98
Rock Porosity	0.4		
Effective Radius	2.4 inches		
Bore Hole Depth	180.24 inches		

Reading	Time (min)	Δt (min)	Depth (in)	H_o (in)	ΔH (inches)	H_{avg} (inches)	K_{fs} (inches/hour)
0	0.00		171.6	8.64			
1	1.00	1.00	179.04	1.20	7.44	4.92	88.97
2	2.00	1.00	180.24	0.00	1.20	0.60	48.33
3	2.00	--	168.12	12.12	--	--	--
4	2.50	0.50	175.80	4.44	7.68	8.28	118.75
5	3.00	0.50	177.84	2.40	2.04	3.42	64.55
6	3.50	0.50	180.24	0.00	2.40	1.20	145.47
*	3.50	--	155.88	24.36	--	--	--
7	4.00	0.50	169.80	10.44	13.92	17.40	109.84
8	4.50	0.50	175.08	5.16	5.28	7.80	85.99
9	5.00	1.00	177.24	3.00	2.16	4.08	29.92
10	6.00	0.50	178.80	1.44	1.56	2.22	66.56
11	6.50	0.50	180.24	0.00	1.44	0.72	108.82
*	6.50	--	149.16	31.08	--	--	--
12	7.00	0.50	169.68	10.56	20.52	20.82	136.80
13	7.50	0.50	174.00	6.24	4.32	8.40	65.97
14	8.00	0.50	176.04	4.20	2.04	5.22	46.52
15	8.50	0.50	177.36	2.88	1.32	3.54	40.72
16	9.00	0.50	180.24	0.00	2.88	1.44	158.84
*	9.00	--	155.76	24.48	--	--	--
17	9.50	0.50	167.64	12.60	11.88	18.54	88.34
18	10.00	0.50	172.44	7.80	4.80	10.20	61.75
19	10.50	0.50	174.96	5.28	2.52	6.54	47.70
20	11.00	0.50	176.52	3.72	1.56	4.50	40.05
21	11.50	0.50	180.24	0.00	3.72	1.86	177.24
*	11.50	--	143.64	36.60	--	--	--
22	12.00	0.50	161.04	19.20	17.40	27.90	87.80
23	12.50	0.50	167.64	12.60	6.60	15.90	56.64
24	13.00	0.50	171.00	9.24	3.36	10.92	40.66
25	13.50	0.50	173.04	7.20	2.04	8.22	31.74
26	14.00	0.50	174.36	5.88	1.32	6.54	24.98
27	14.50	0.50	175.44	4.80	1.08	5.34	24.18
28	15.00	0.50	175.80	4.44	0.36	4.62	9.05
*	15.00	--	151.56	28.68	--	--	--
29	15.50	0.50	162.36	13.44	15.24	21.06	100.51
30	16.00	0.50	168.12	7.68	5.76	10.56	71.83
31	16.50	0.50	170.88	4.92	2.76	6.30	53.91
32	17.00	0.50	172.44	3.36	1.56	4.14	42.74
33	17.50	0.50	173.76	2.04	1.32	2.70	49.43
34	18.00	0.50	174.84	0.96	1.08	1.50	58.25
35	18.50	0.50	175.80	0.00	0.96	0.48	82.76
*	18.50	--	149.88	25.92	--	--	--
36	19.00	0.50	161.40	14.40	11.52	20.16	79.17
37	19.50	0.50	167.40	8.40	6.00	11.40	69.85
38	20.00	0.50	170.04	5.76	2.64	7.08	46.72
39	20.50	0.50	171.72	4.08	1.68	4.92	40.18
40	21.00	0.50	173.04	2.76	1.32	3.42	41.77
41	21.50	0.50	174.00	1.80	0.96	2.28	40.26
42	22.00	0.50	174.60	1.20	0.60	1.50	32.36
*	22.00	--	147.24	27.36	--	--	--
43	22.50	0.50	159.84	14.76	12.60	21.06	83.10
44	23.00	0.50	165.72	8.88	5.88	11.82	66.25
45	23.50	0.50	168.84	5.76	3.12	7.32	53.66
46	24.00	0.50	170.76	3.84	1.92	4.80	46.84
47	24.50	0.50	172.20	2.40	1.44	3.12	48.71
48	25.00	0.50	173.40	1.20	1.20	1.80	58.31
49	25.50	0.50	174.00	0.00	1.20	0.60	96.65

Average		**76.83**	**inches/hour**
Field Saturated Hydraulic Conductivity	**K_{fs}**	**58.31**	**inches/hour**
Design Rate - (FS = 2.0)	**K_d**	**29.16**	**inches/hour**

Pre-soaked hole with approximately 85 gallons of water 24 hours before the start of the percolation test. Due to the rapid infiltration, a 30 minute pre-soak maintaining constant head was unachievable. The pipe could not be filled to the top during the test, thus it was onlly filled to the depth indicated on the data sheet (*) at the start of the test as well as when it ran dry. Approximately 100 gallons of water was used during the percolation test.

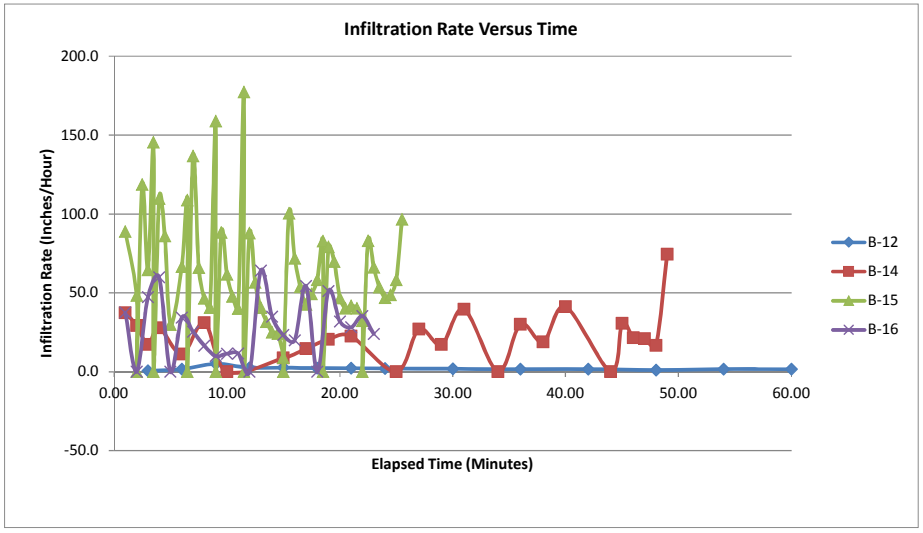
B-16

Borehole Radius	3 inches	Test Hole Elevation (feet)	93
Casing Radius	2 inches	Test Elevation (feet)	83.85
Rock Porosity	0.4		
Bore Hole Radius	2.4 inches		
Bore Hole Depth	109.8 inches		

Reading	Time (min)	Δt (min)	Depth (in)	H_o (in)	ΔH (inches)	H_{avg} (inches)	K_{fs} (inches/hour)
0	0		108.96	0.84			
1	1.00	1.00	109.80	0	0.84	0.42	37.53
*	2.00	--	105.36	4.44	--	--	--
2	3.00	1.00	108.12	1.68	2.76	3.06	47.33
3	4.00	1.00	109.80	0	1.68	0.84	59.79
*	5.00	1.00	92.04	17.76	--	--	--
4	6.00	1.00	99.24	10.56	7.20	14.16	34.39
5	7.00	1.00	102.72	7.08	3.48	8.82	25.46
6	8.00	1.00	104.40	5.4	1.68	6.24	16.54
7	9.00	1.00	105.24	4.56	0.84	4.98	9.95
8	10.00	1.00	106.08	3.72	0.84	4.14	11.51
9	11.00	1.00	106.80	3	0.72	3.36	11.54
*	12.00	--	88.08	18.72	--	--	--
10	13.00	1.00	100.20	6.60	12.12	12.66	64.14
11	14.00	1.00	103.20	3.60	3.00	5.10	34.86
12	15.00	1.00	104.52	2.28	1.32	2.94	23.29
13	16.00	1.00	105.36	1.44	0.84	1.86	20.01
14	17.00	1.00	106.80	0.00	1.44	0.72	54.41
*	18.00	--	94.80	12.00	--	--	--
19	19.00	1.00	101.64	5.16	6.84	8.58	51.26
15	20.00	1.00	103.92	2.88	2.28	4.02	31.95
16	21.00	1.00	105.24	1.56	1.32	2.22	28.16
17	22.00	1.00	106.32	0.48	1.08	1.02	35.36
18	23.00	1.00	106.80	0.00	0.48	0.24	24.08

Average		**39.31**	**inches/hour**
Field Saturated Hydraulic Conductivity	**K_{fs}**	**24.08**	**inches/hour**
Design Rate - (FS = 2.0)	**K_d**	**12.04**	**inches/hour**

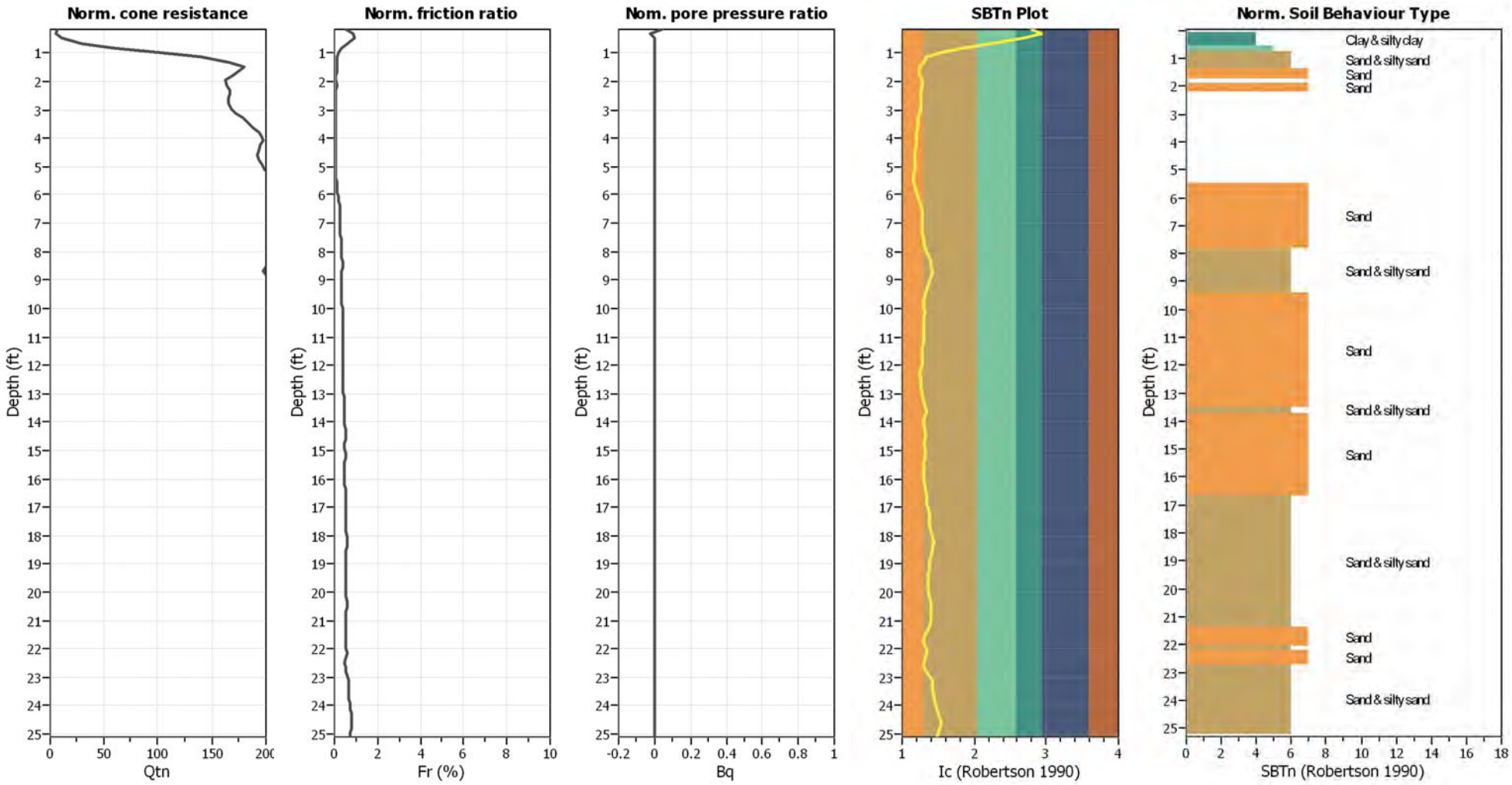
Could not maintain more than 3 to 4 feet of head. Placed approximately 58 gallons into the percolation hole prior to starting the percolation test. Water was not filled to the ground surface at the beginning of the test or when refilled during the percolation test. The pipe could not be filled to the top during the test, thus it was only filled to the depth indicated on the data sheet (*) at the start of the test as well as when it ran dry.



APPENDIX F

CPT Data, Interpretation, and Seismic Settlement Plots

CPT basic interpretation plots (normalized)



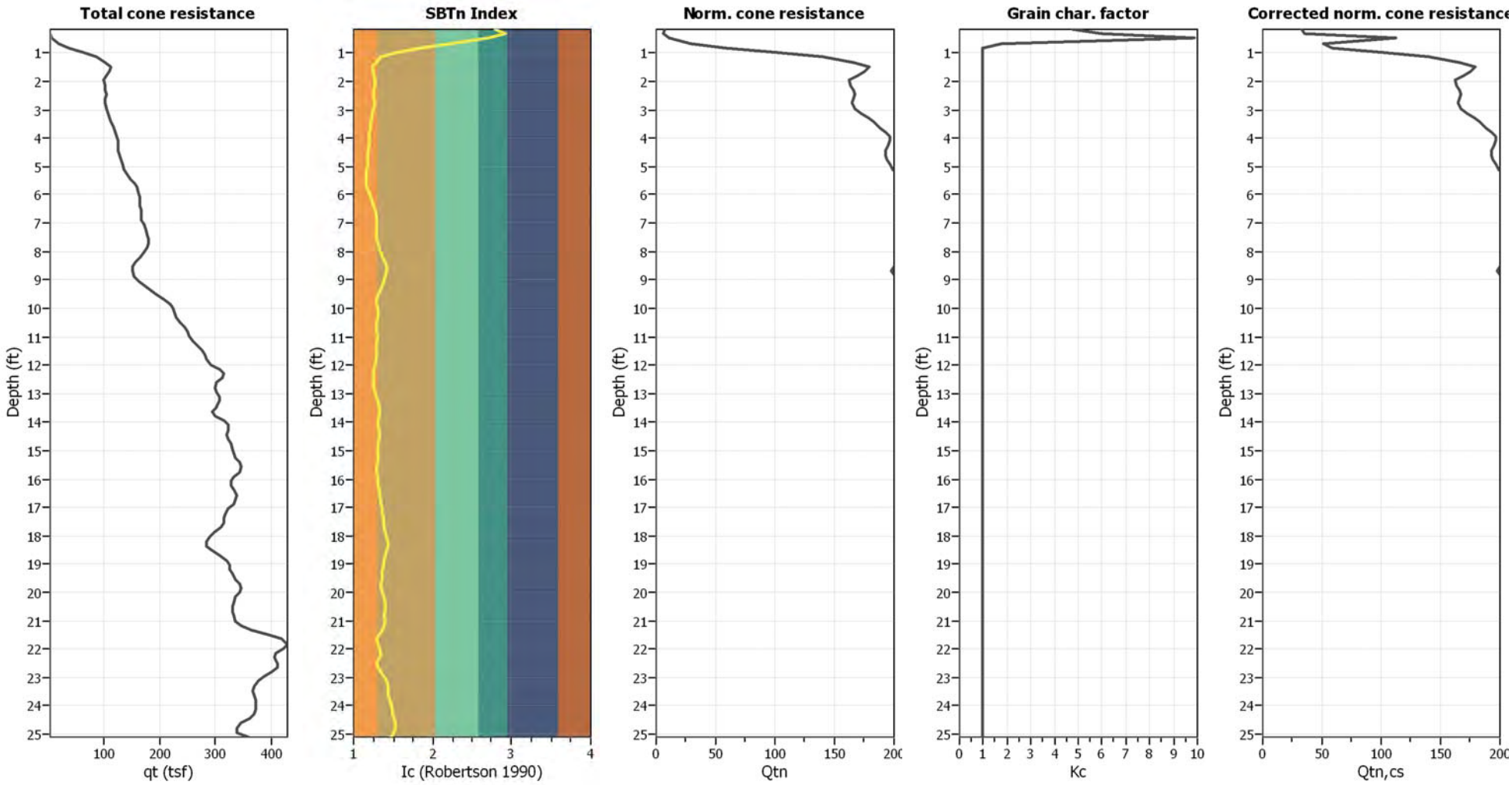
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

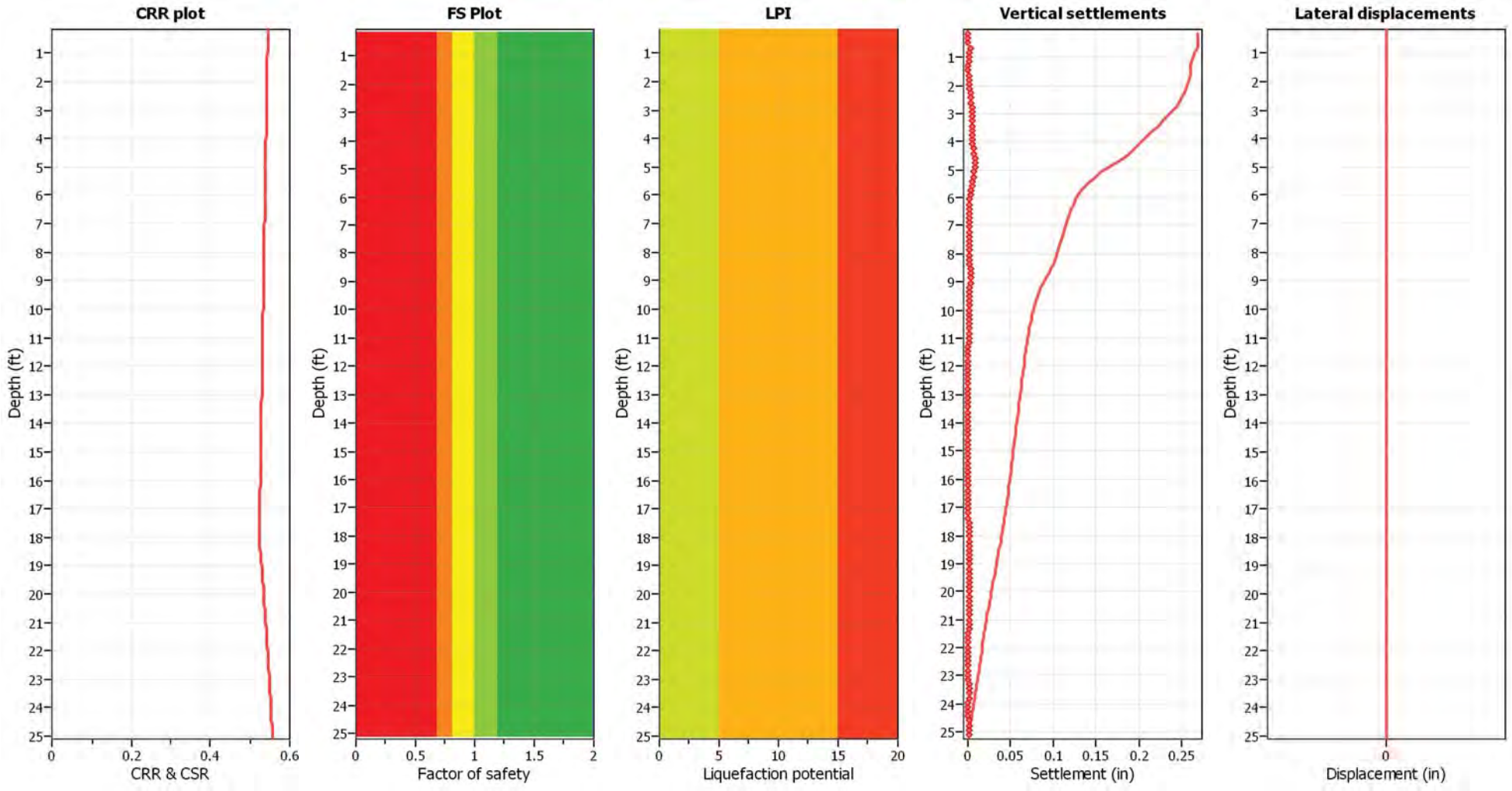
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

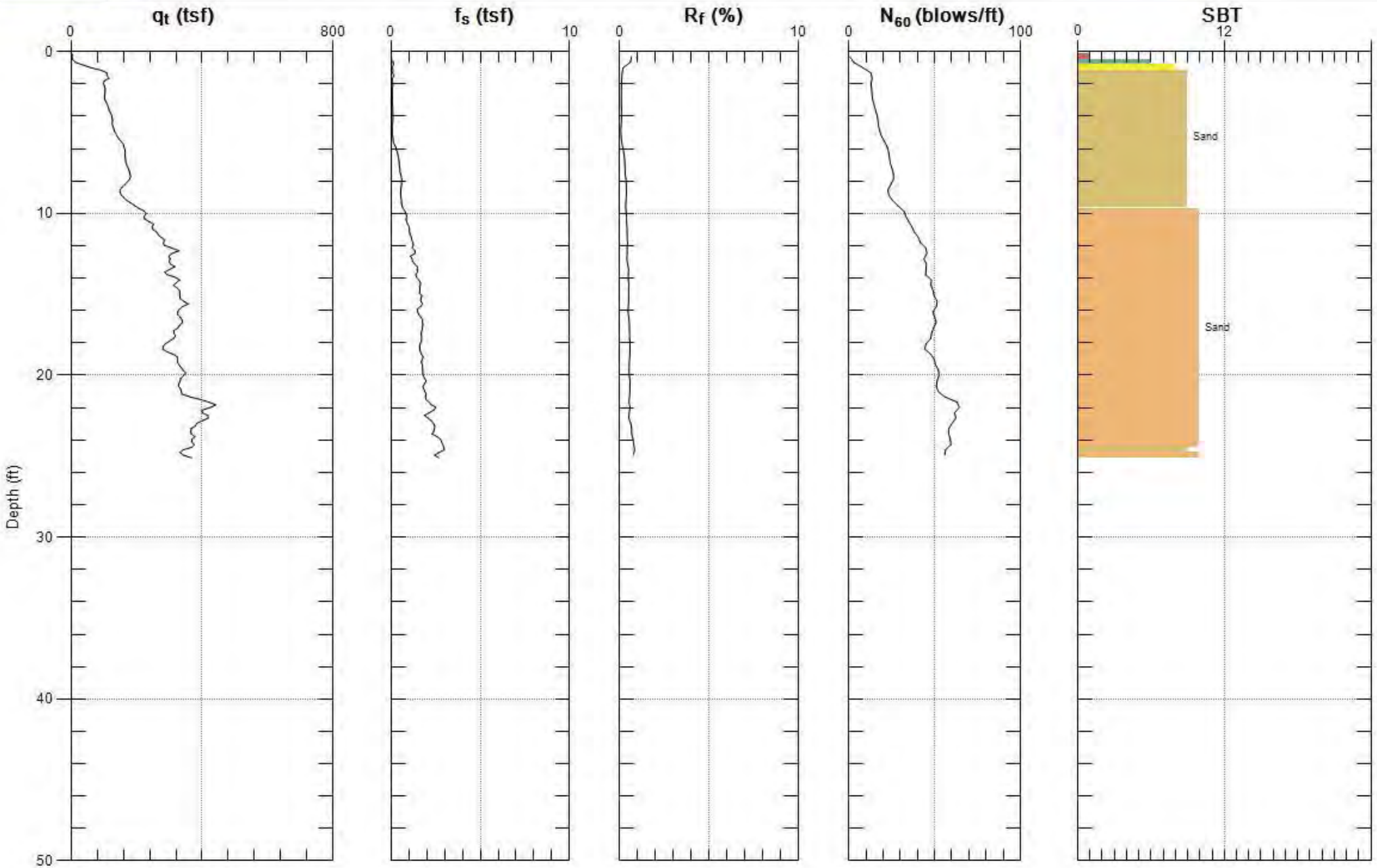
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5032

Engineer: C.AL-LAMI
Date: 7/17/2014 09:51



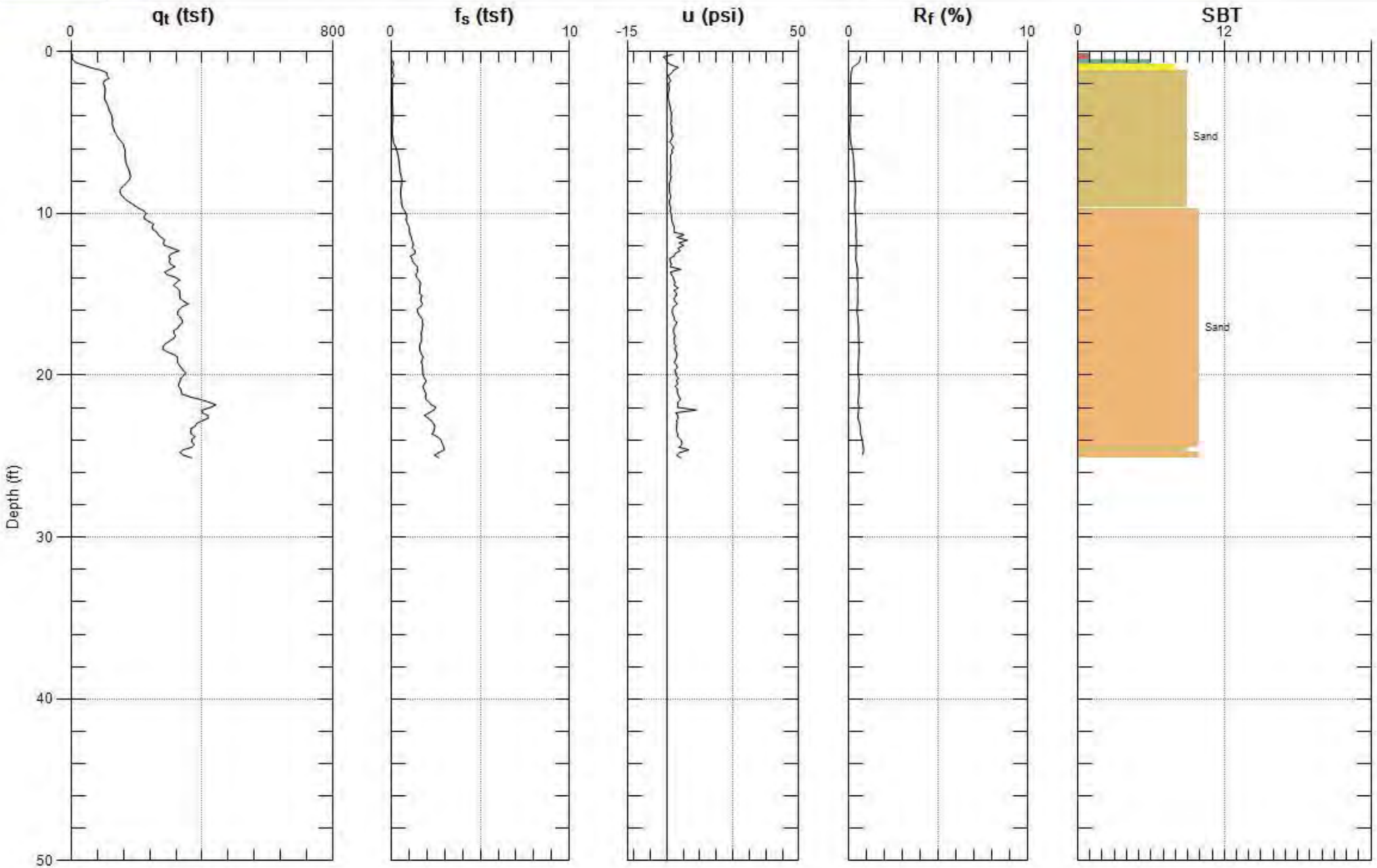
Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5032

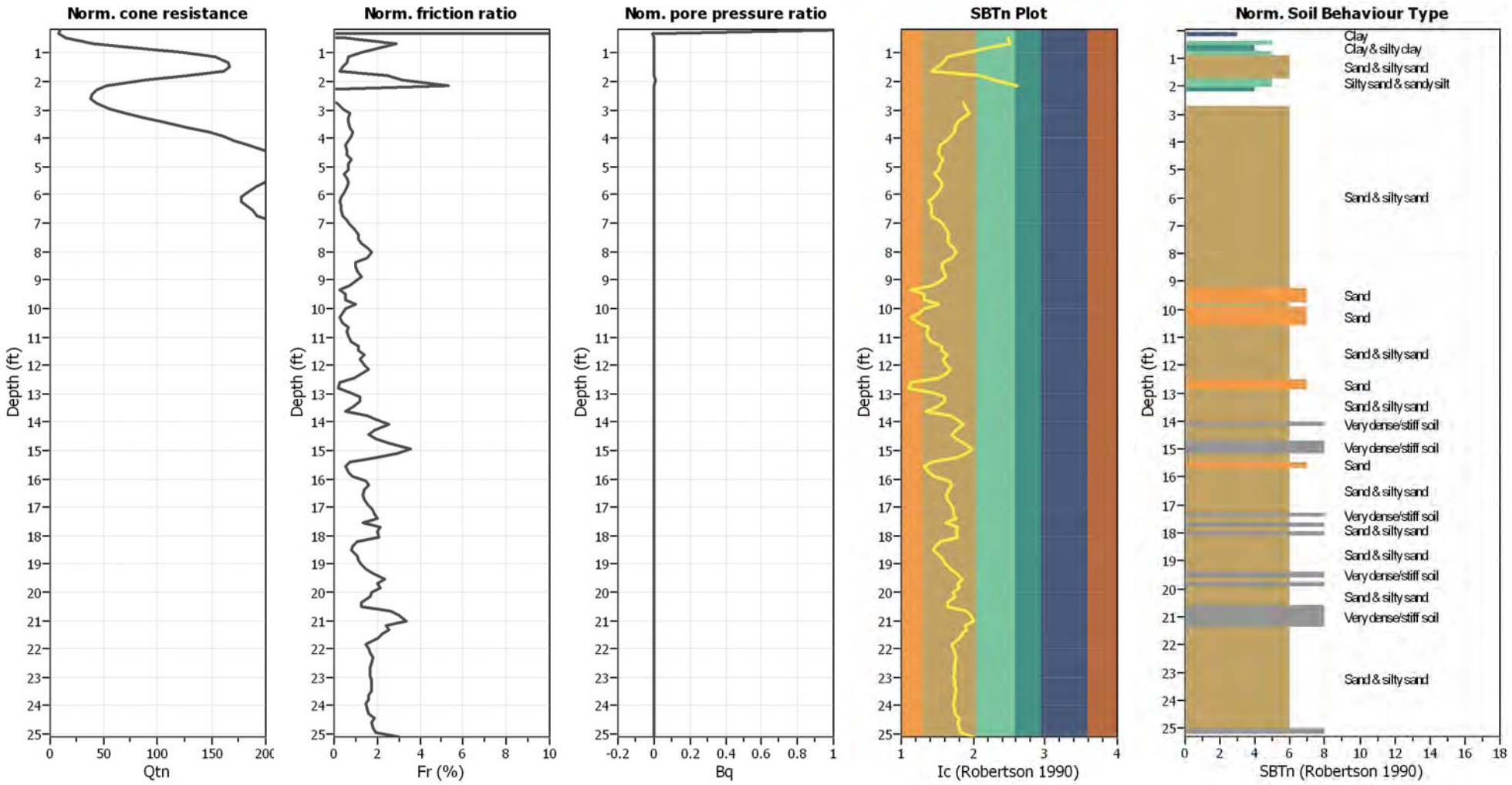
Engineer: C.AL-LAMI
Date: 7/17/2014 09:51



Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



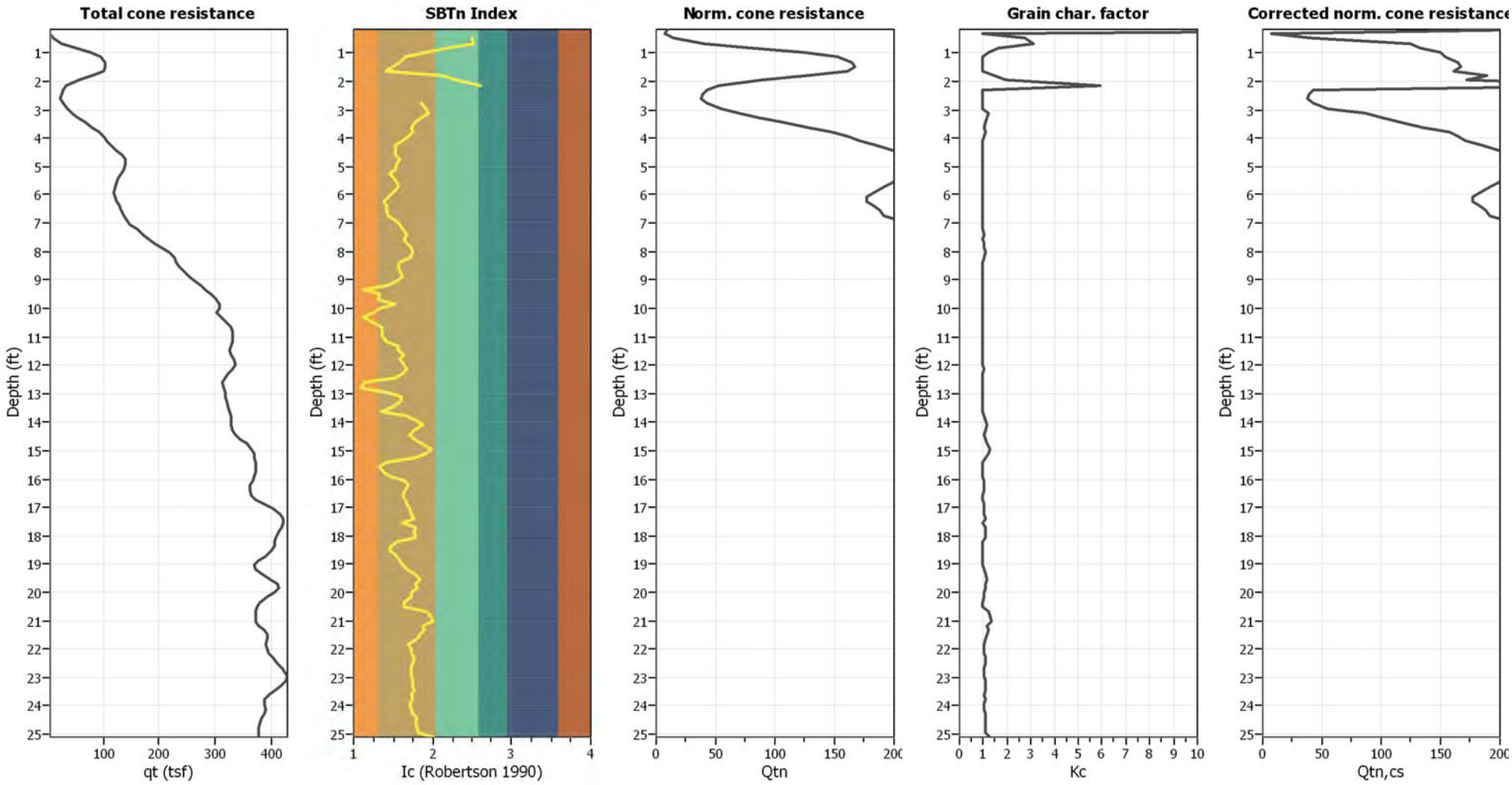
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

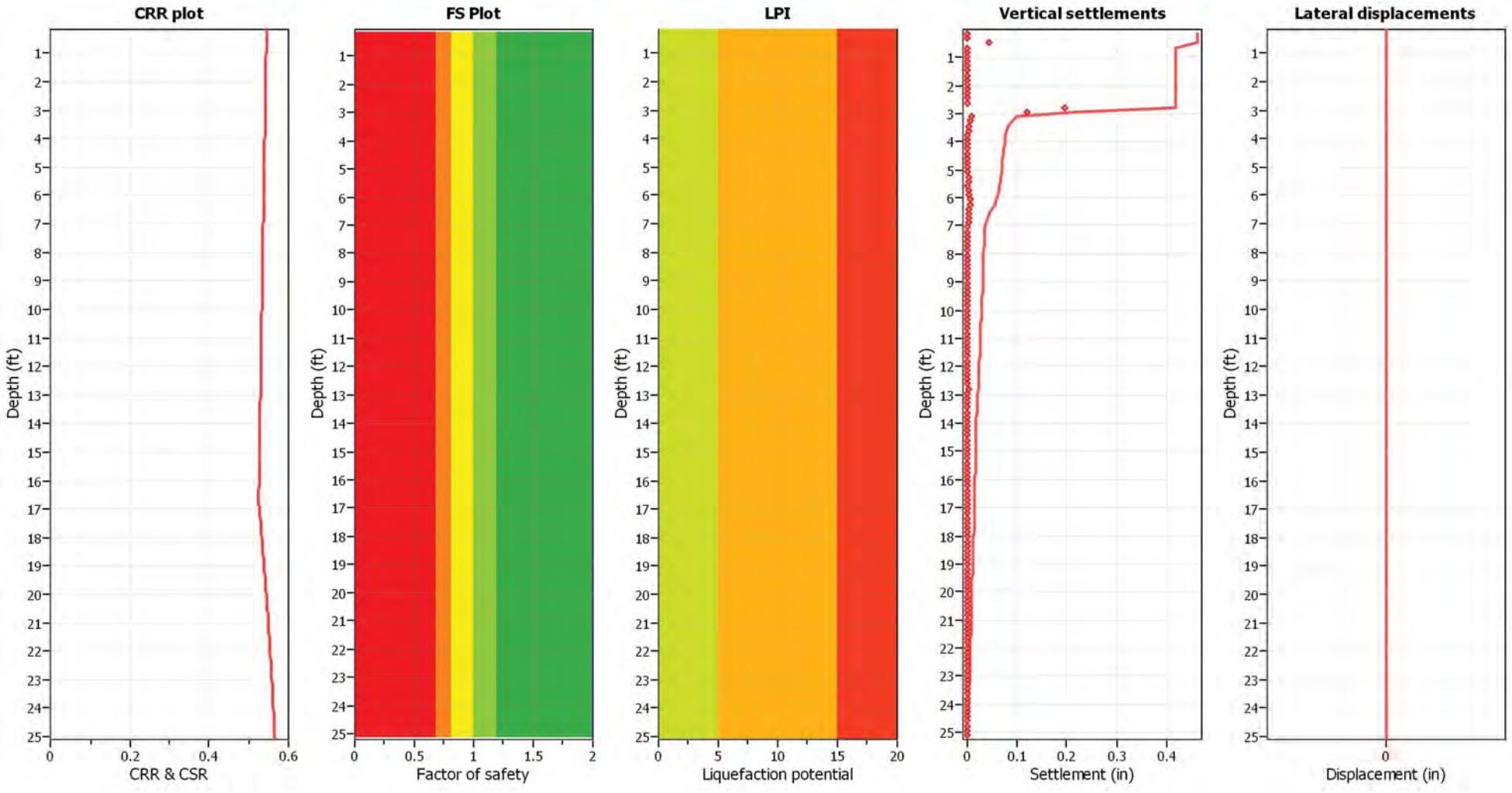
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

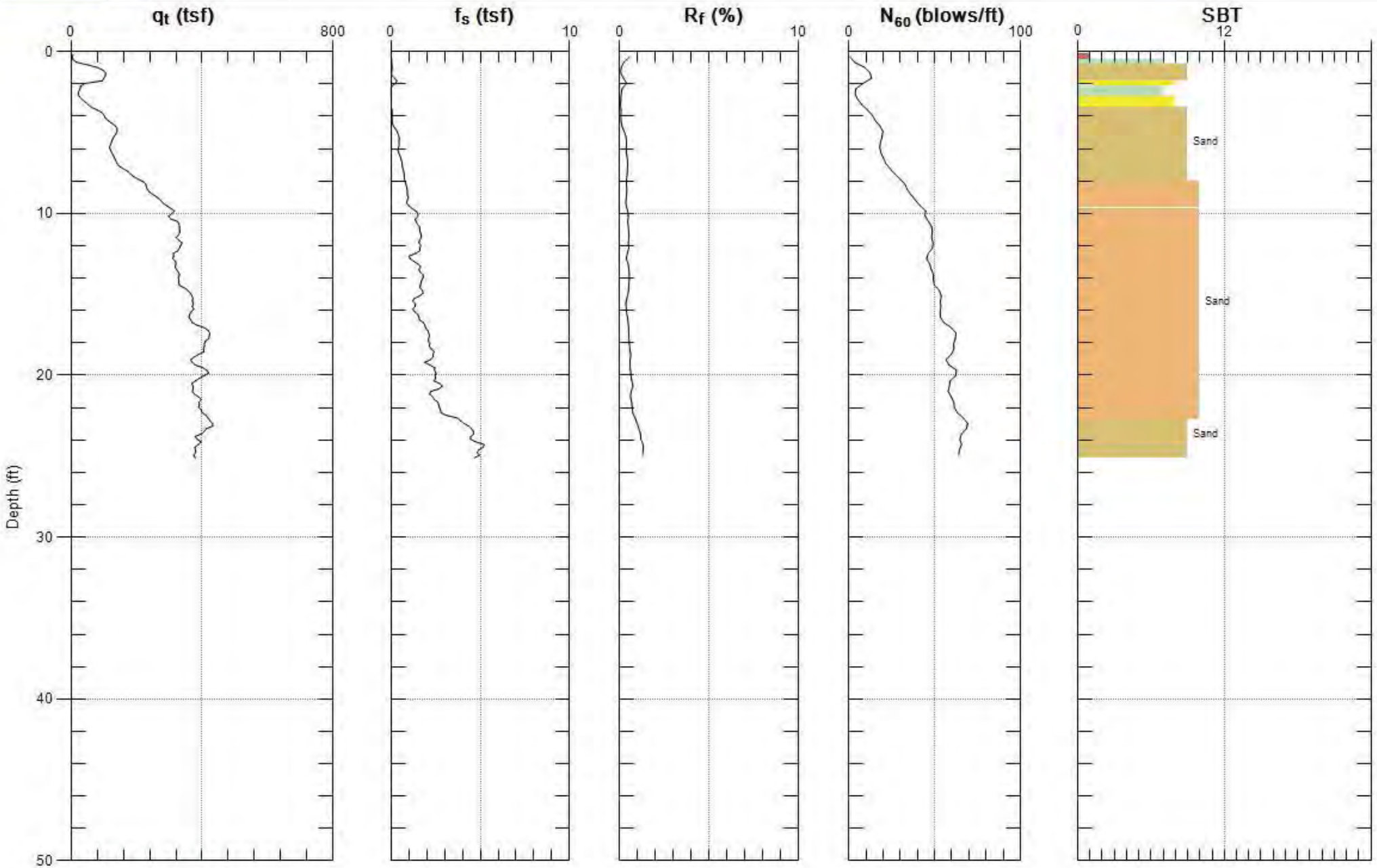
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5034

Engineer: C.AL-LAMI
Date: 7/17/2014 12:14



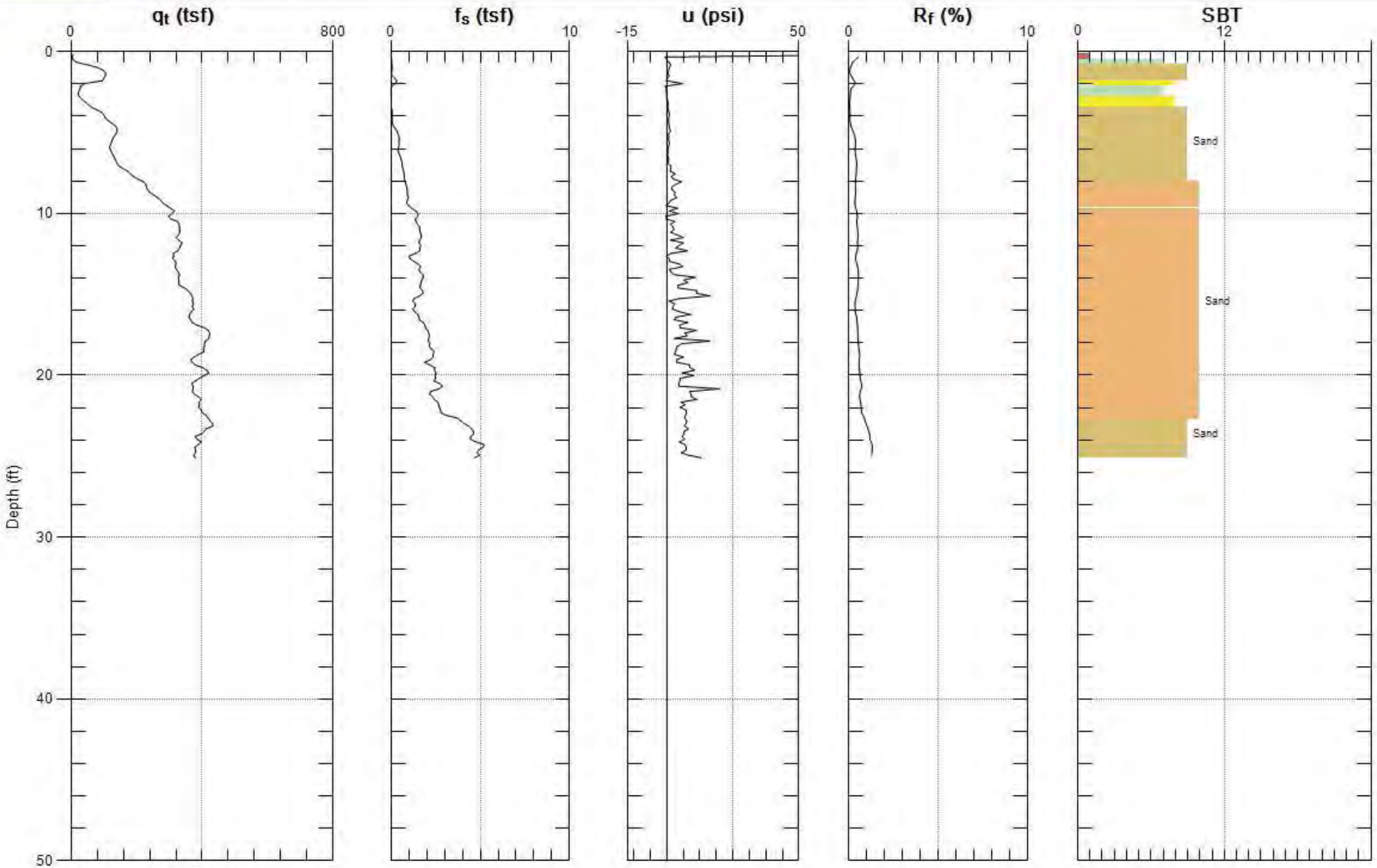
Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5034

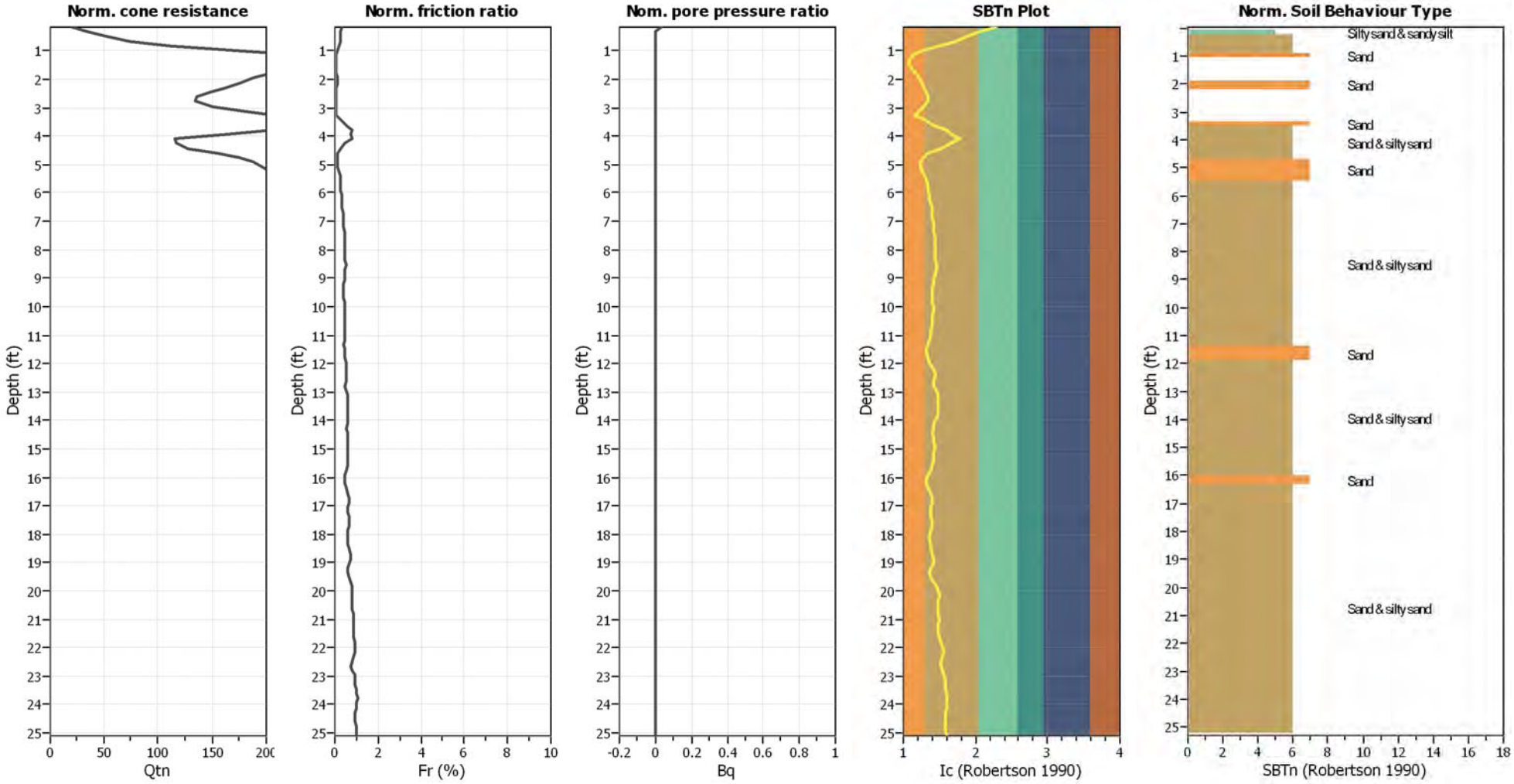
Engineer: C.AL-LAMI
Date: 7/17/2014 12:14



Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



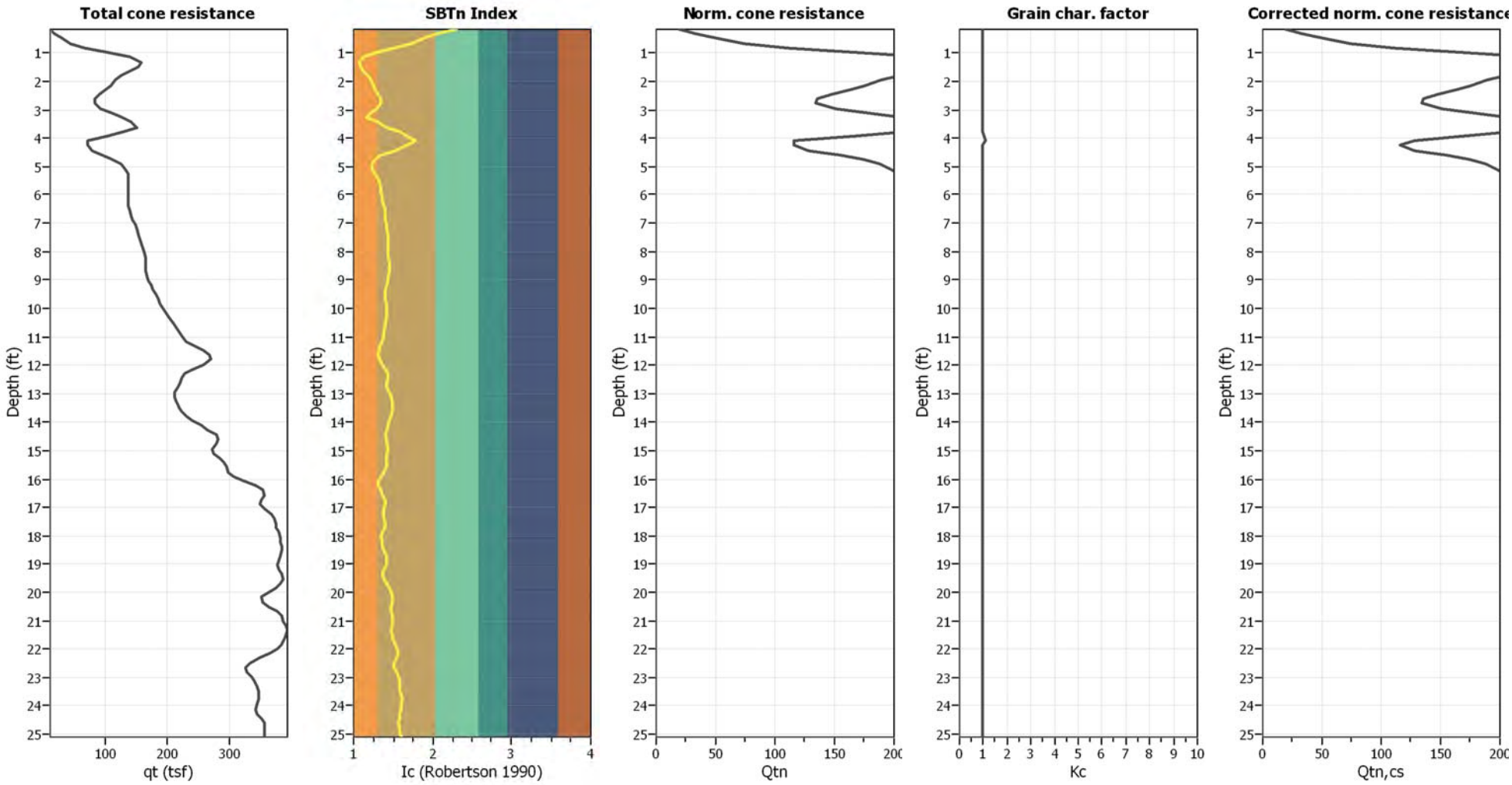
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

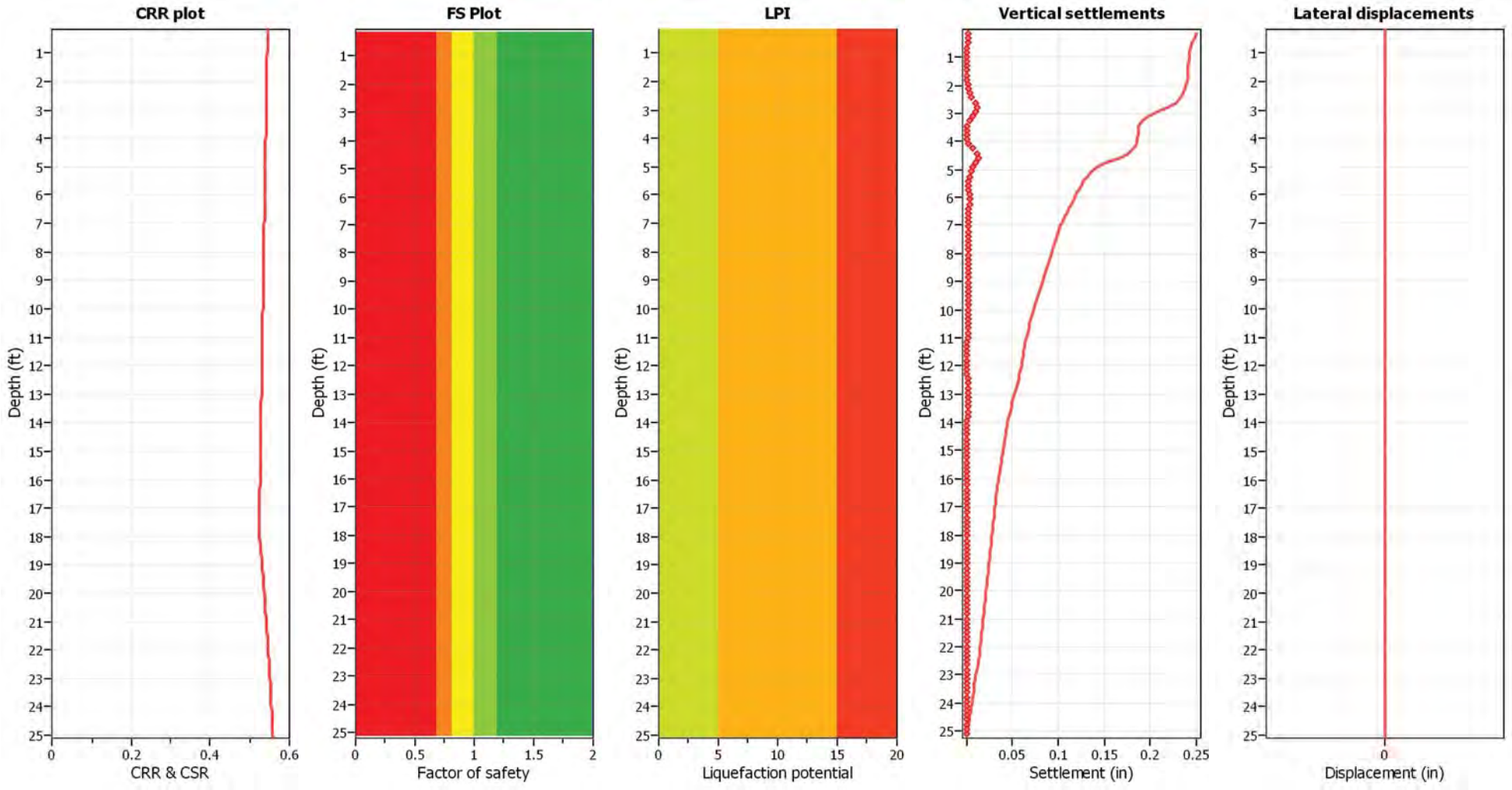
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

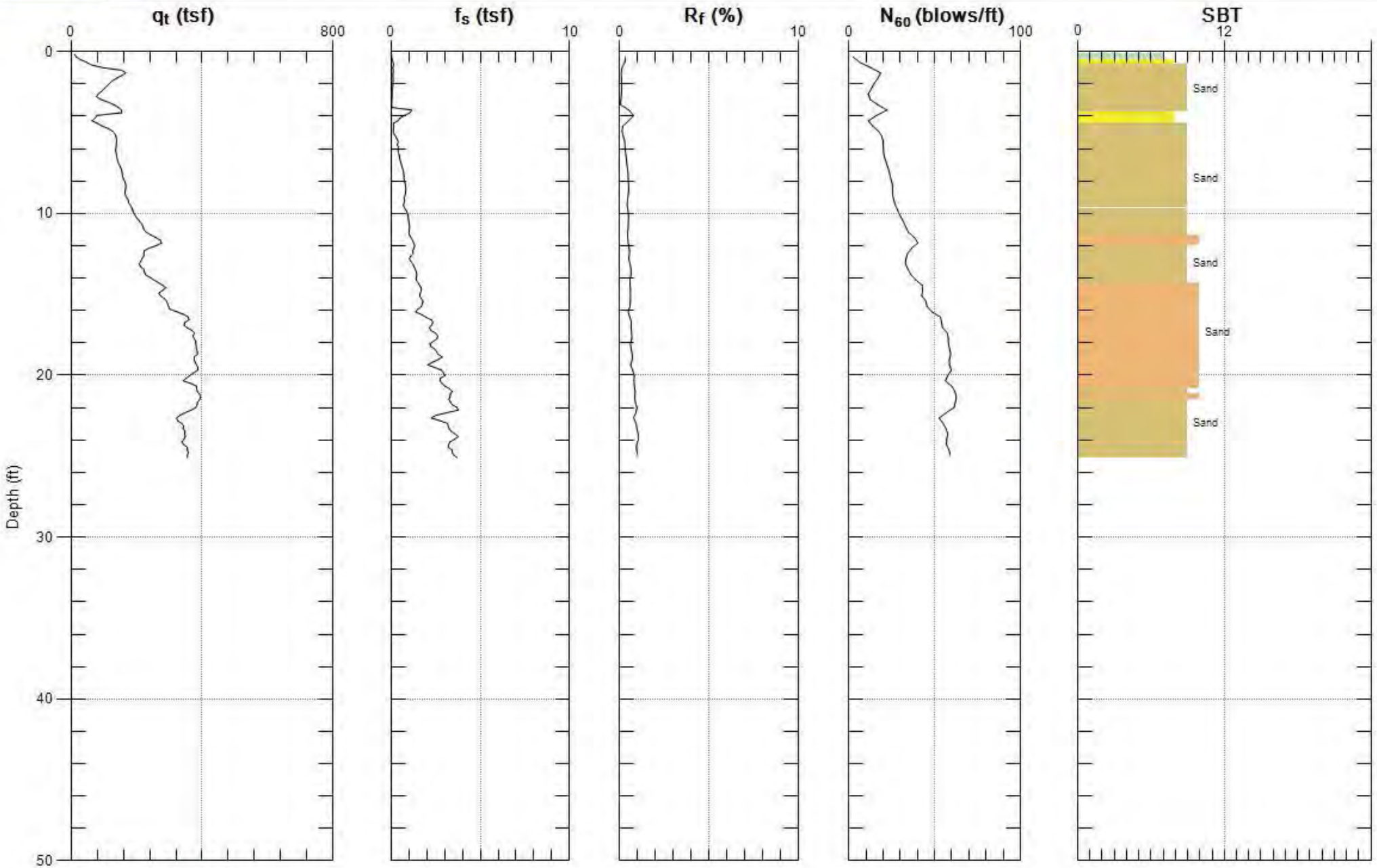
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5033

Engineer: C.AL-LAMI
Date: 7/17/2014 01:15



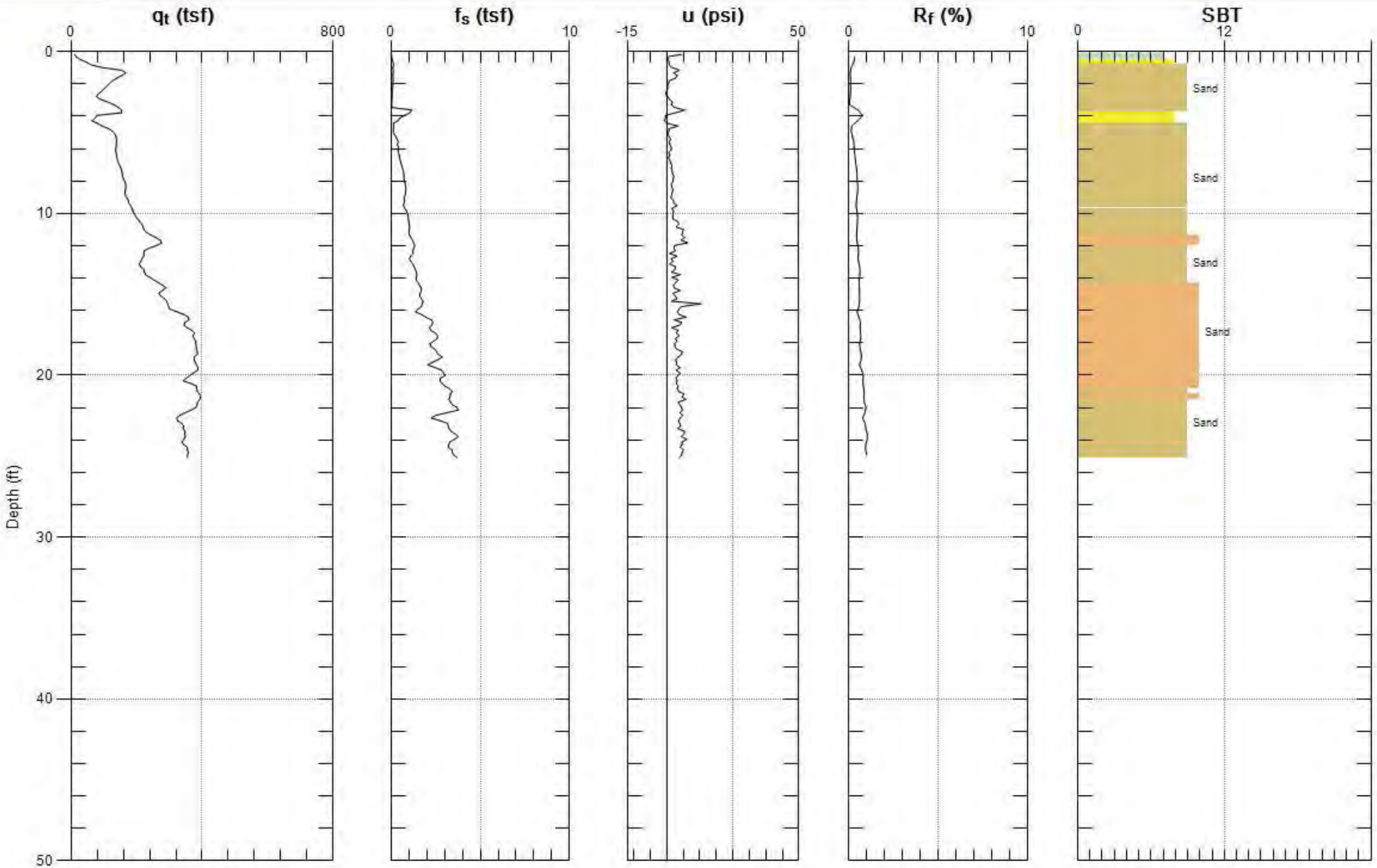
Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5033

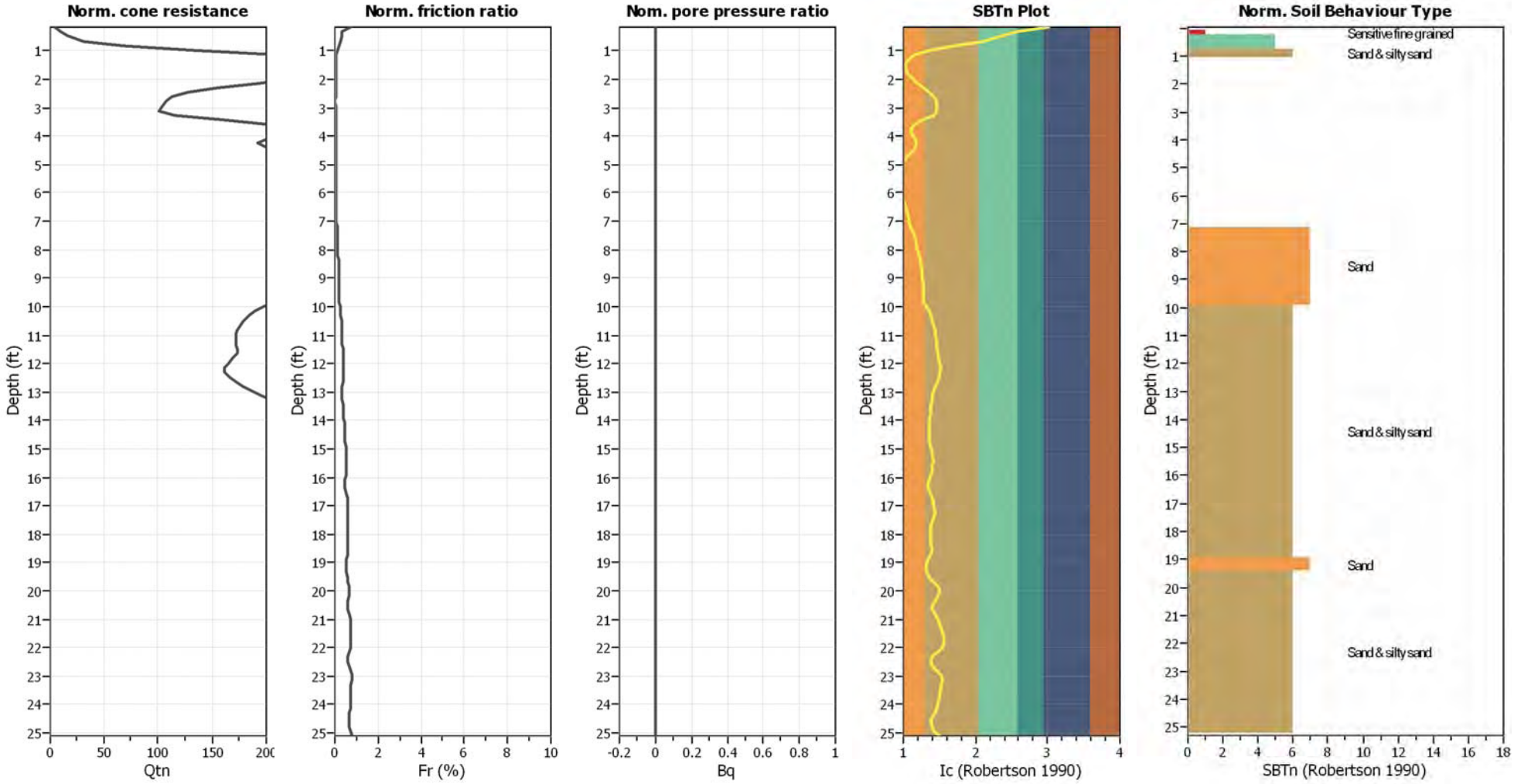
Engineer: C.AL-LAMI
Date: 7/17/2014 01:15



Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



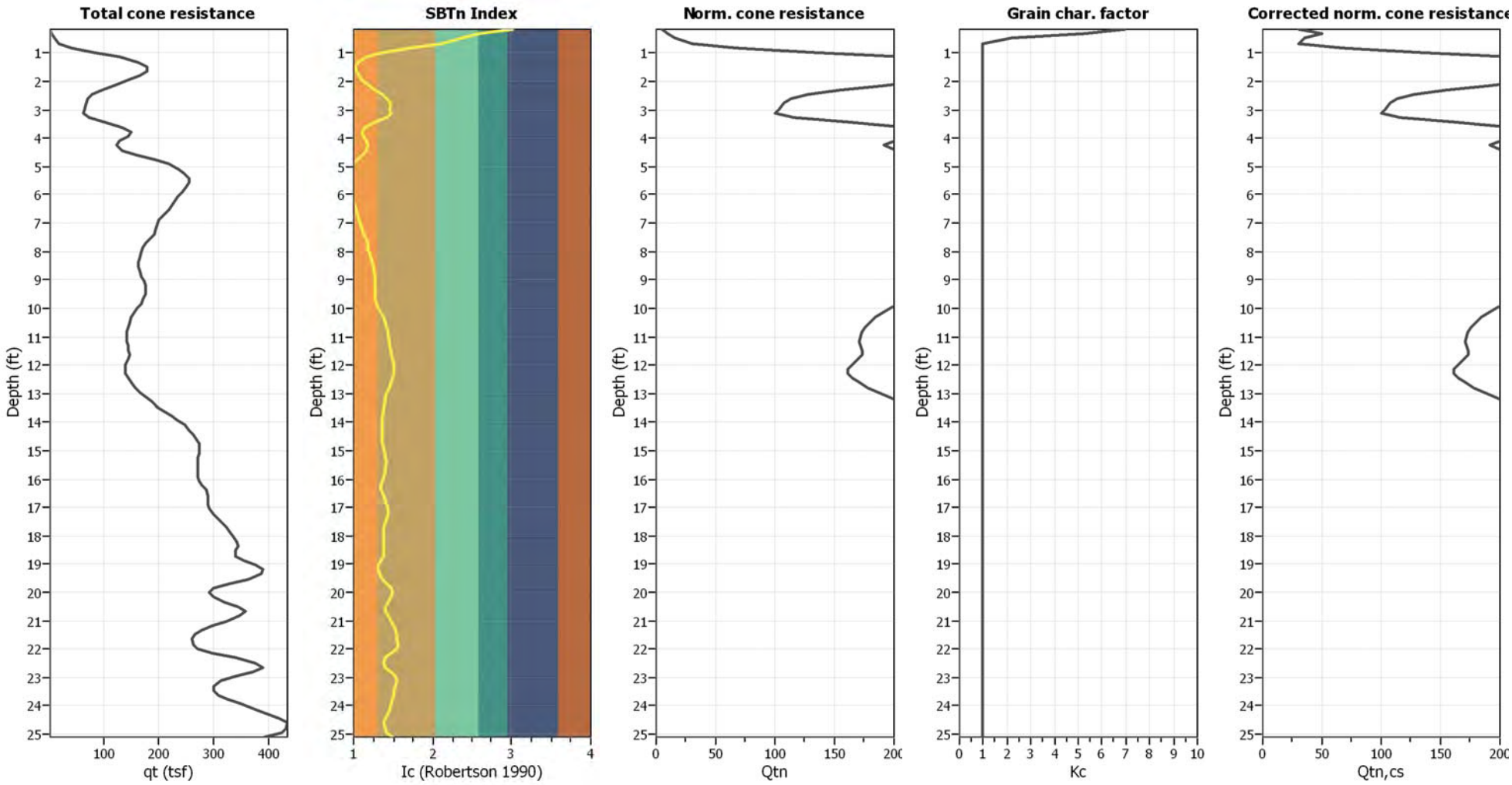
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

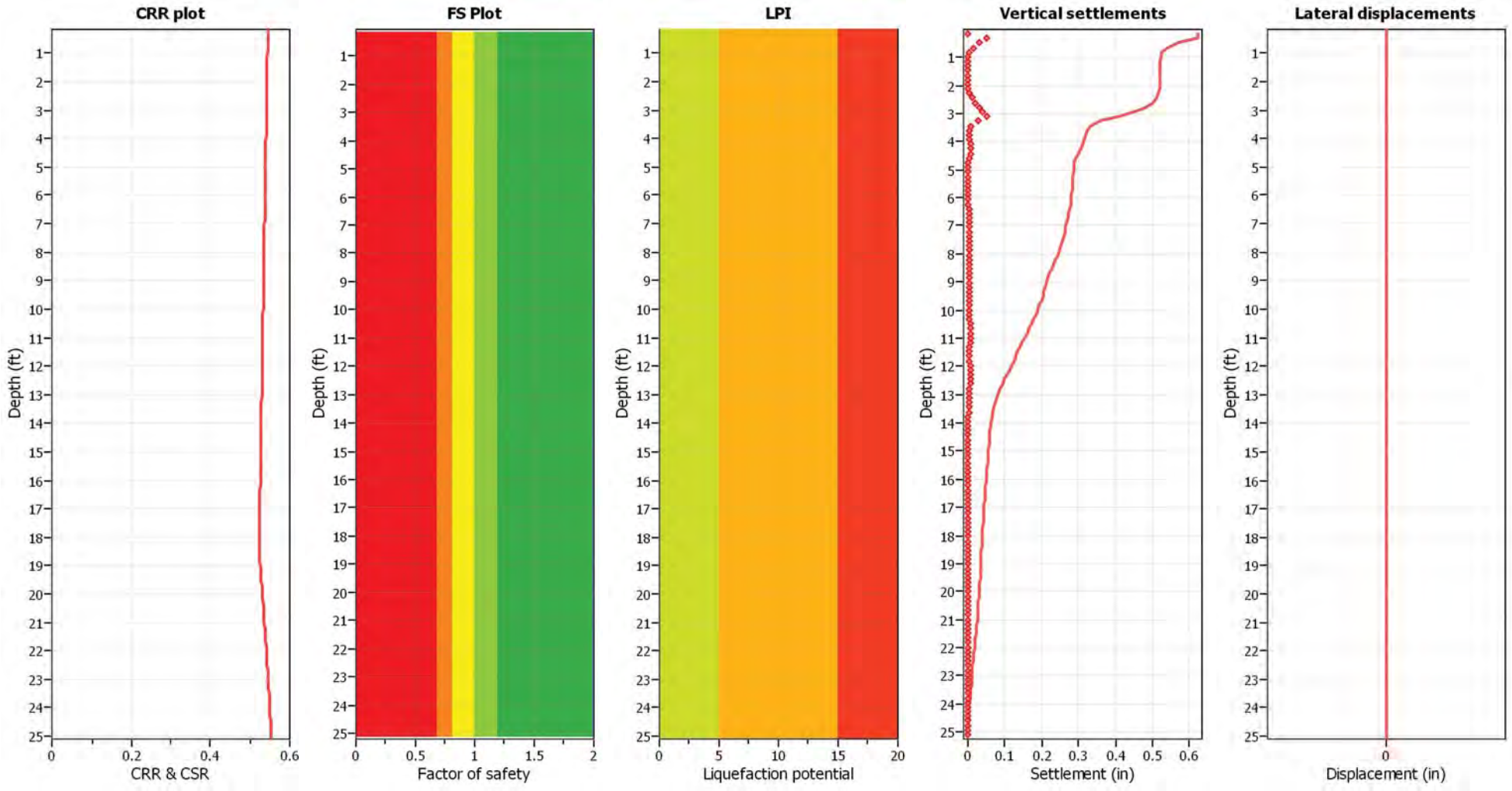
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

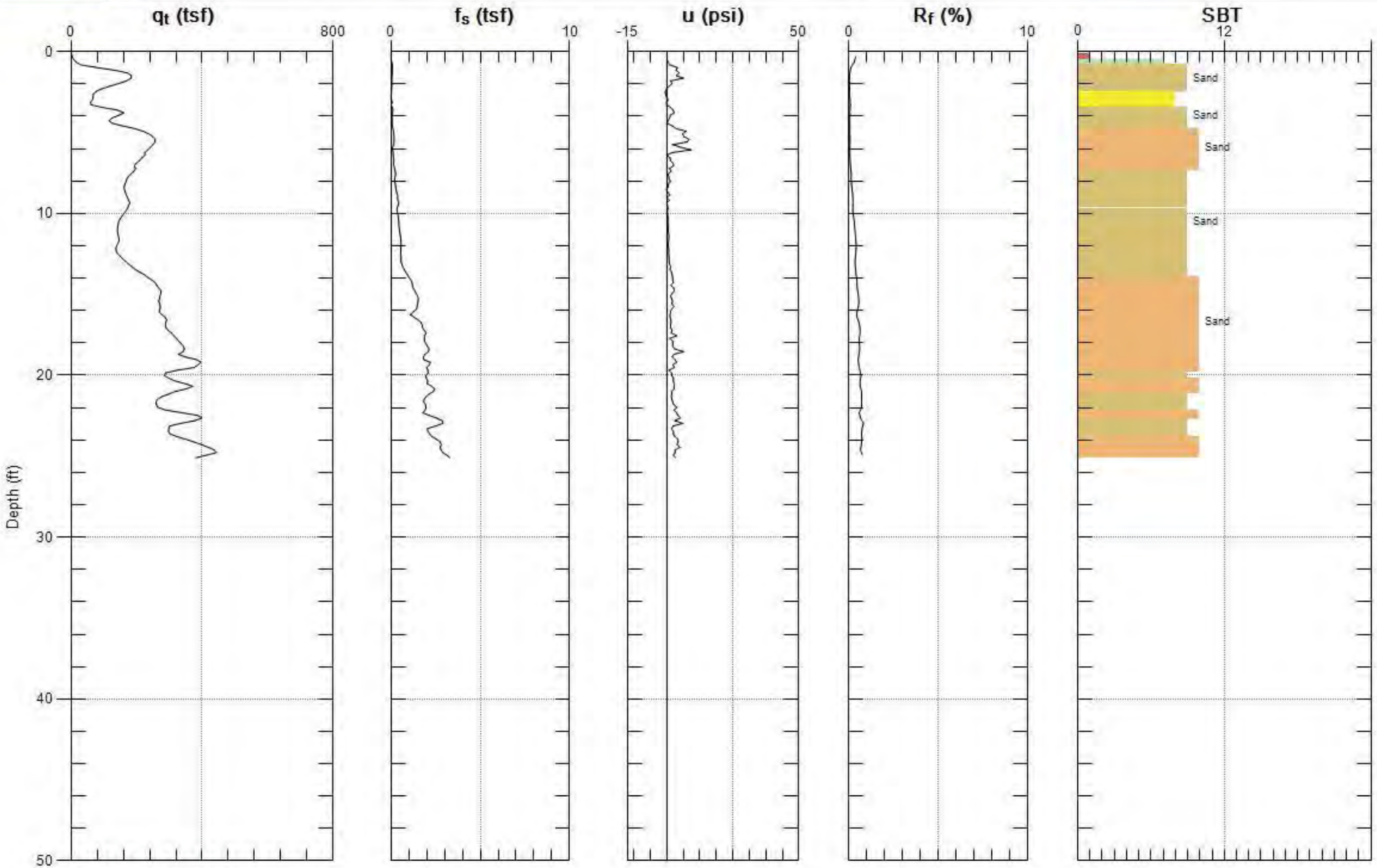
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5049

Engineer: C.AL-LAMI
Date: 7/17/2014 01:45



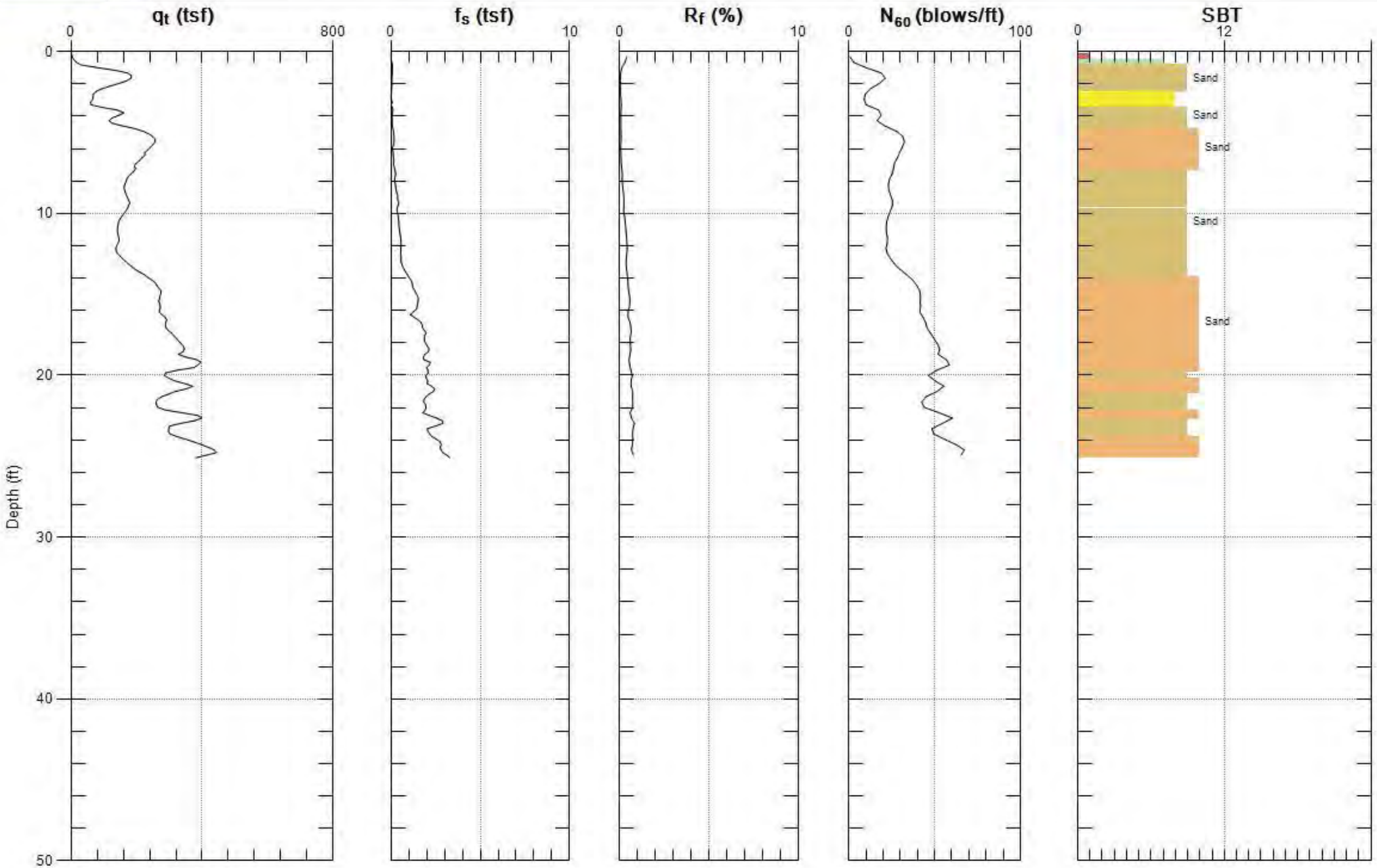
Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5049

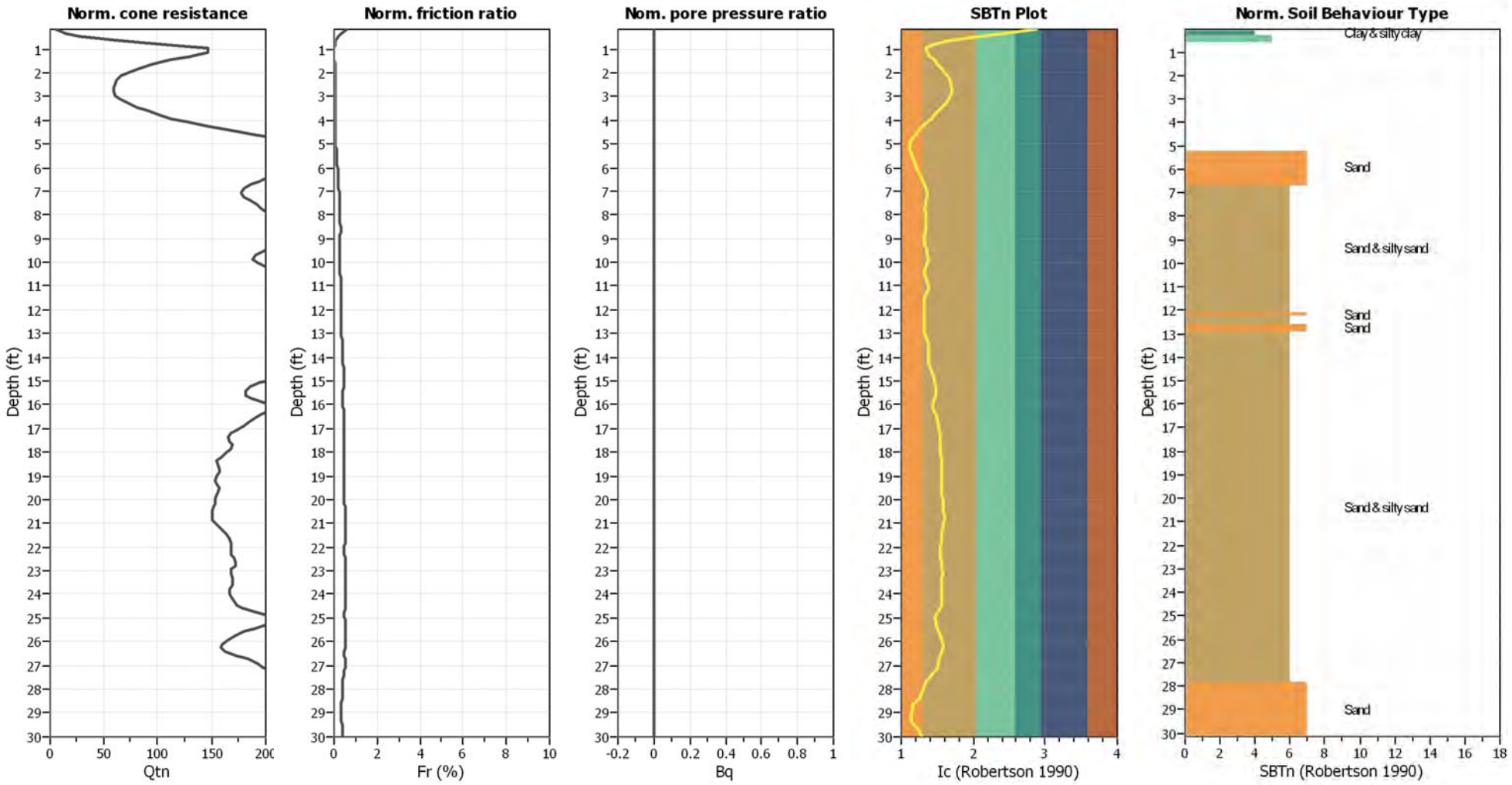
Engineer: C.AL-LAMI
Date: 7/17/2014 01:45



Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



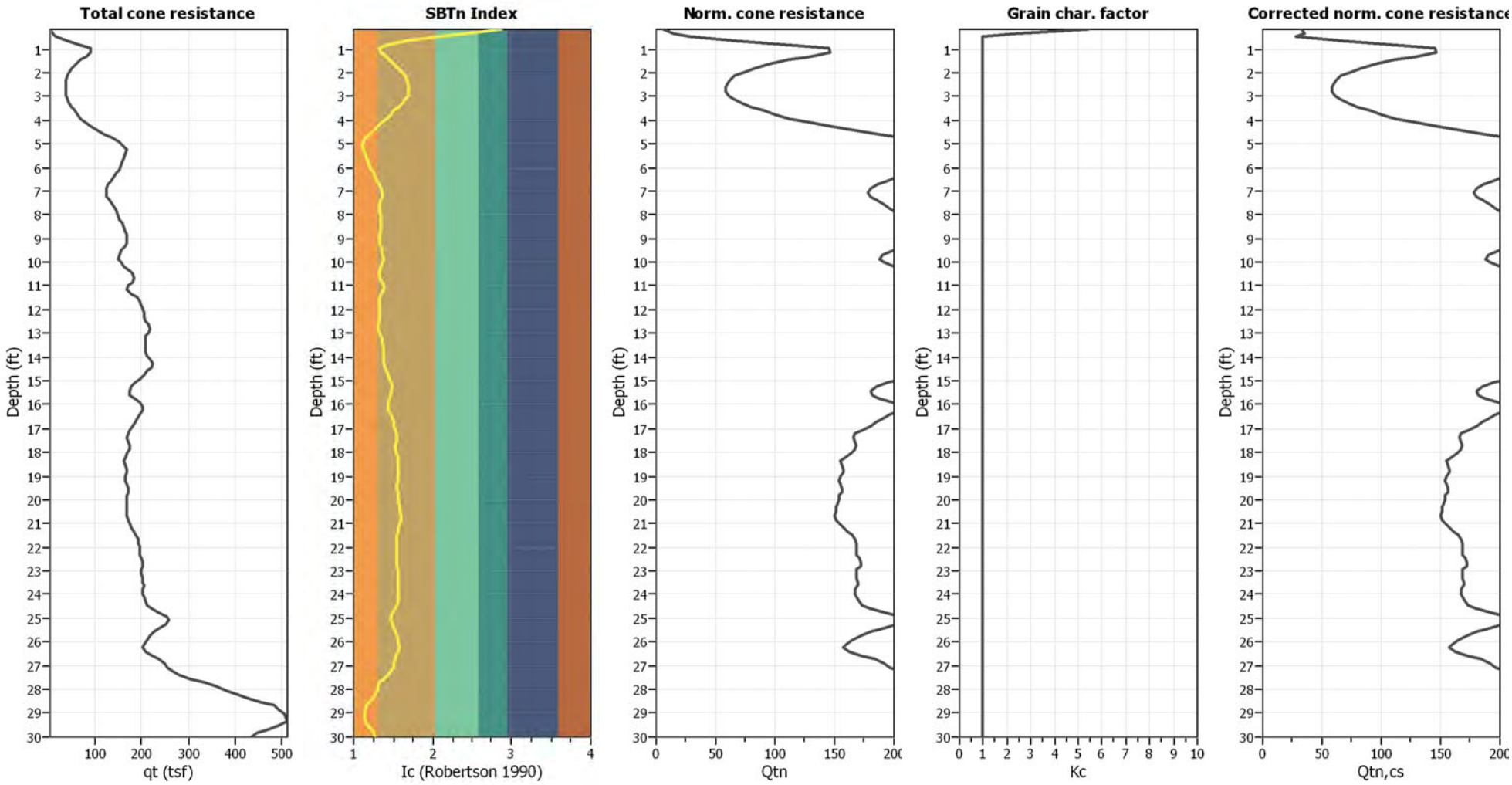
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

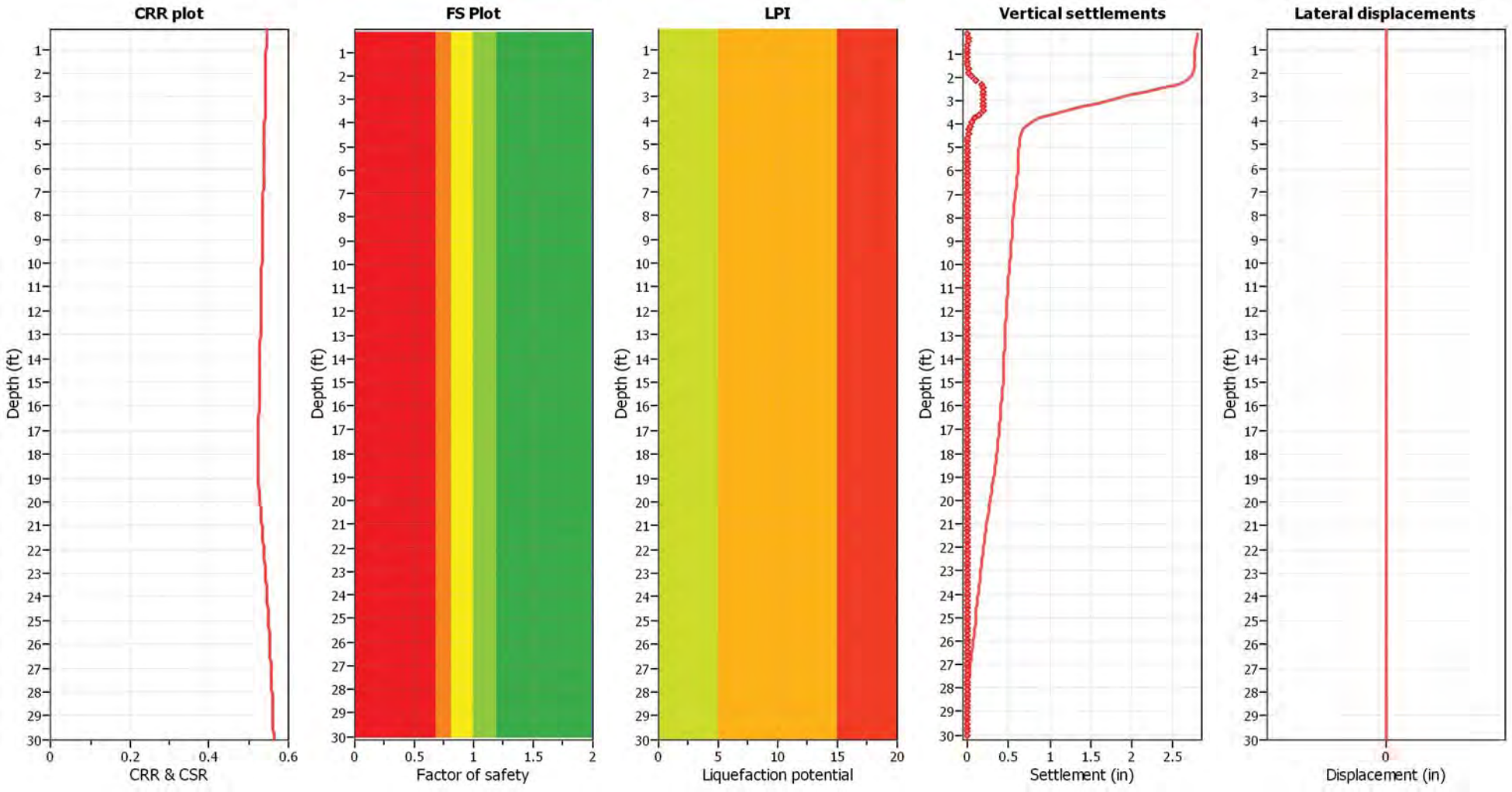
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

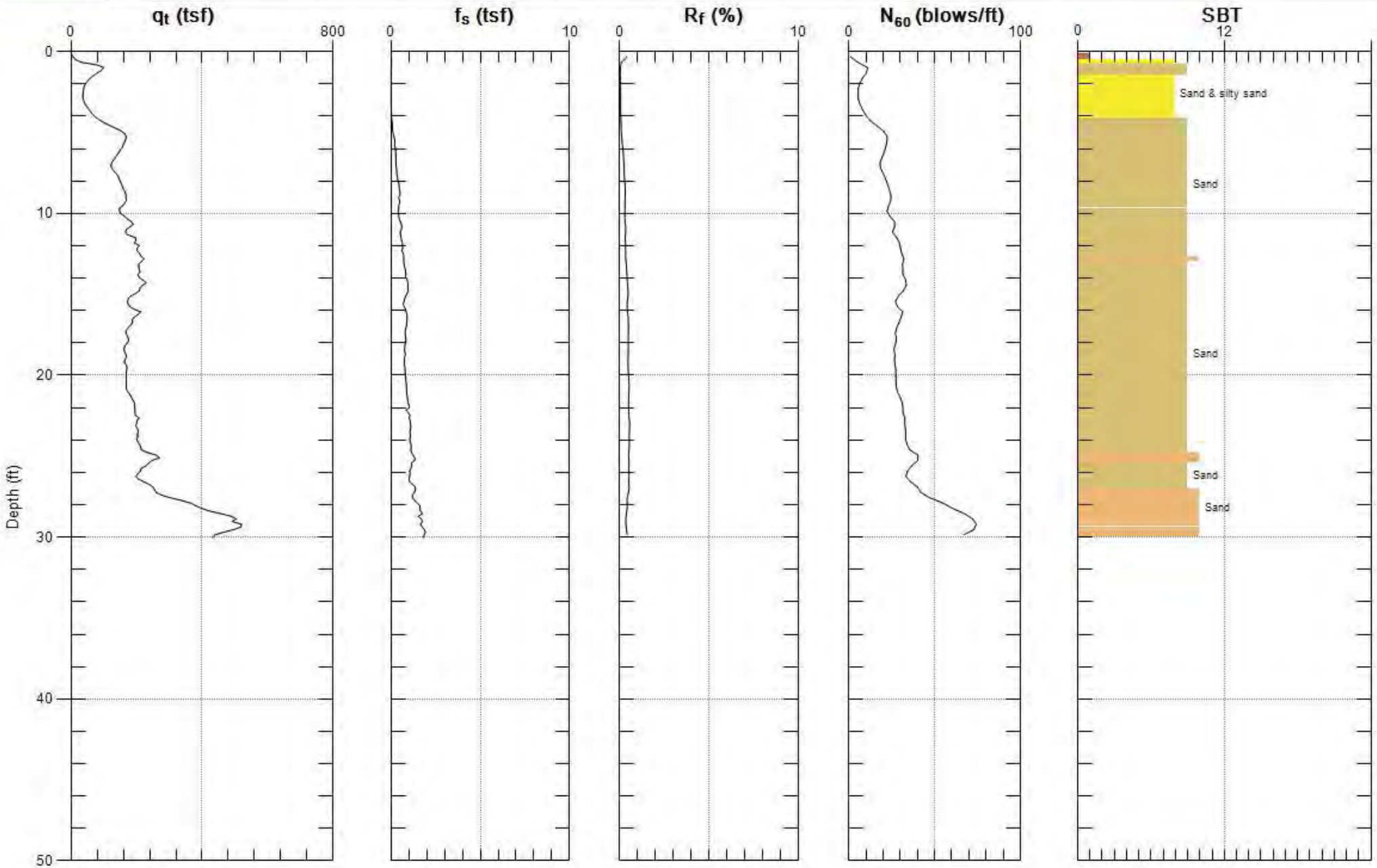
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5048

Engineer: C.AL-LAMI
Date: 7/17/2014 02:24



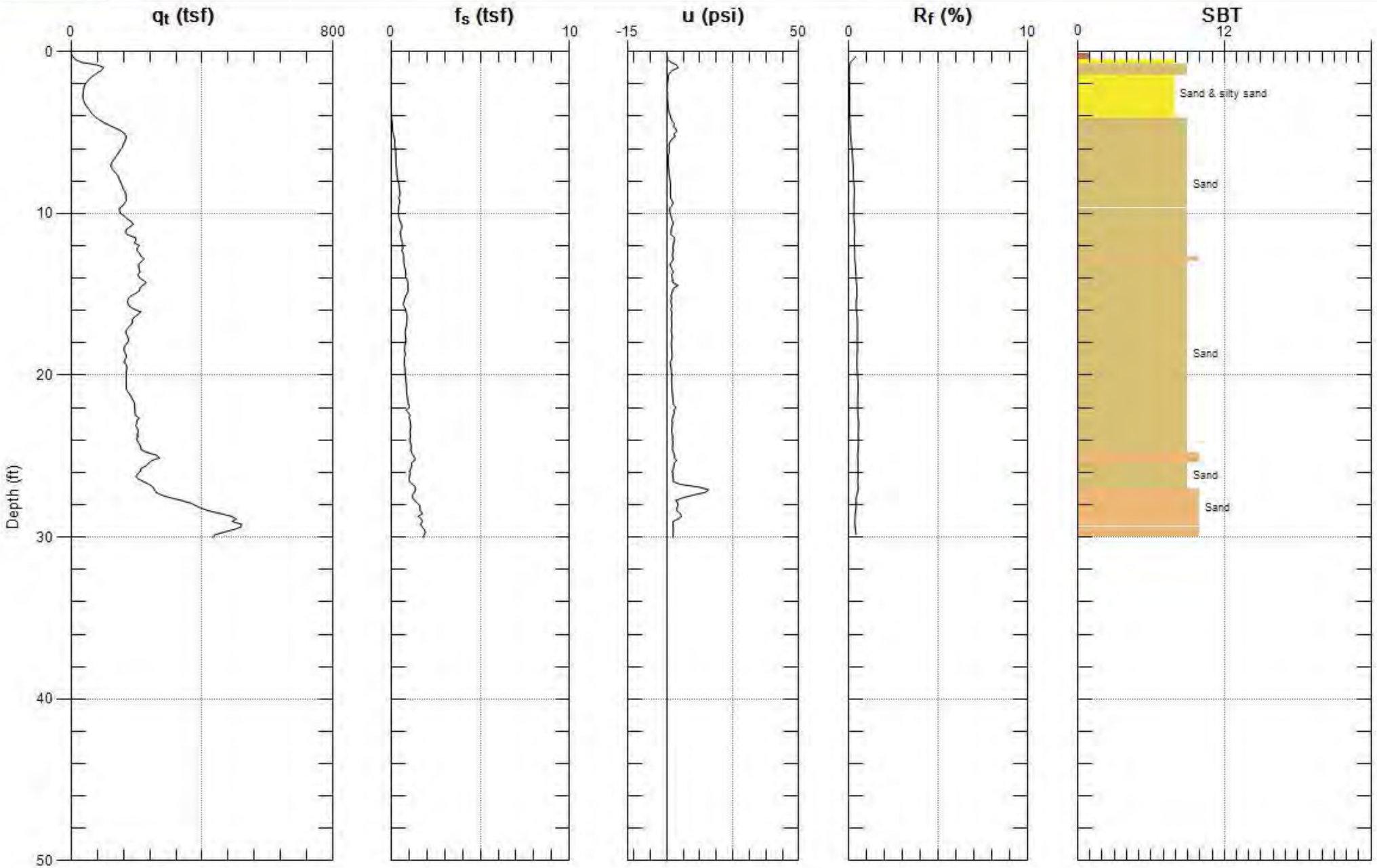
Max. Depth: 30.020 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5048

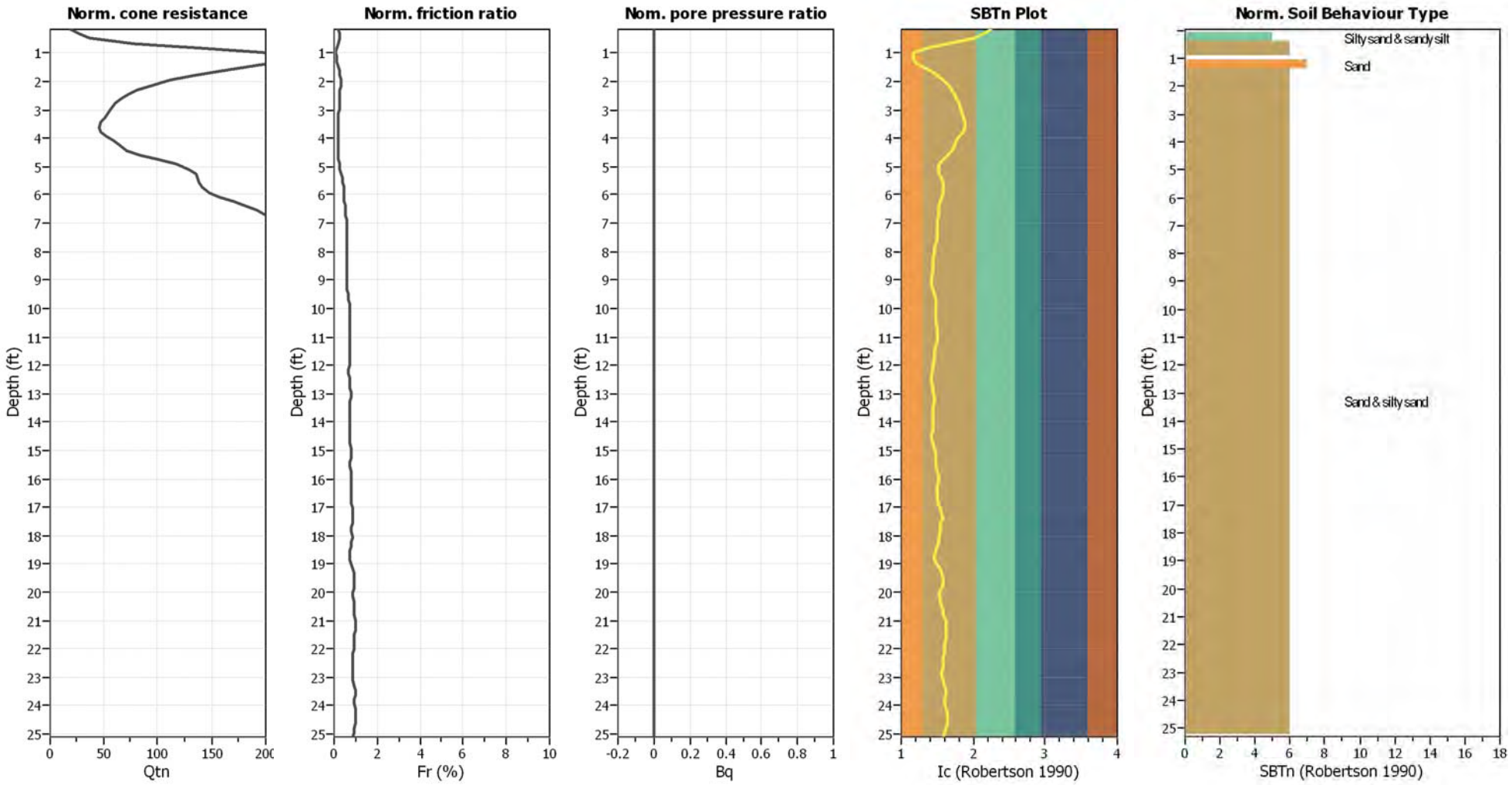
Engineer: C.AL-LAMI
Date: 7/17/2014 02:24



Max. Depth: 30.020 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



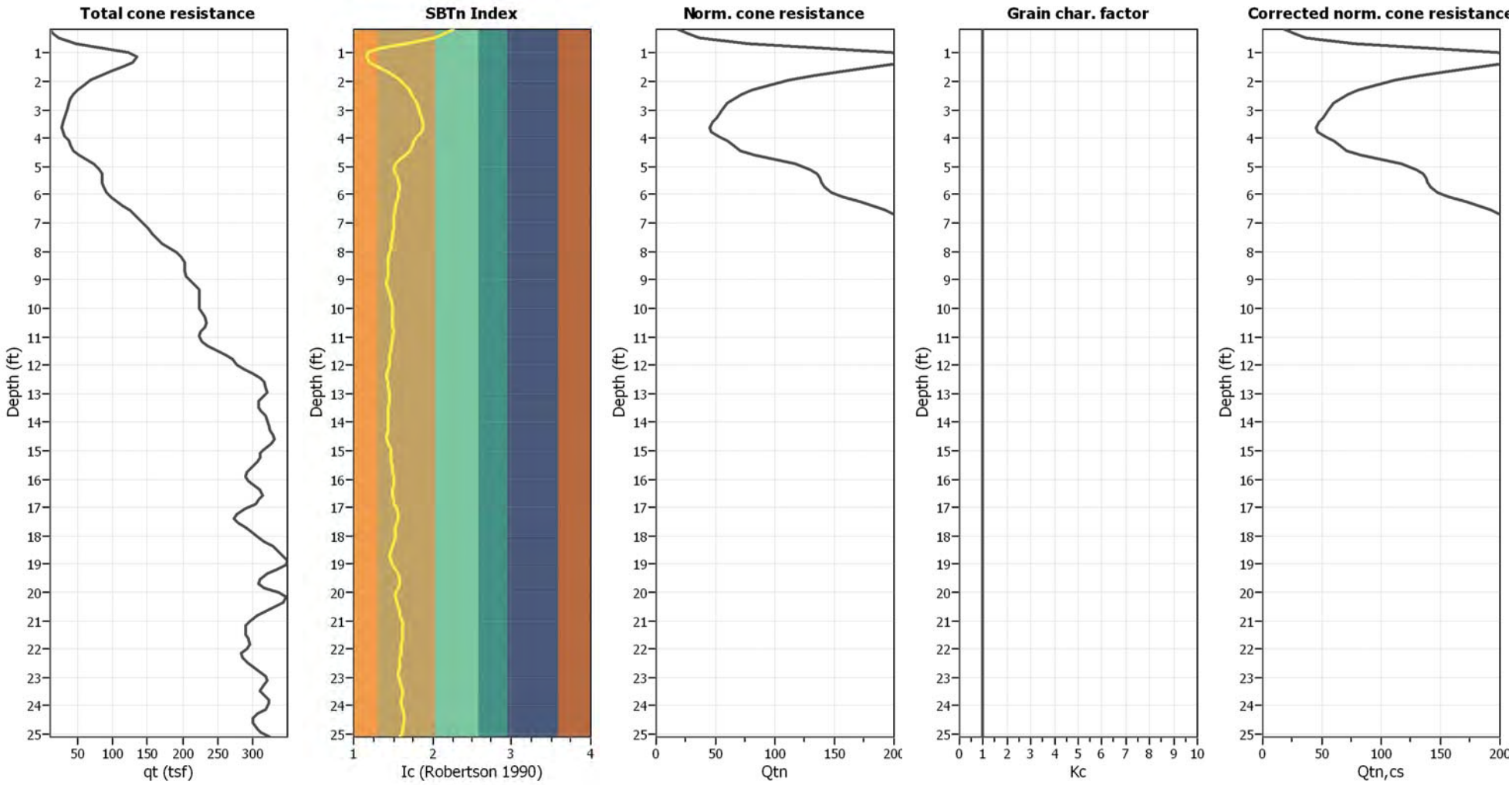
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

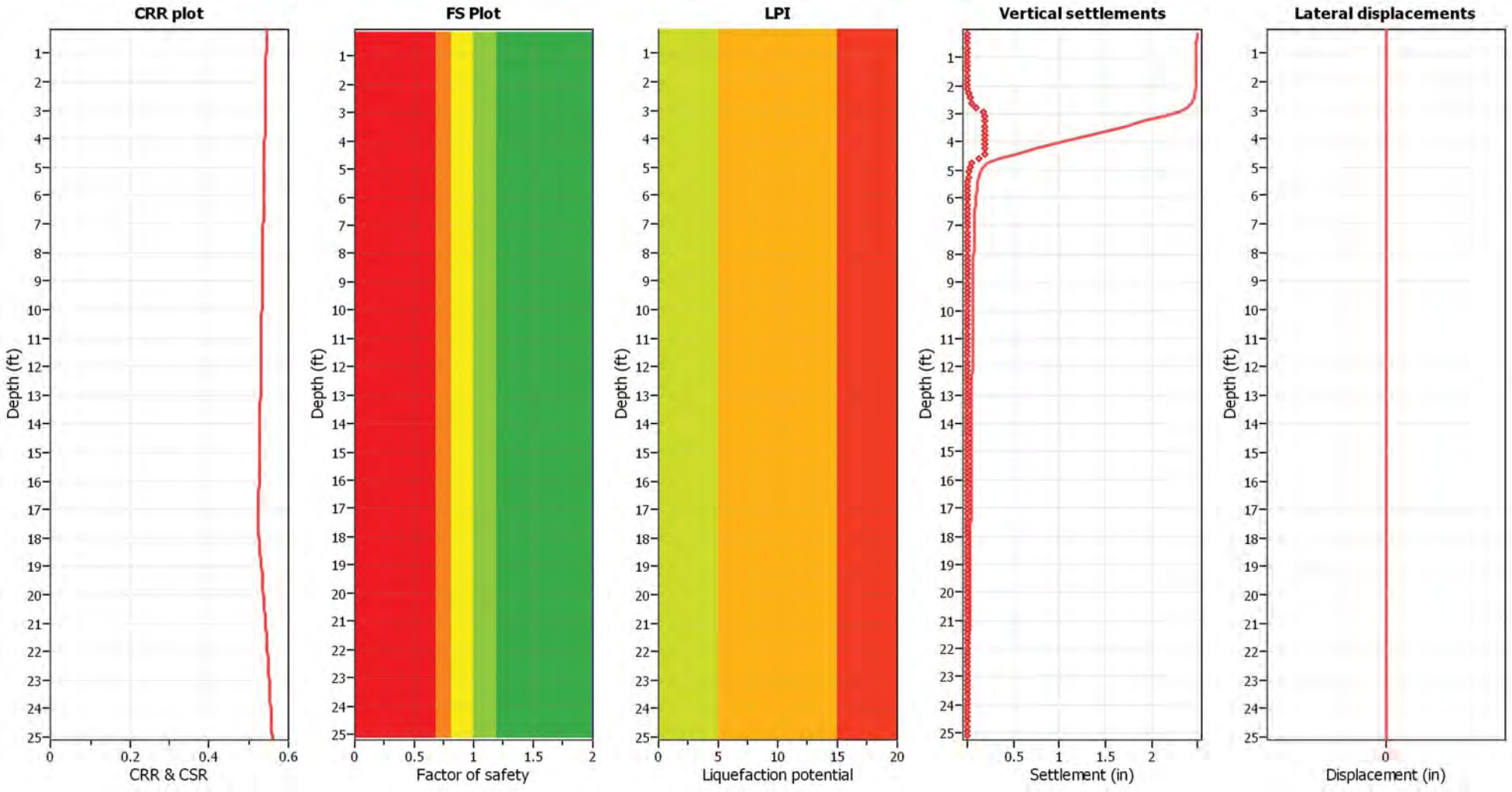
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

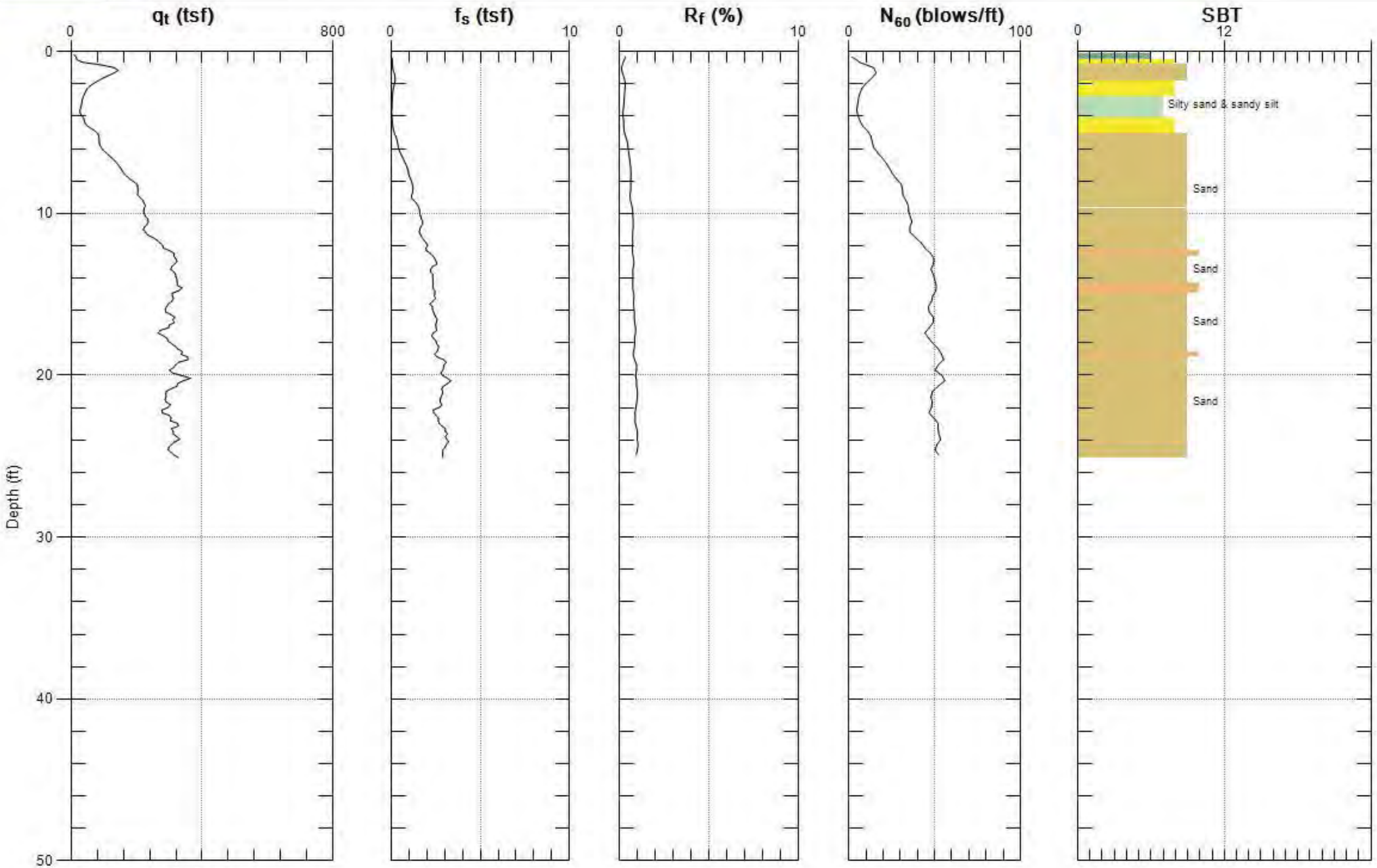
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5050

Engineer: C.AL-LAMI
Date: 7/18/2014 08:21



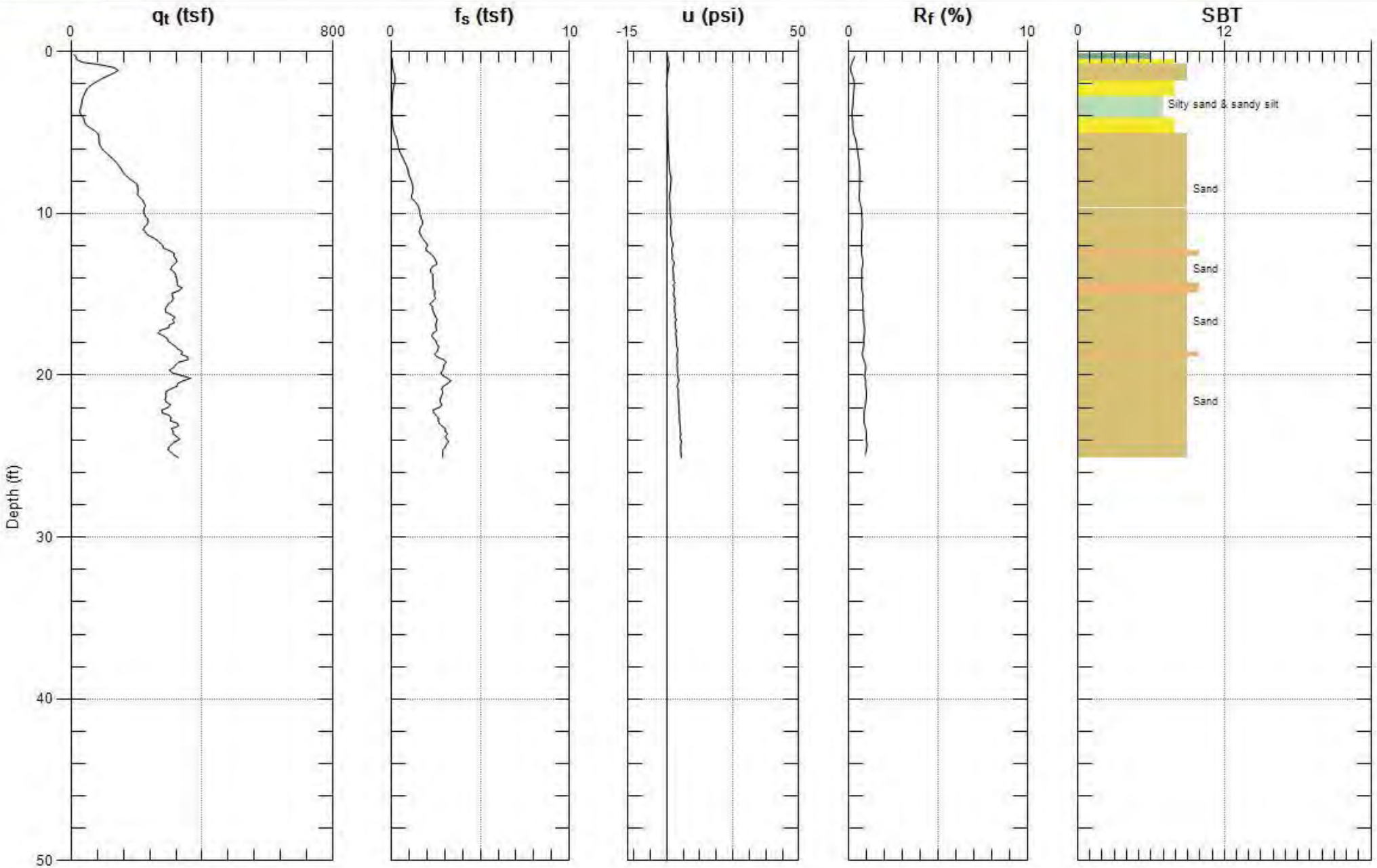
Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5050

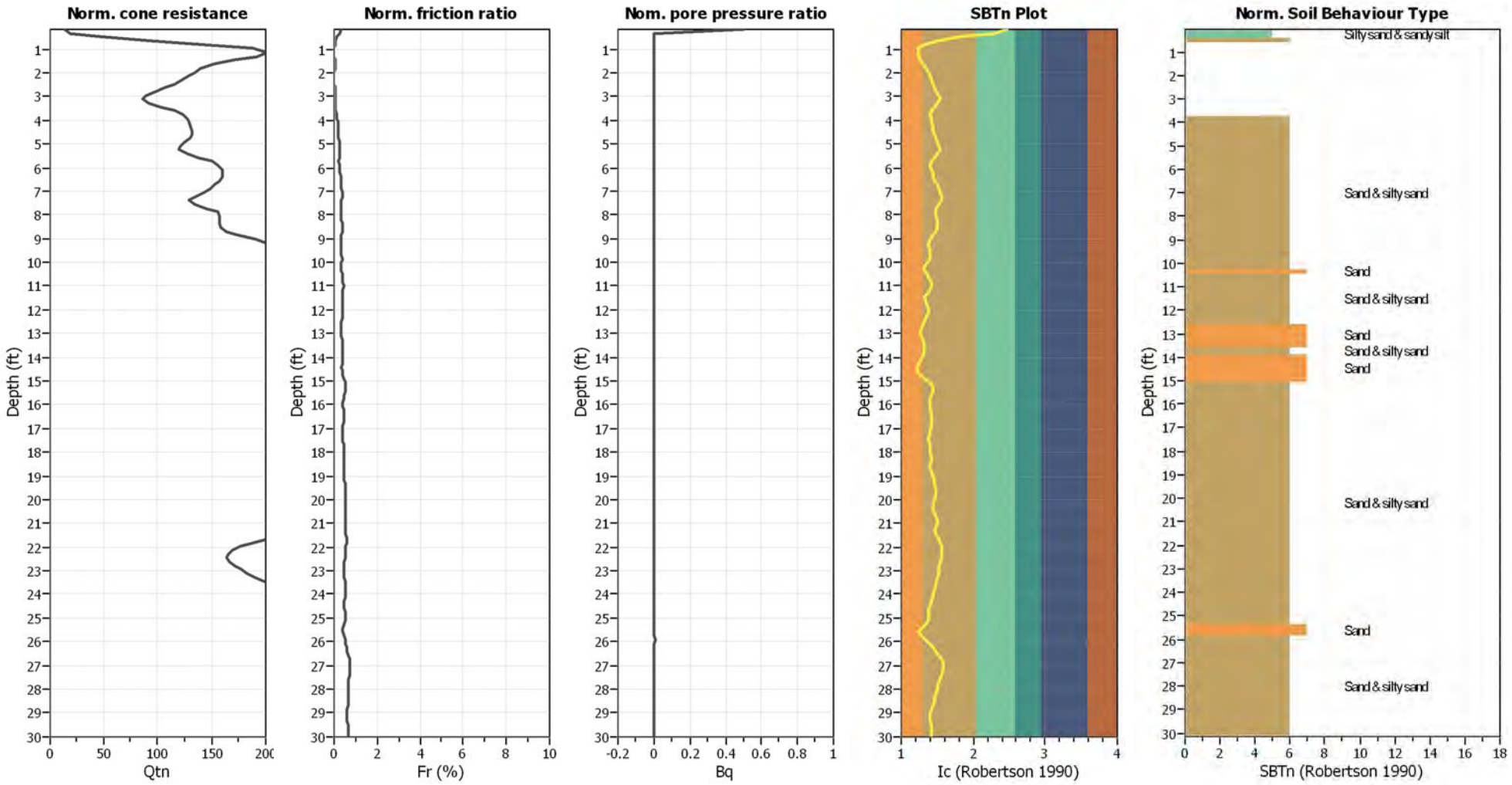
Engineer: C.AL-LAMI
Date: 7/18/2014 08:21



Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



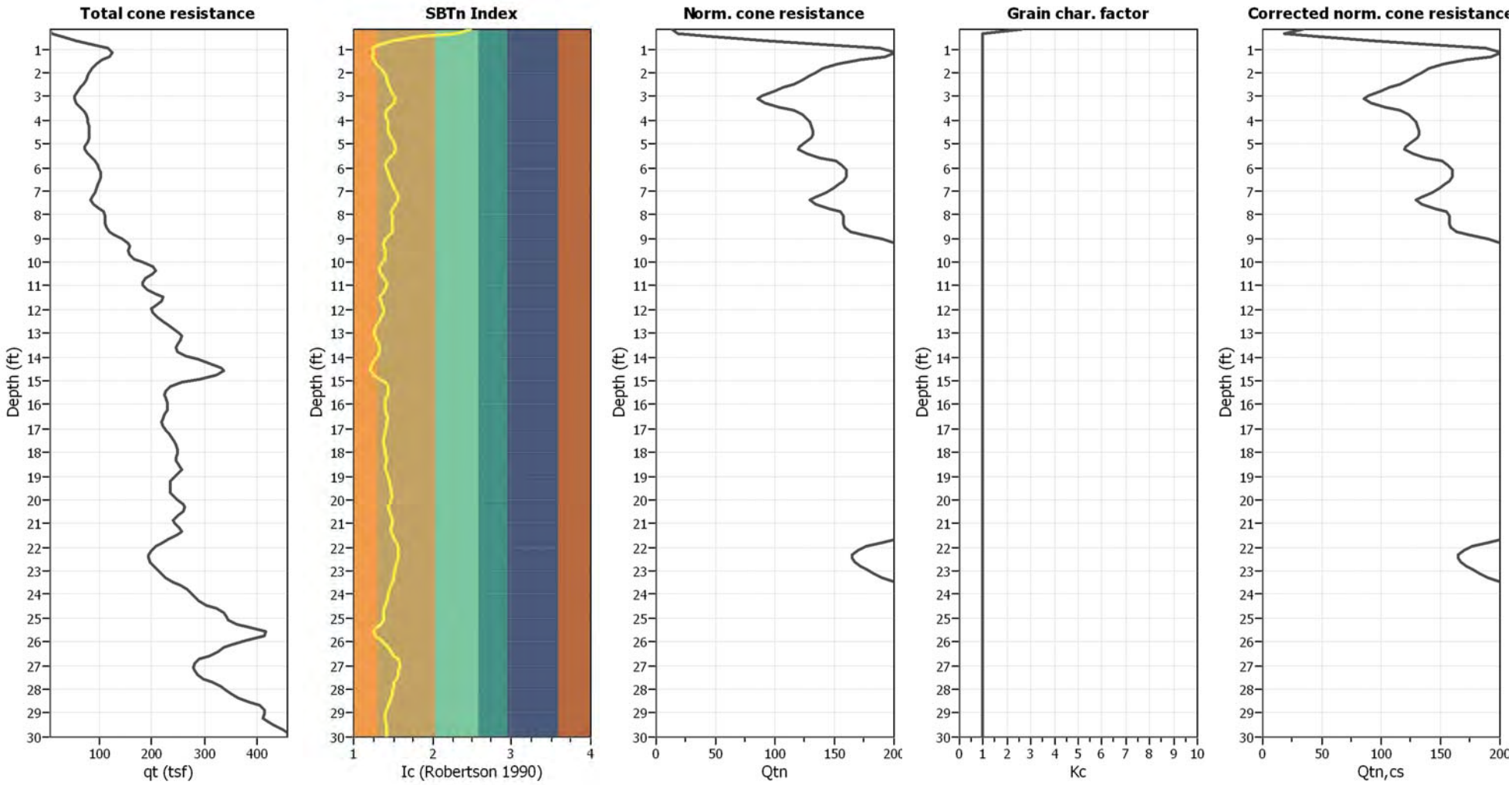
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

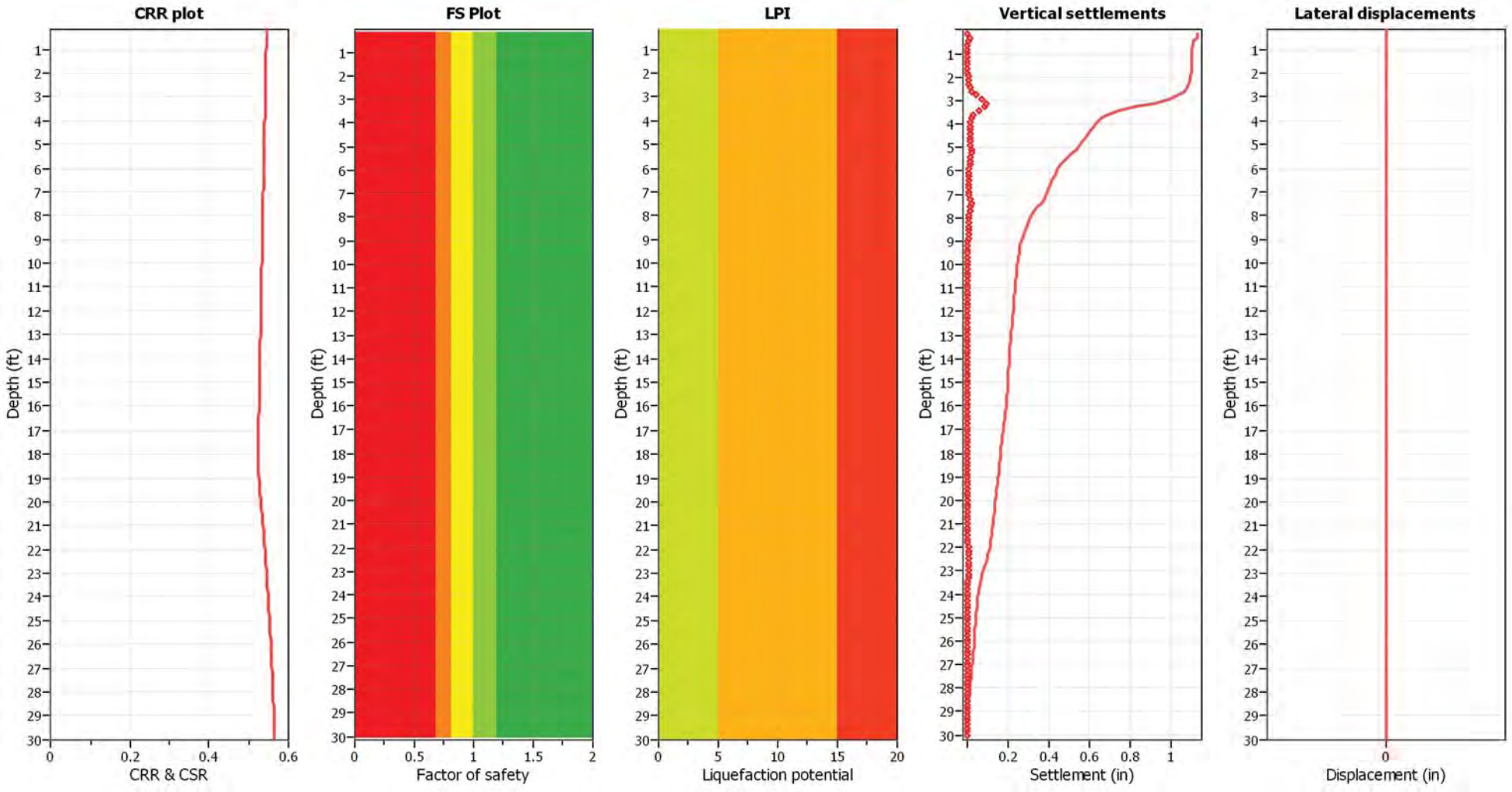
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

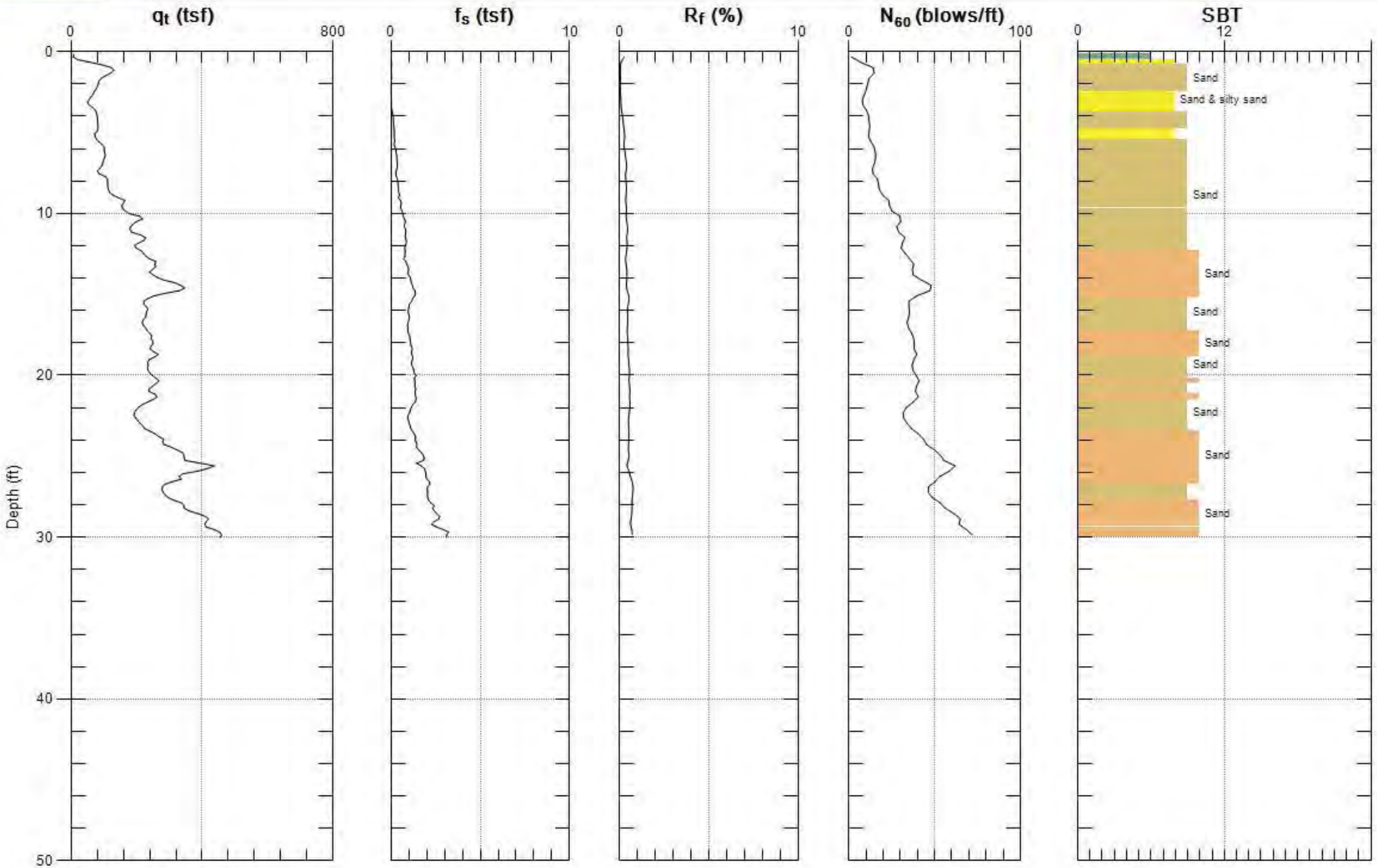
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5047

Engineer: C.AL-LAMI
Date: 7/17/2014 03:05



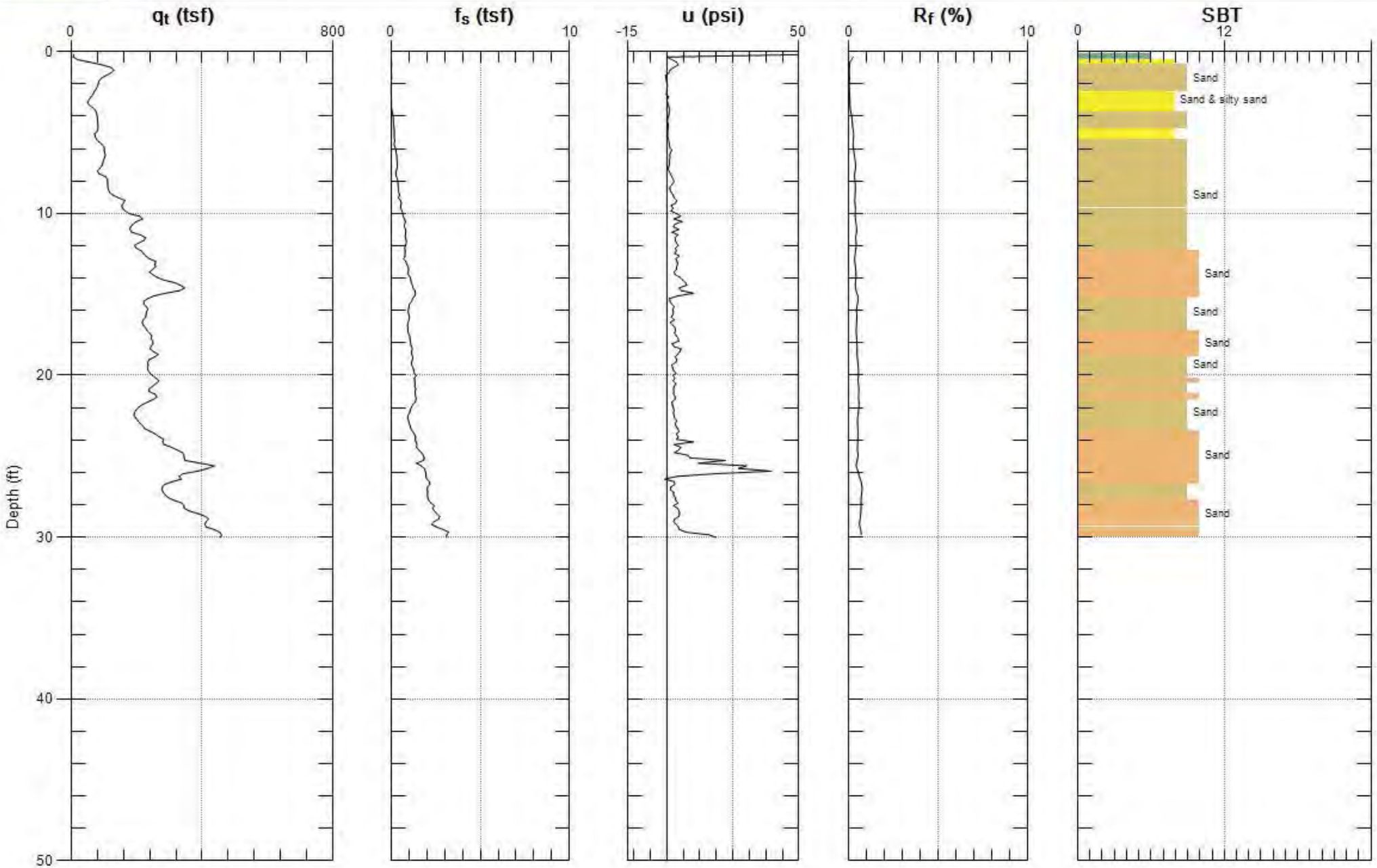
Max. Depth: 30.020 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5047

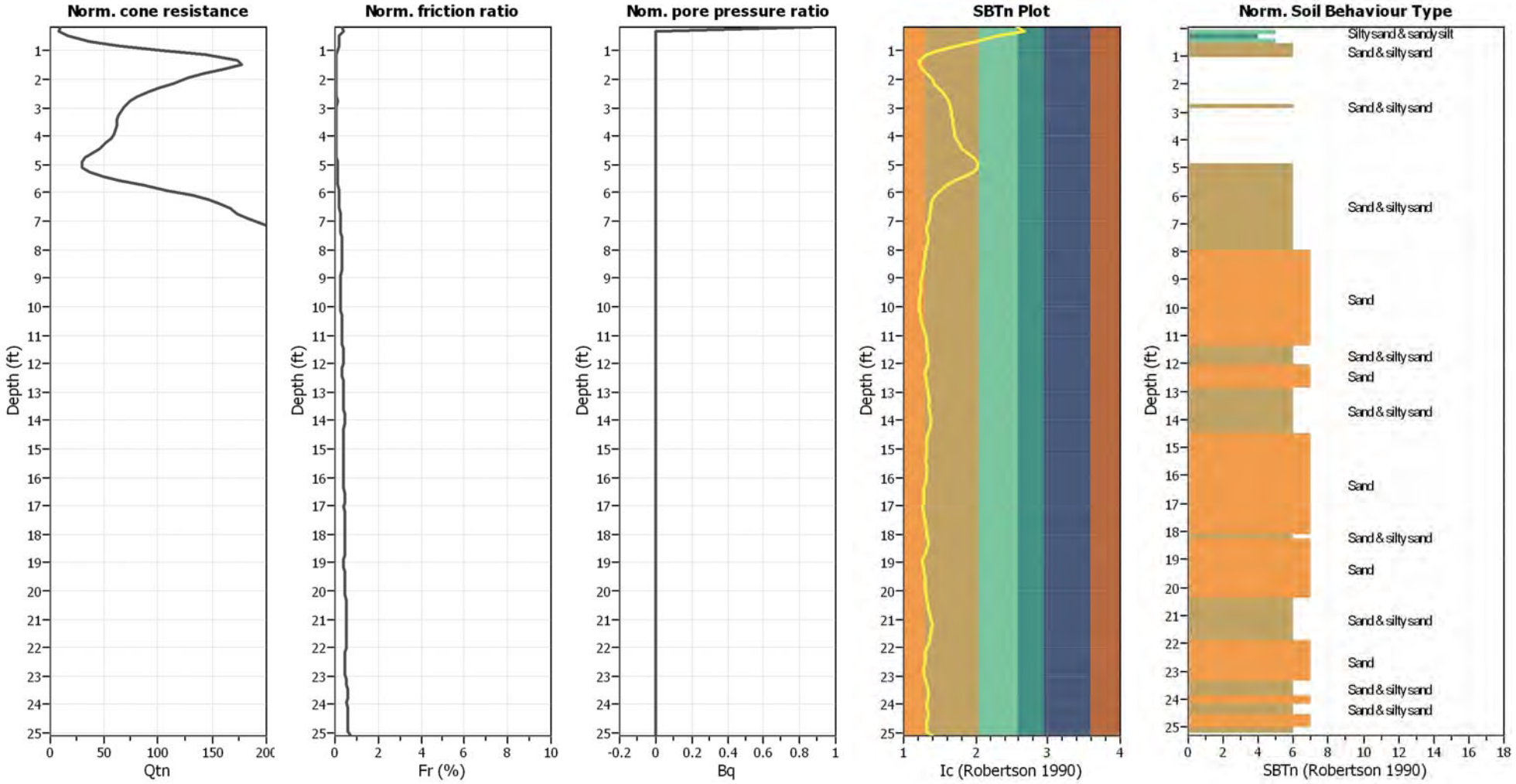
Engineer: C.AL-LAMI
Date: 7/17/2014 03:05



Max. Depth: 30.020 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



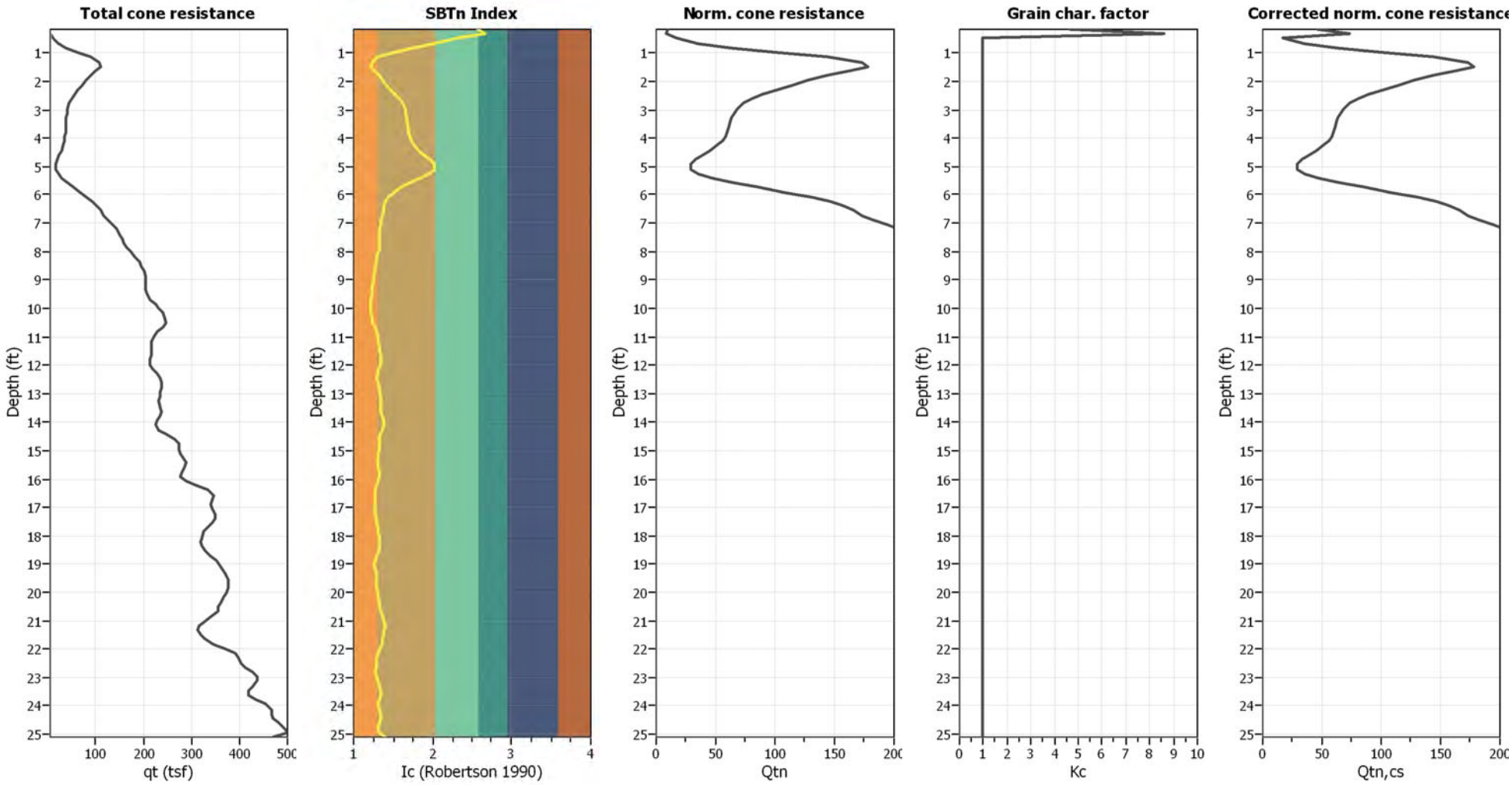
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

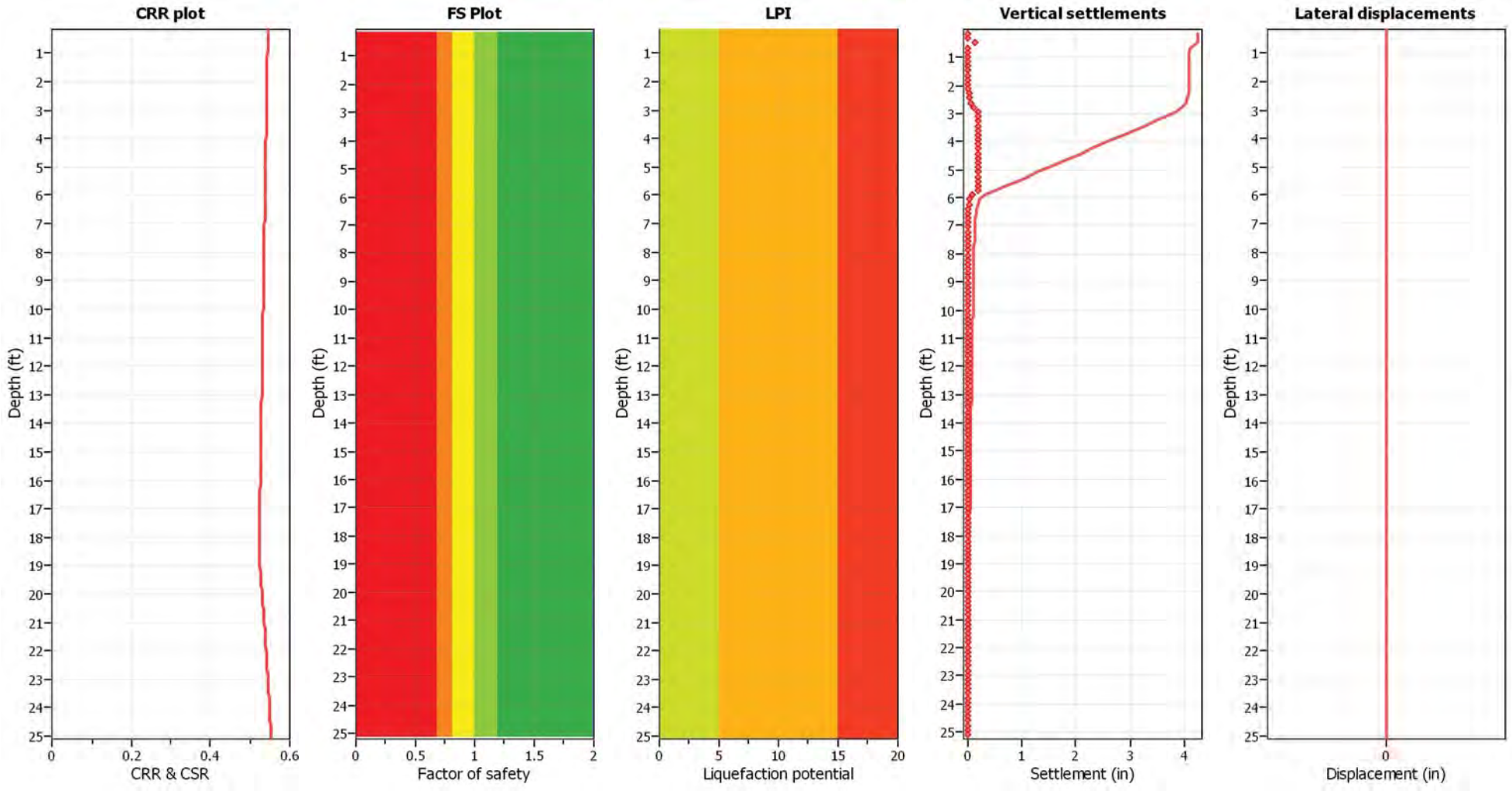
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

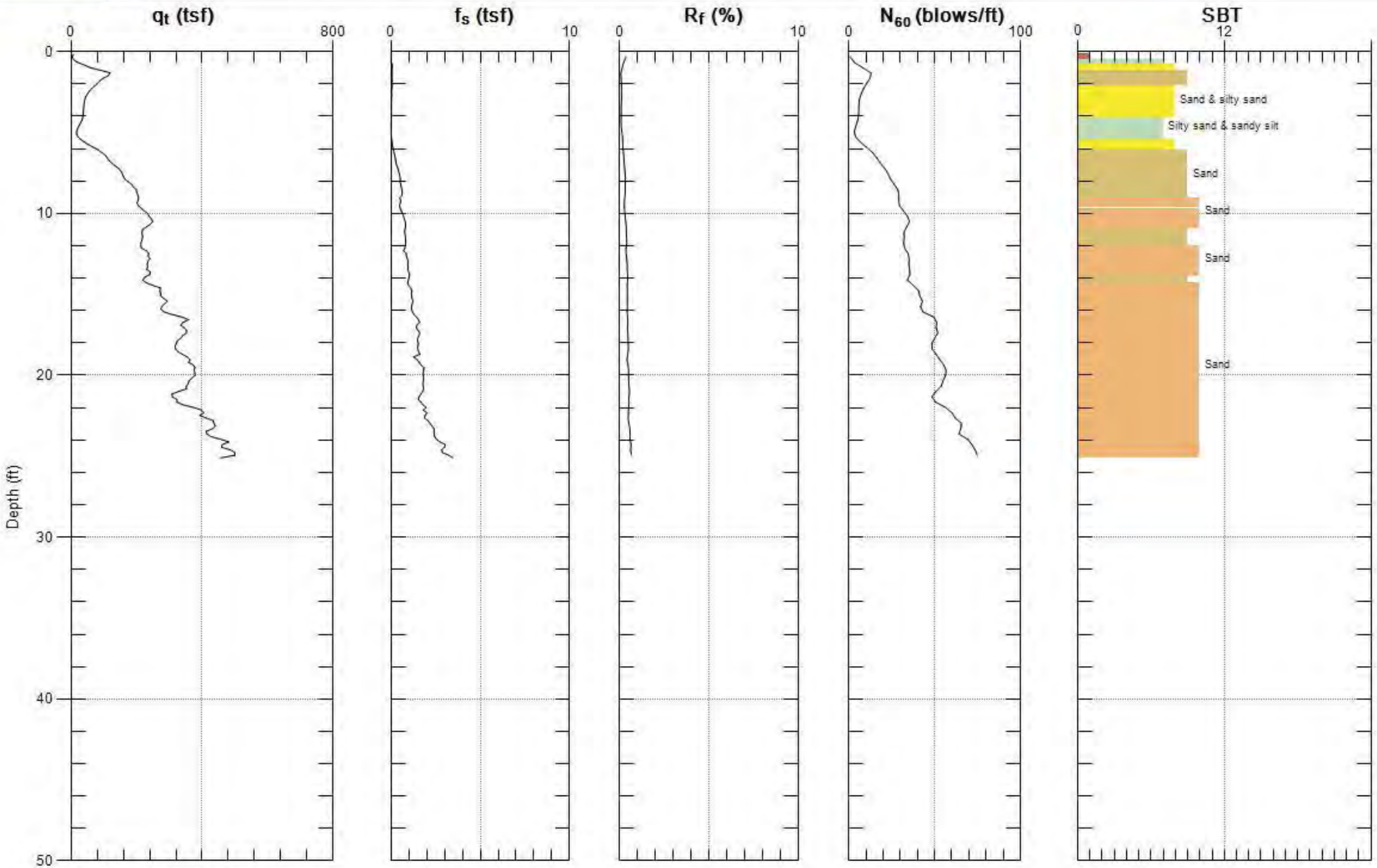
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5031

Engineer: C.AL-LAMI
Date: 7/17/2014 10:27



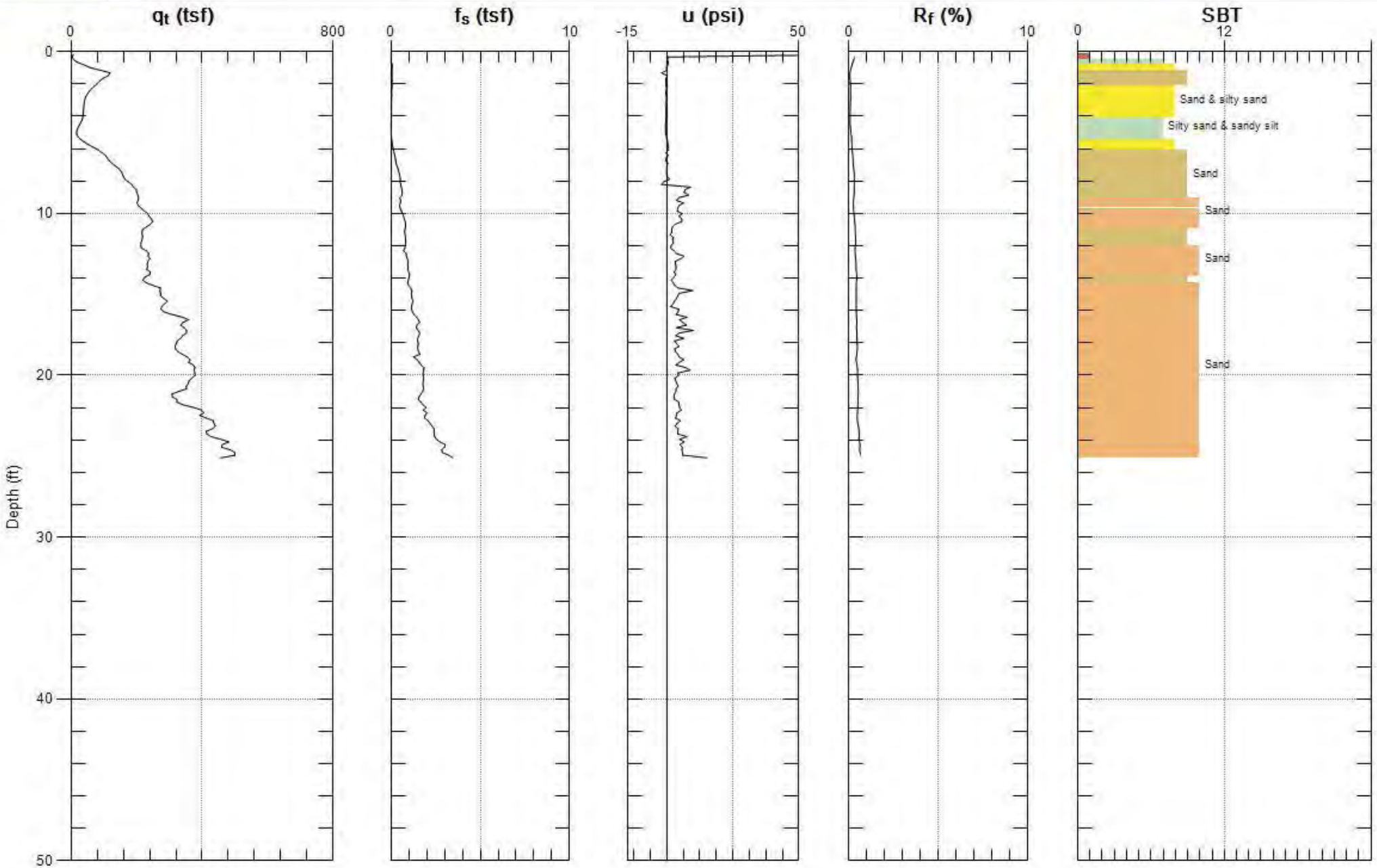
Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5031

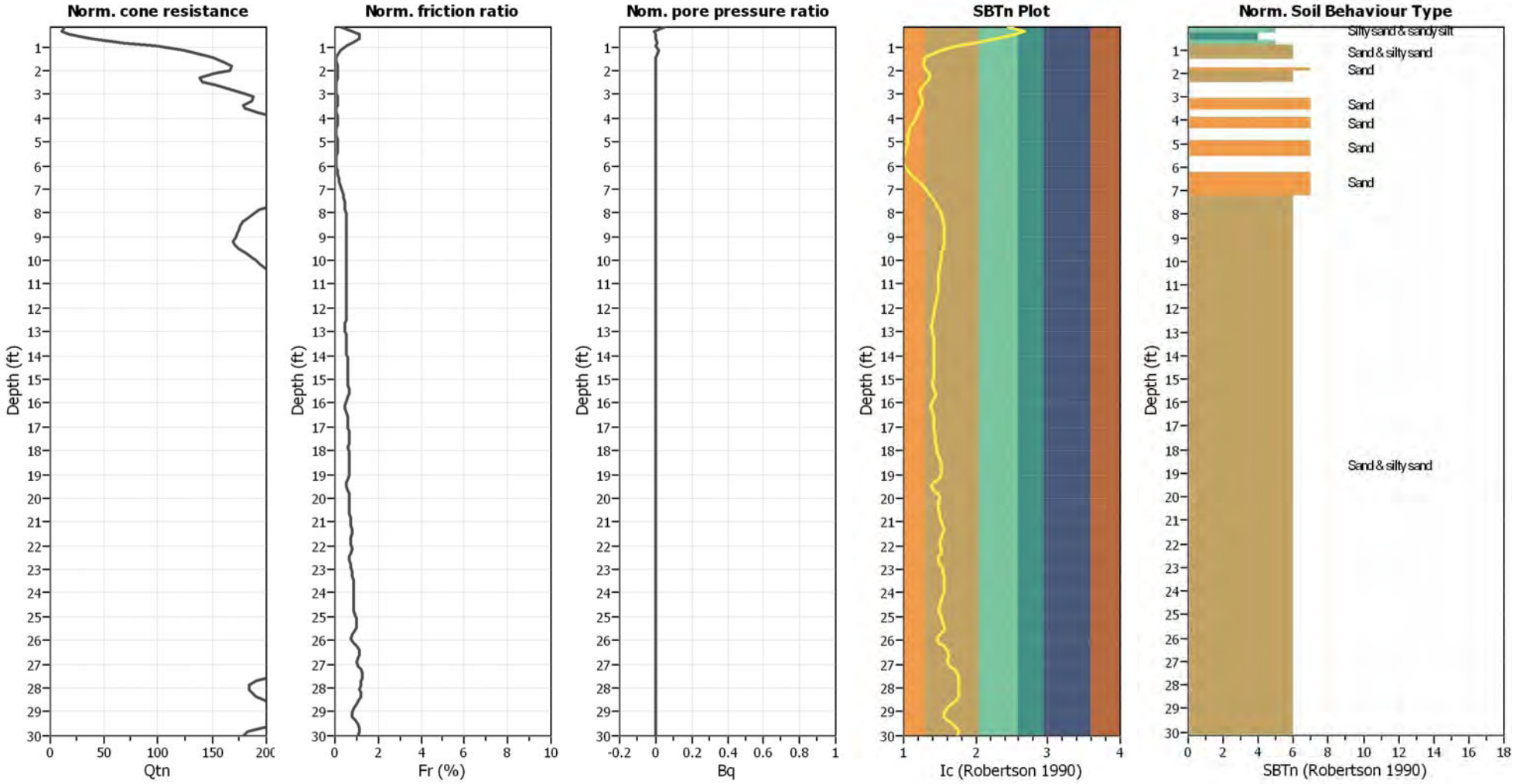
Engineer: C.AL-LAMI
Date: 7/17/2014 10:27



Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



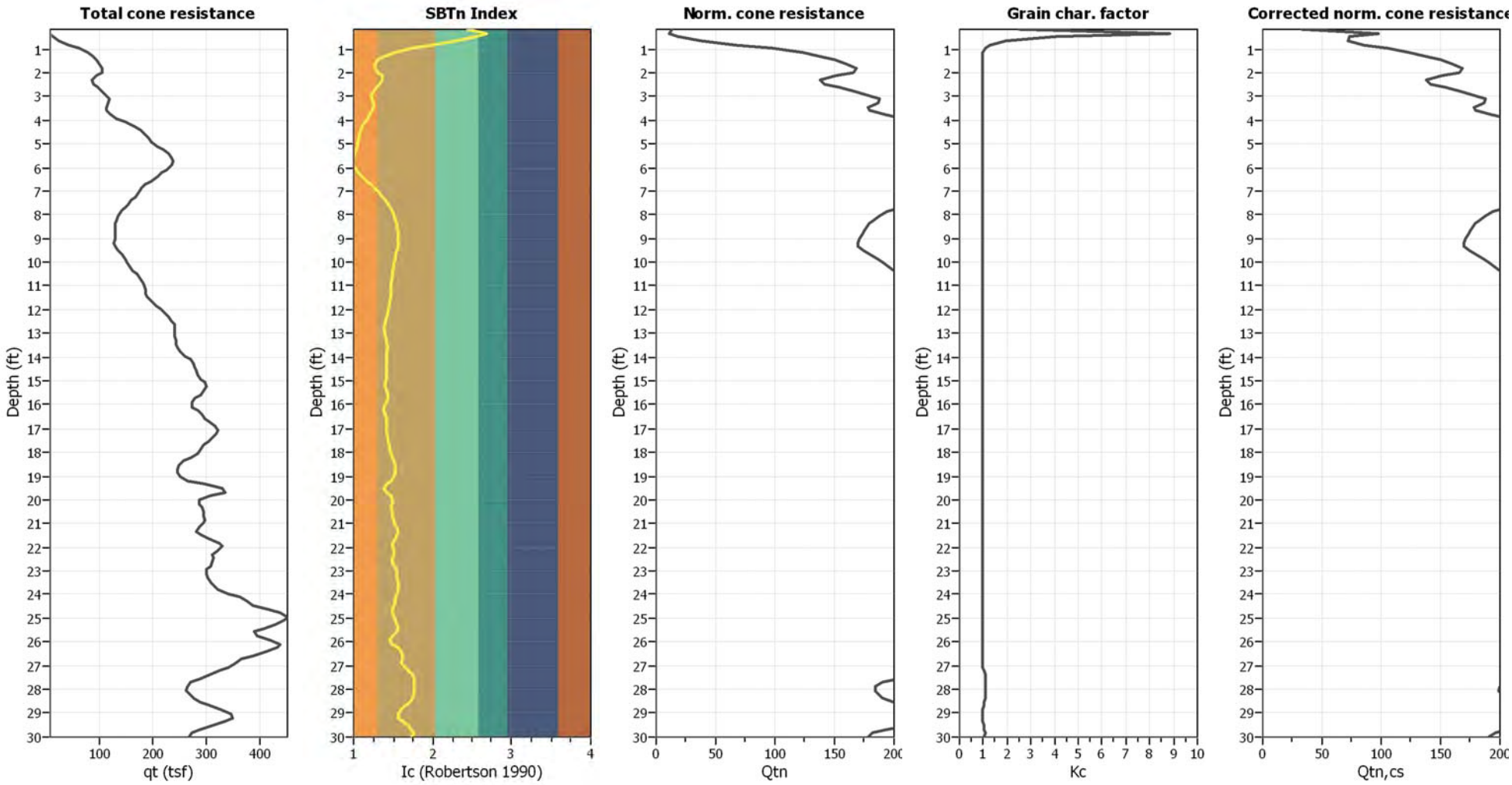
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

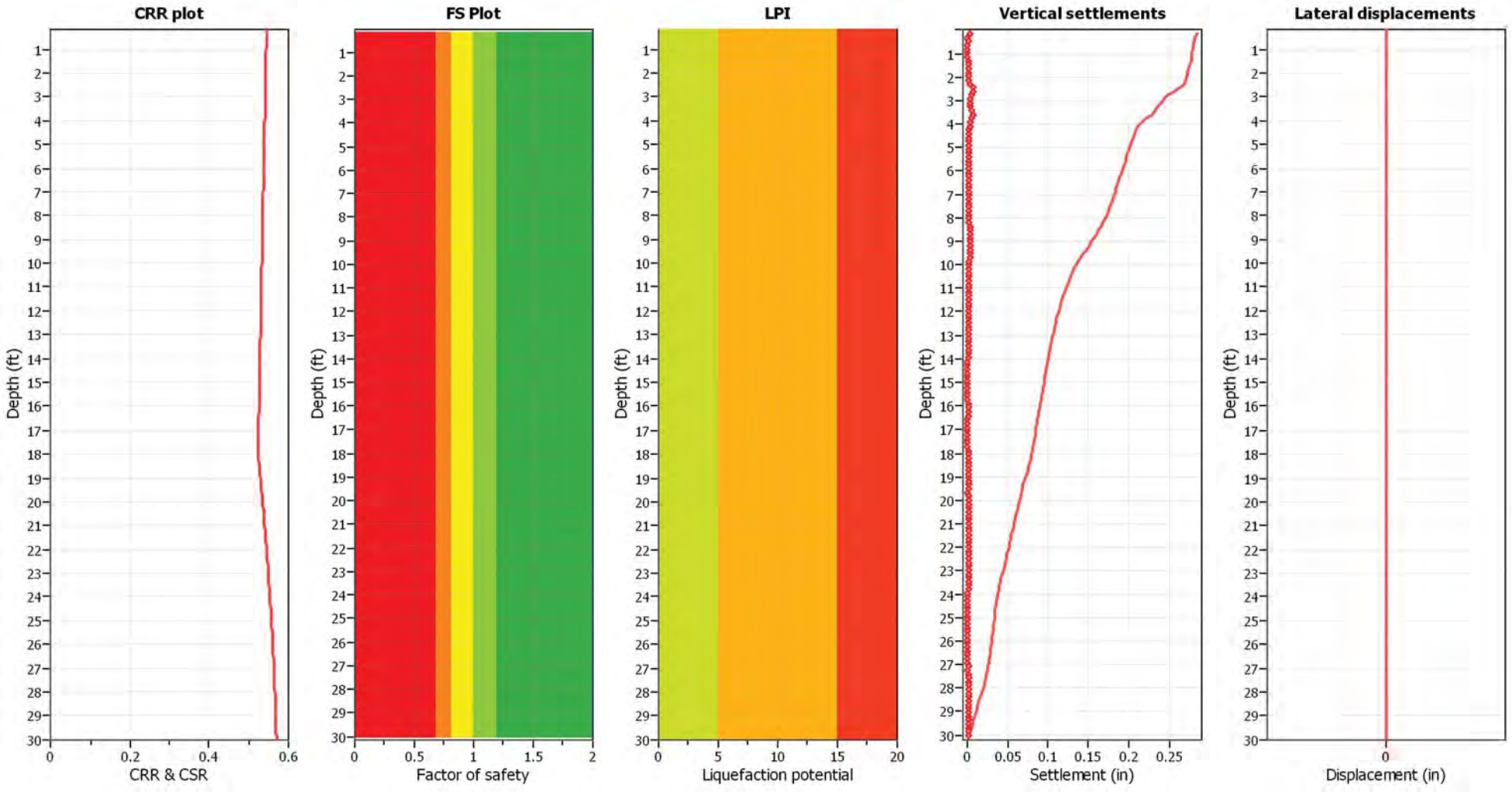
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

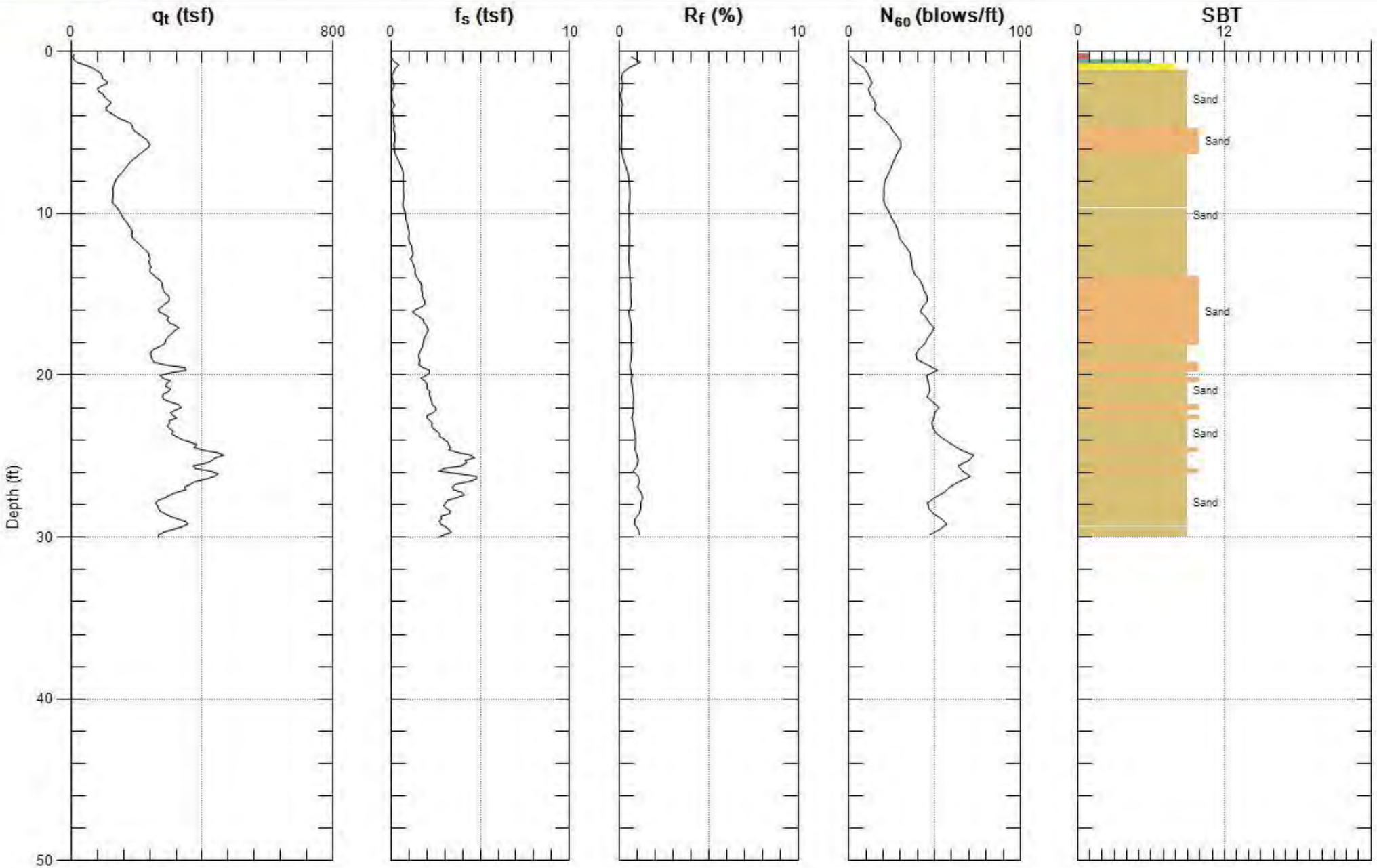
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5046

Engineer: C.AL-LAMI
Date: 7/17/2014 11:41



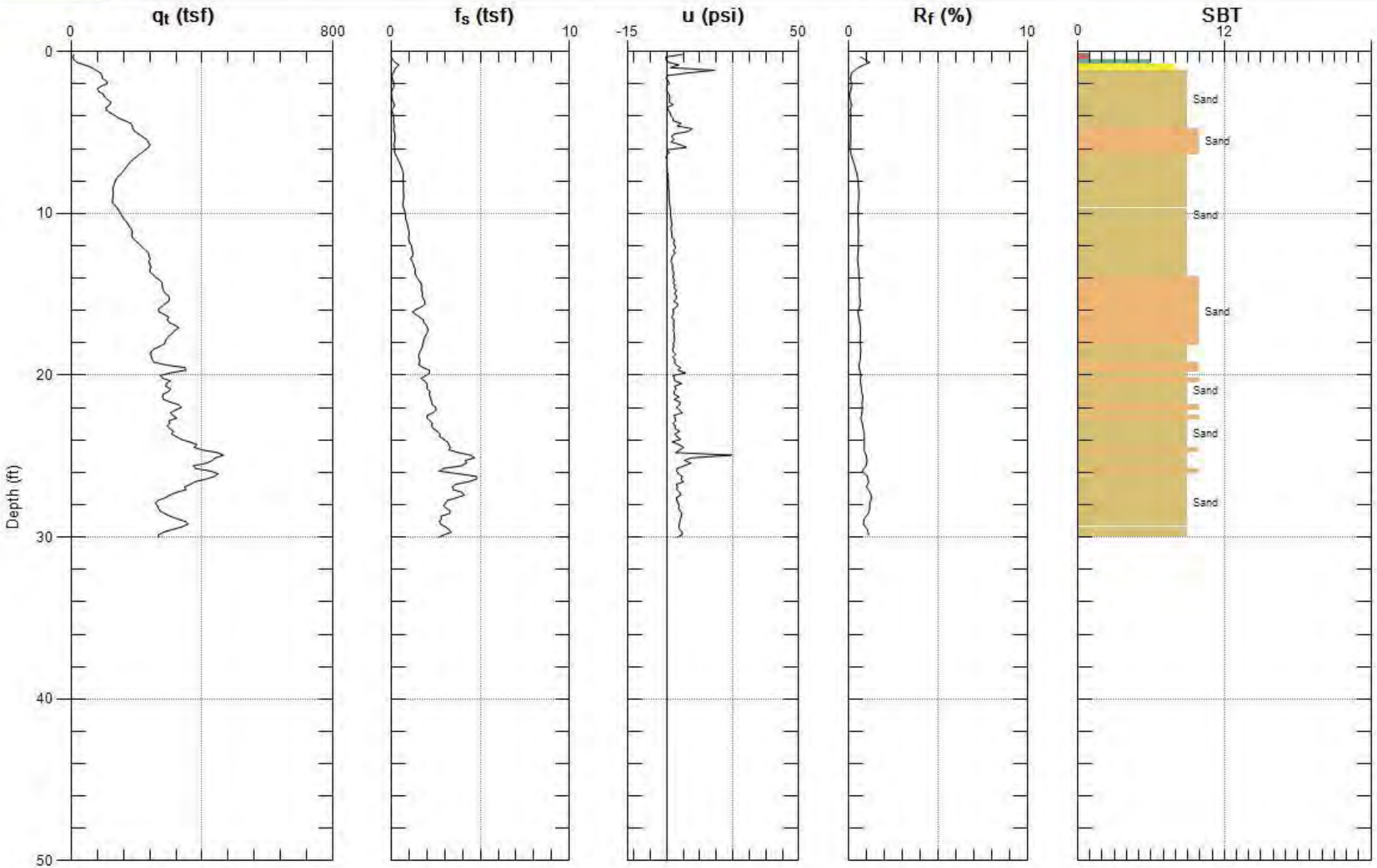
Max. Depth: 30.020 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5046

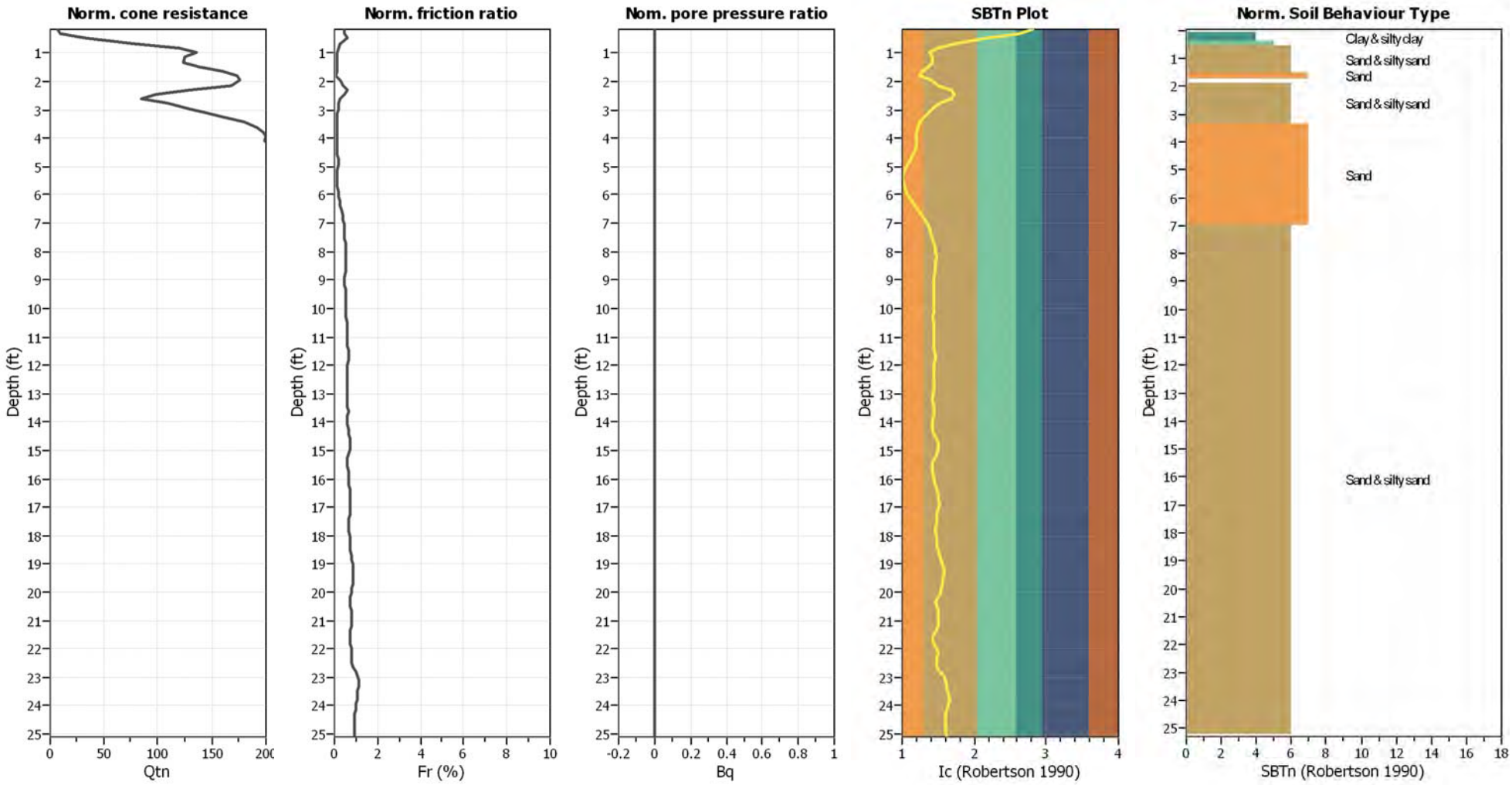
Engineer: C.AL-LAMI
Date: 7/17/2014 11:41



Max. Depth: 30.020 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



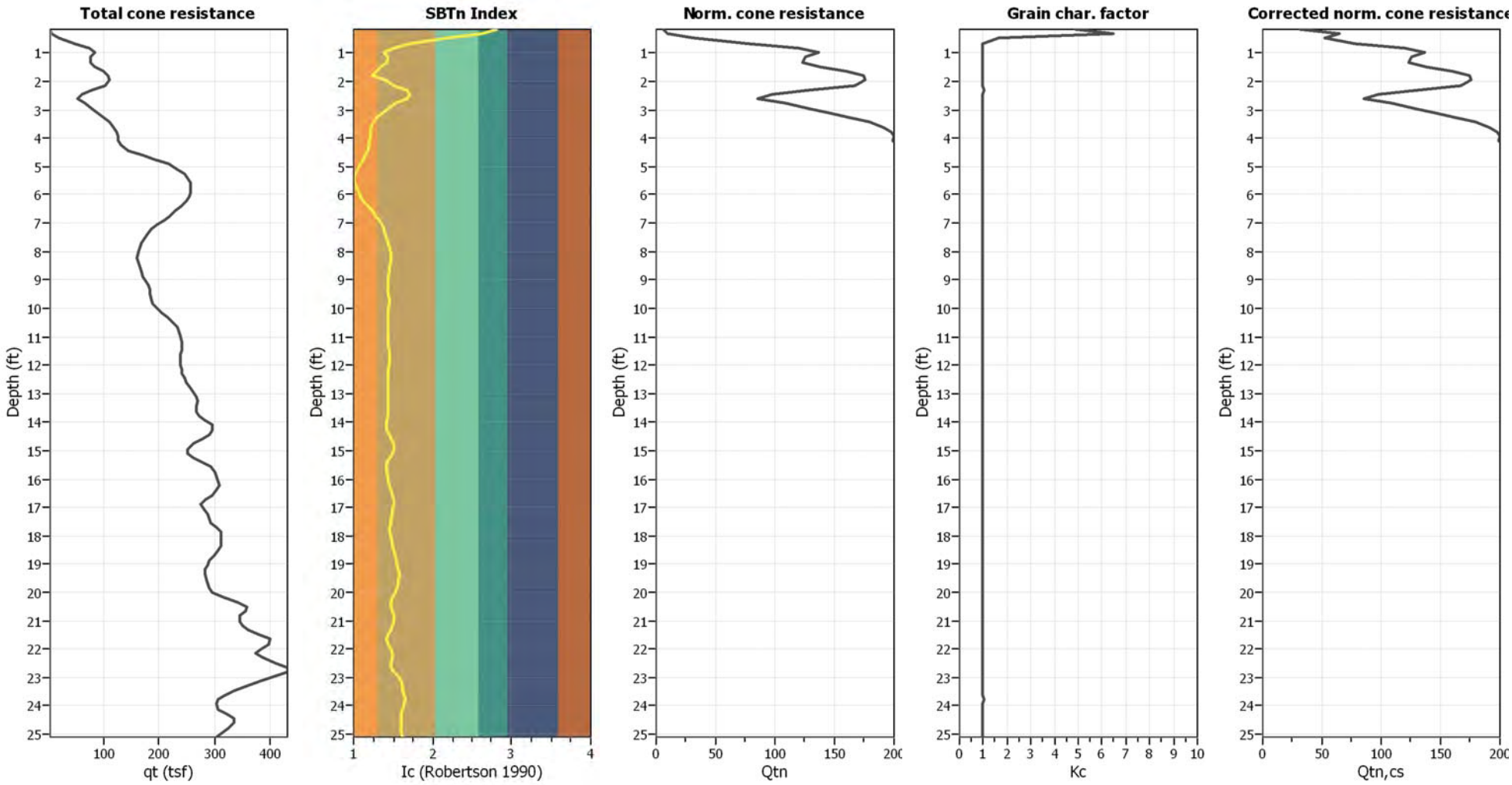
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

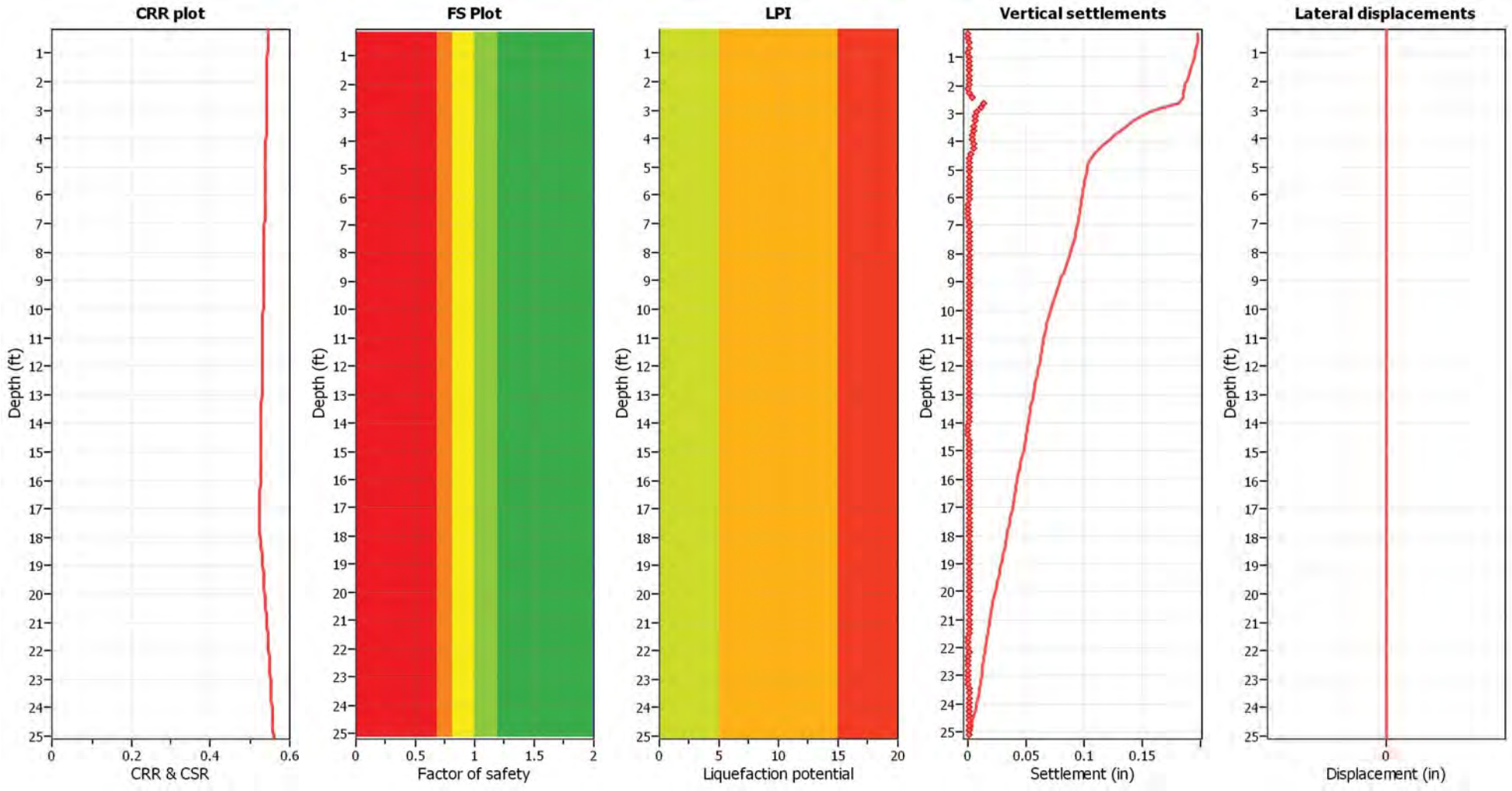
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

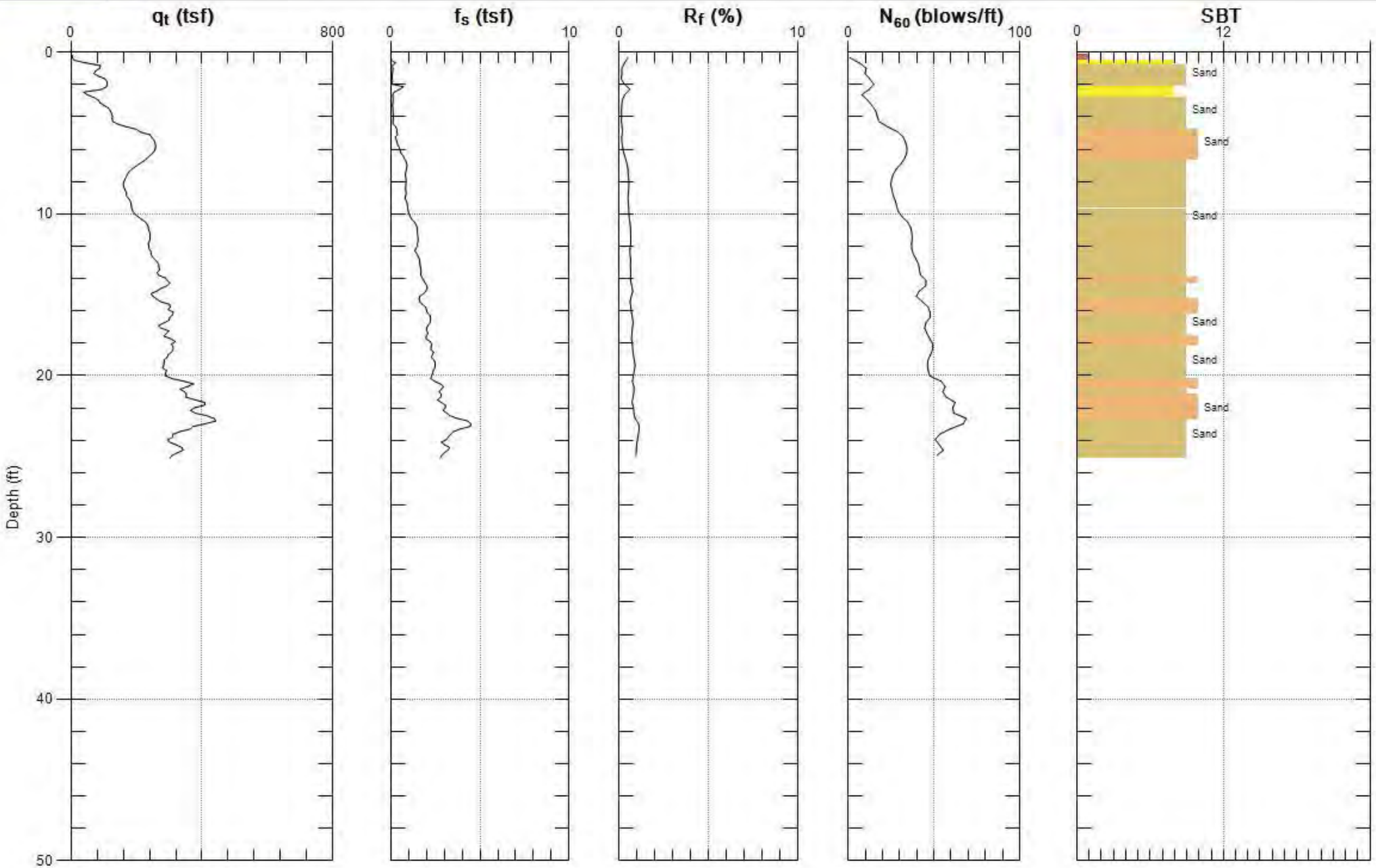
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5045

Engineer: C.AL-LAMI
Date: 7/18/2014 10:13



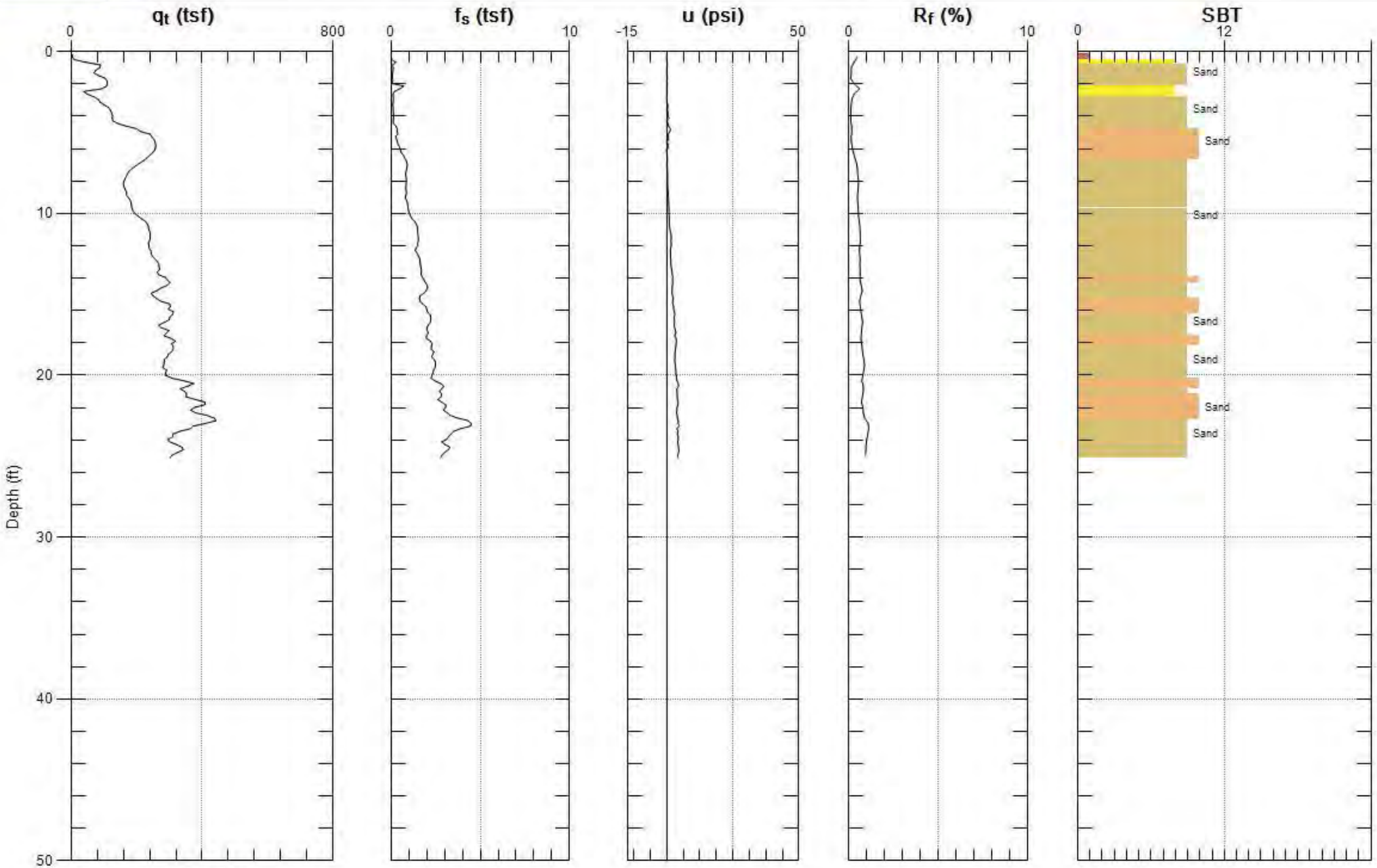
Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5045

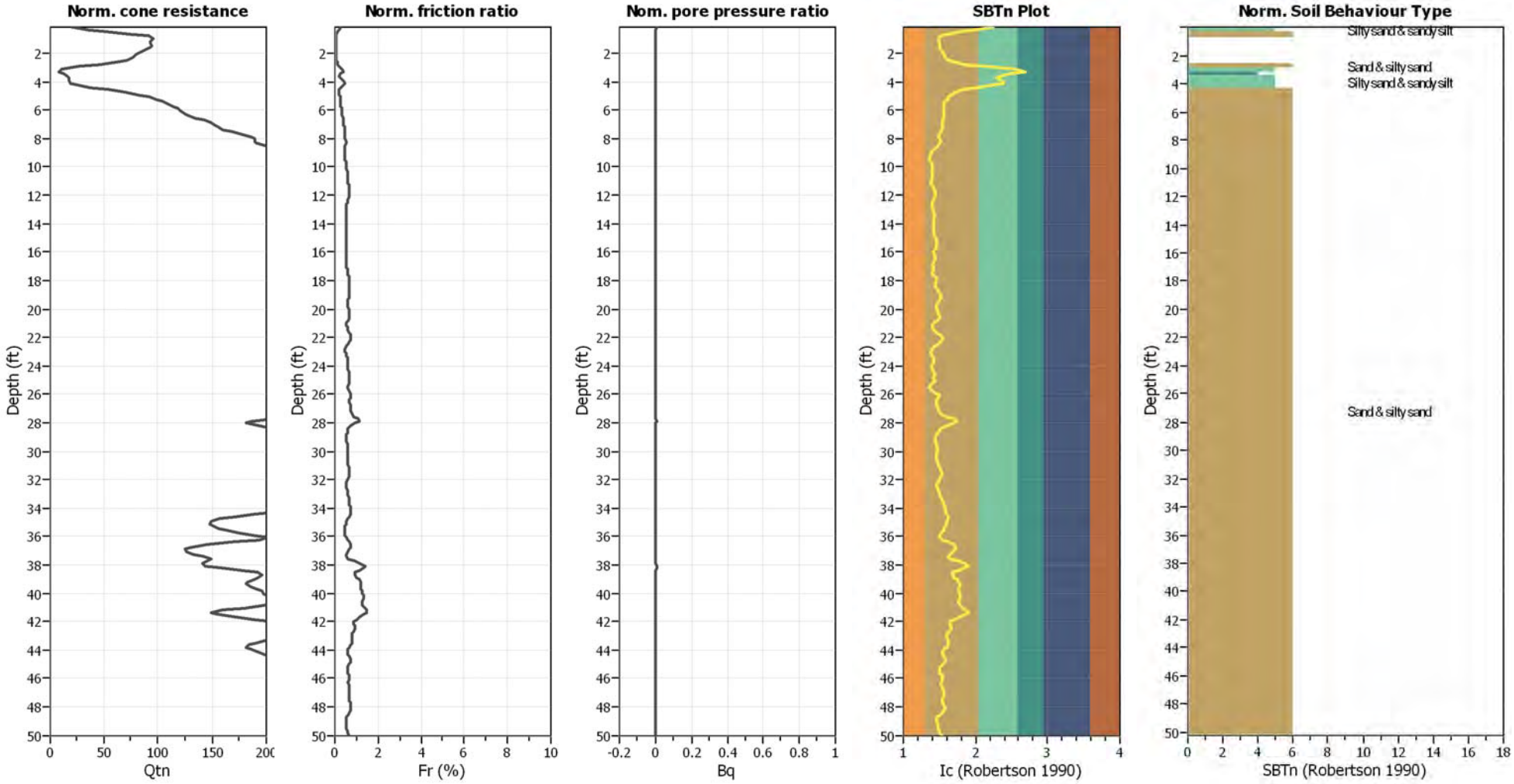
Engineer: C.AL-LAMI
Date: 7/18/2014 10:13



Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



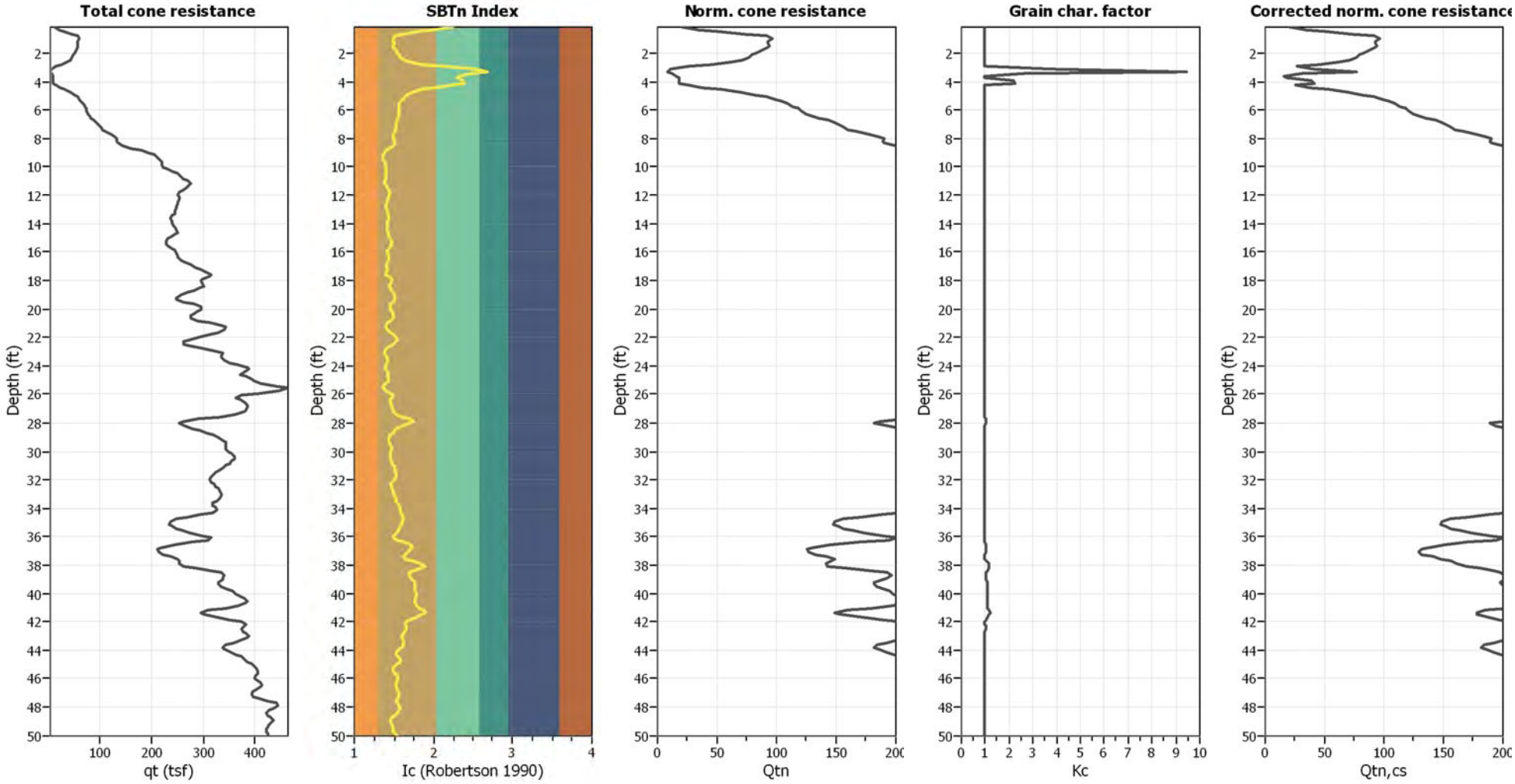
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

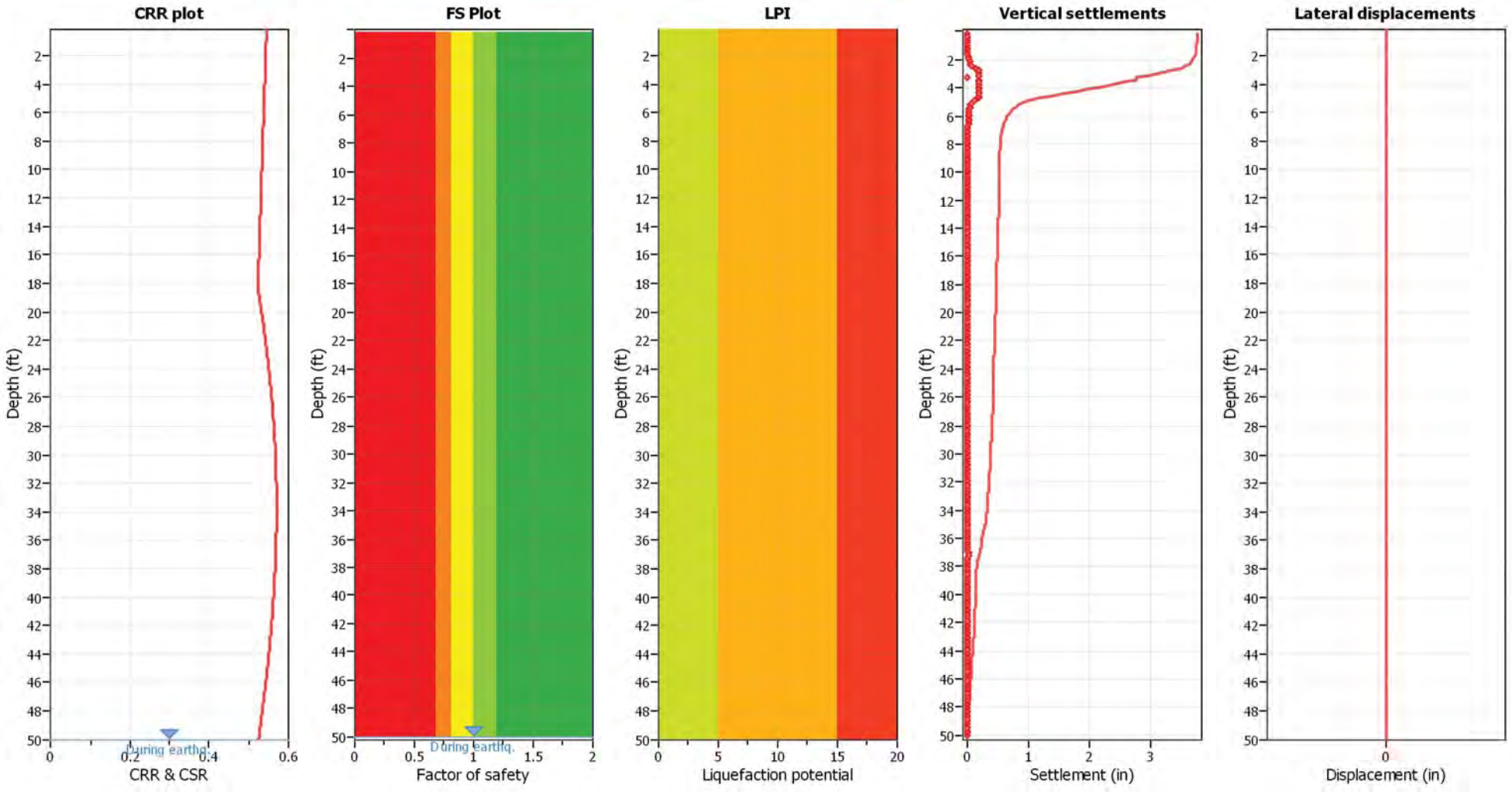
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

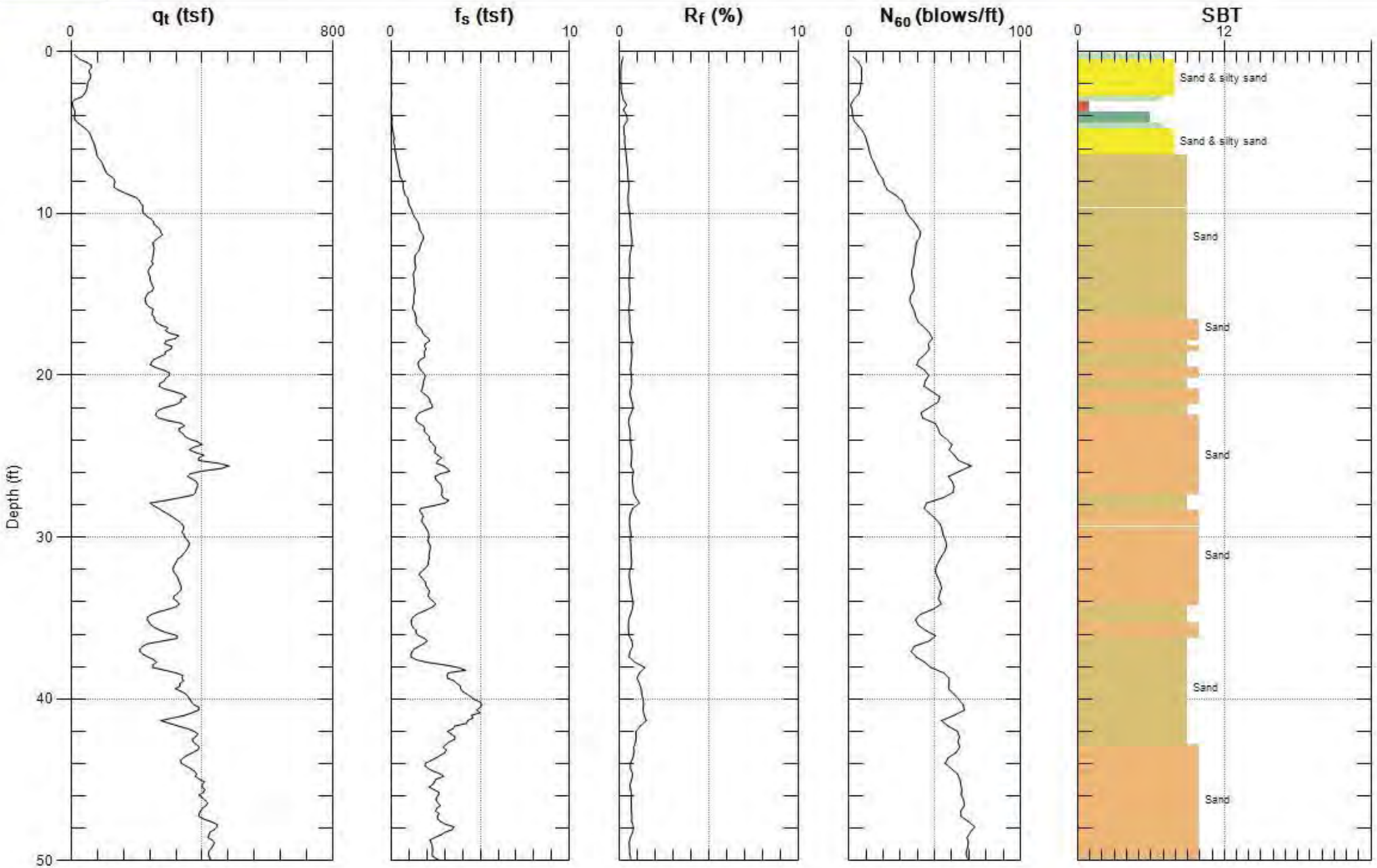
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5035

Engineer: C.AL-LAMI
Date: 7/18/2014 08:51



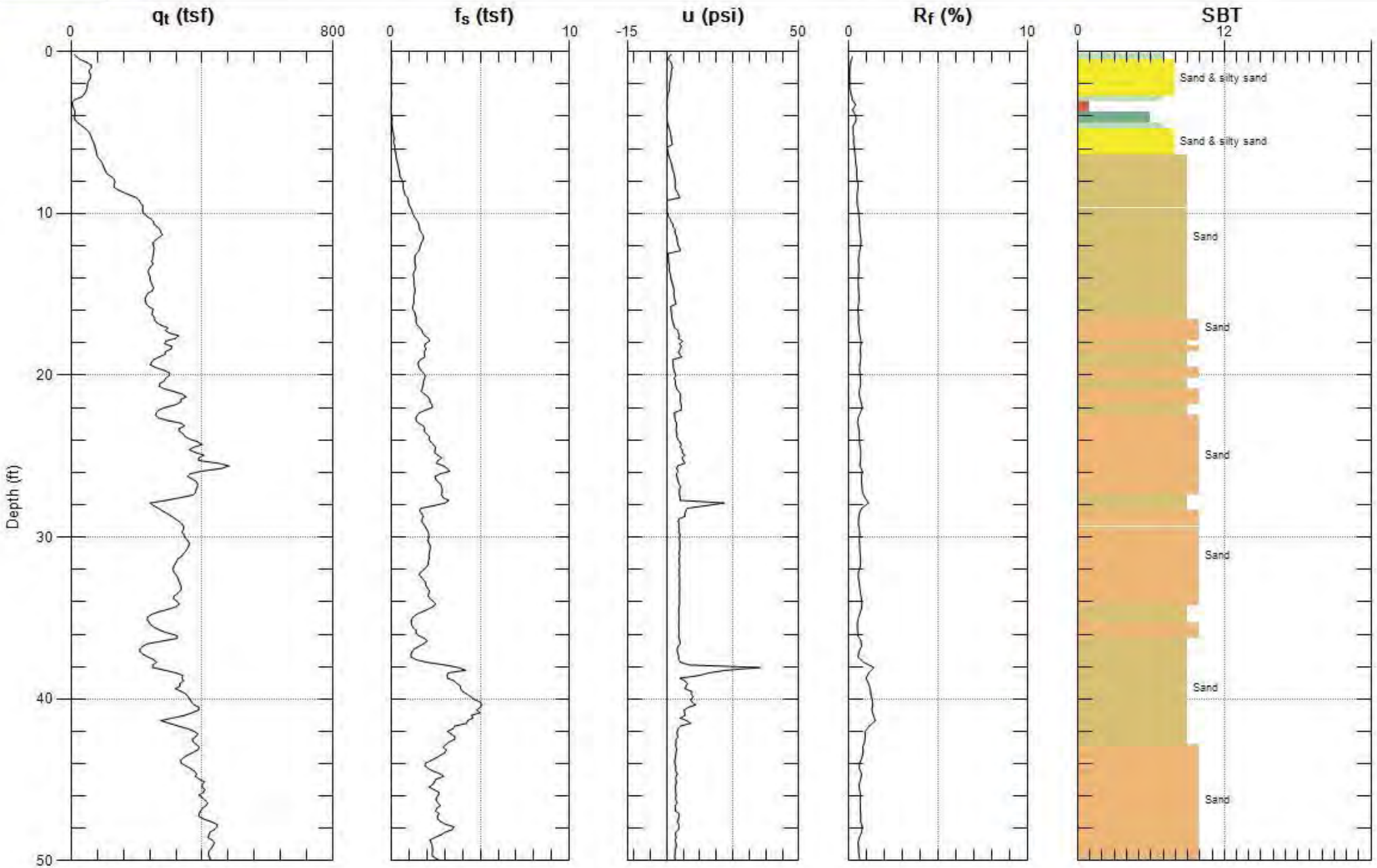
Max. Depth: 50.033 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5035

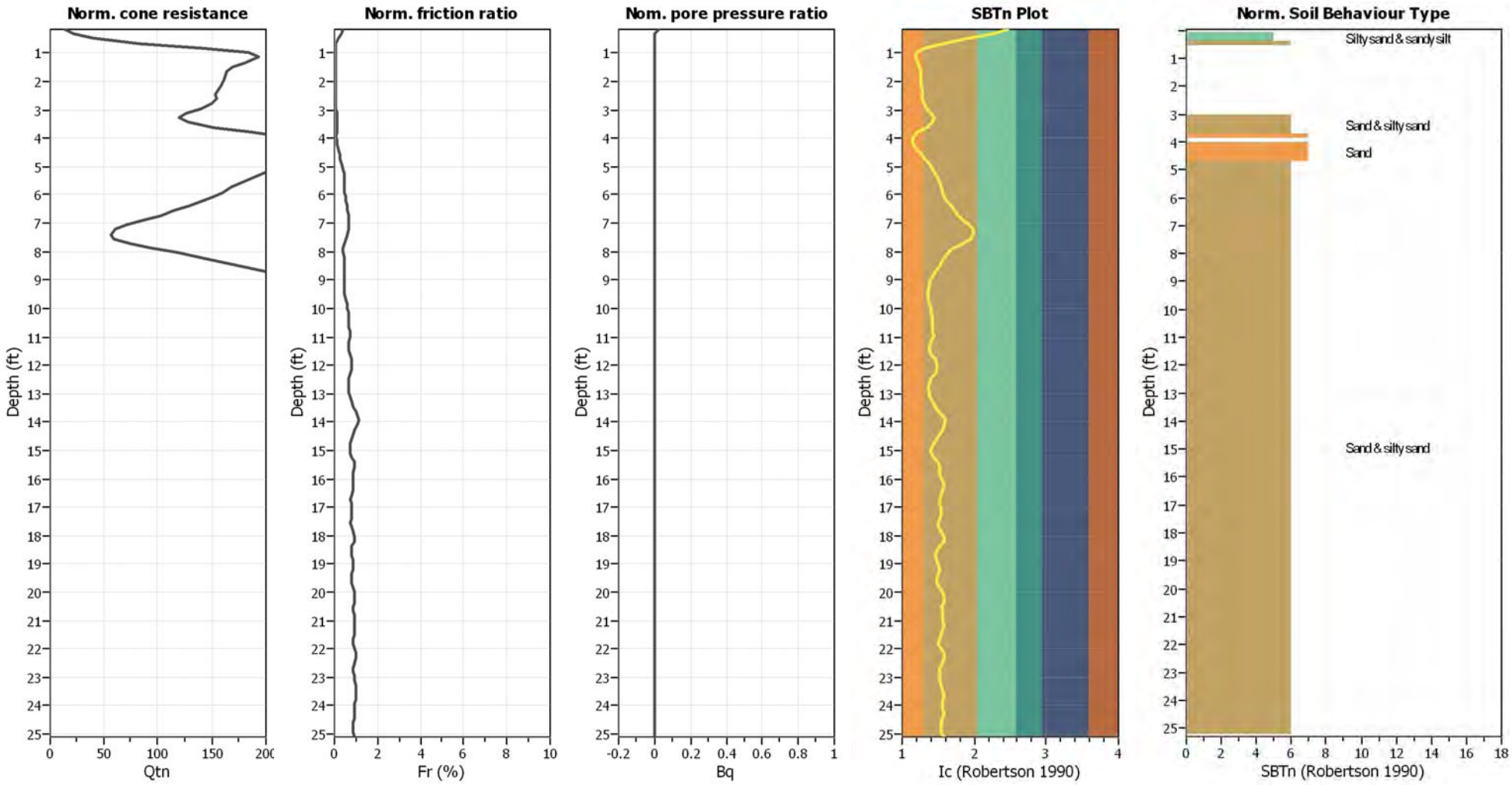
Engineer: C.AL-LAMI
Date: 7/18/2014 08:51



Max. Depth: 50.033 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



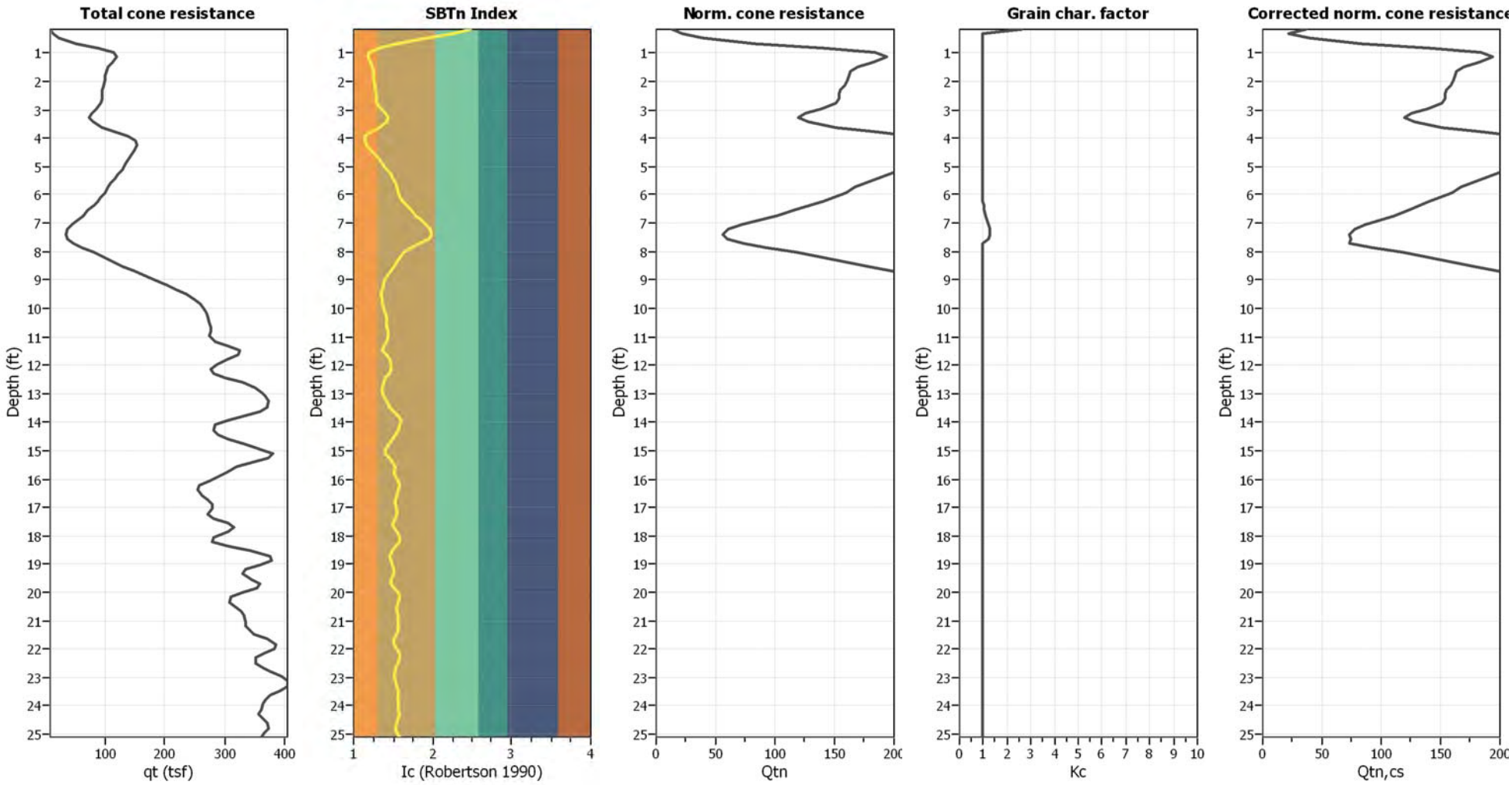
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

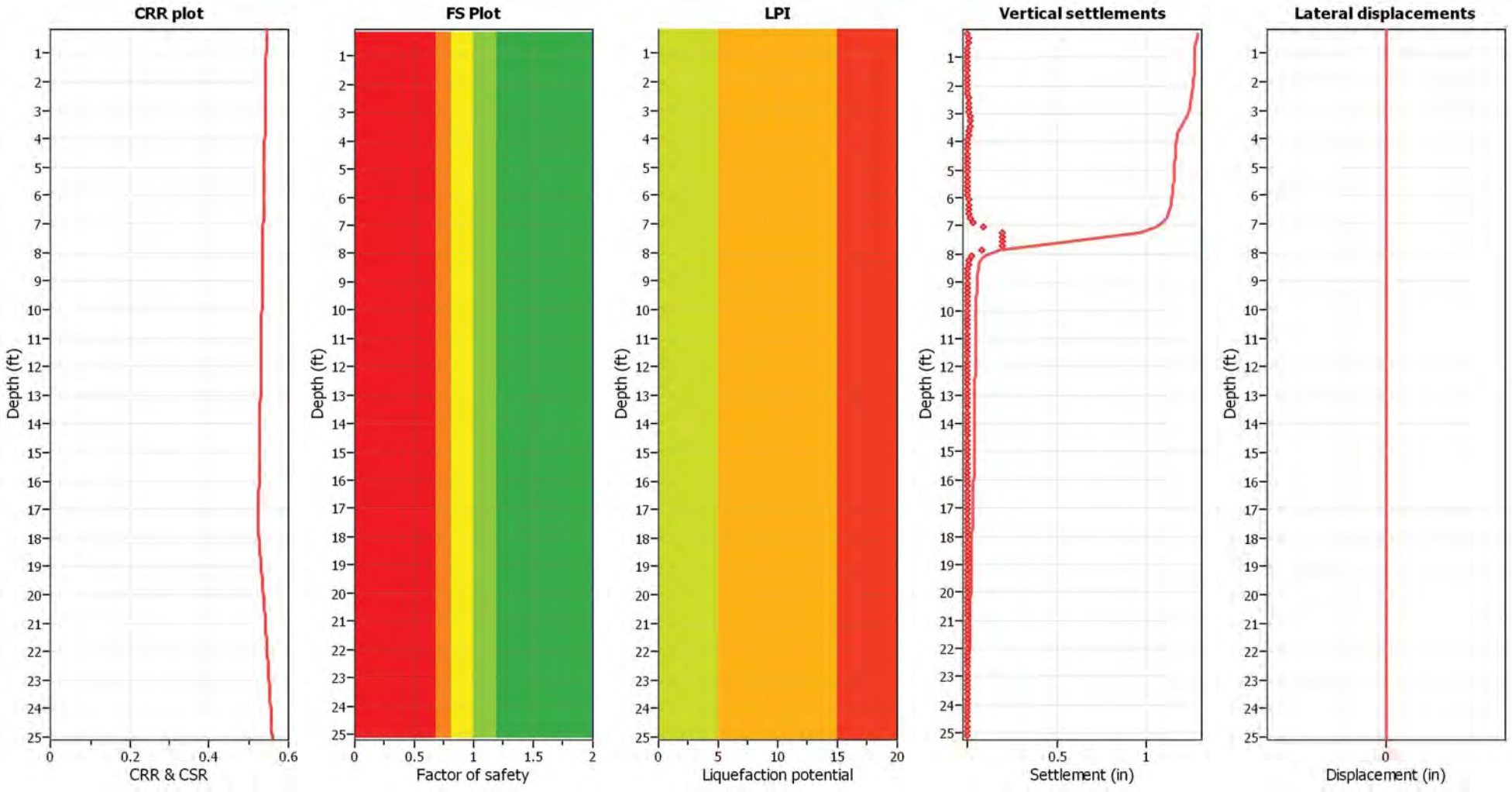
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

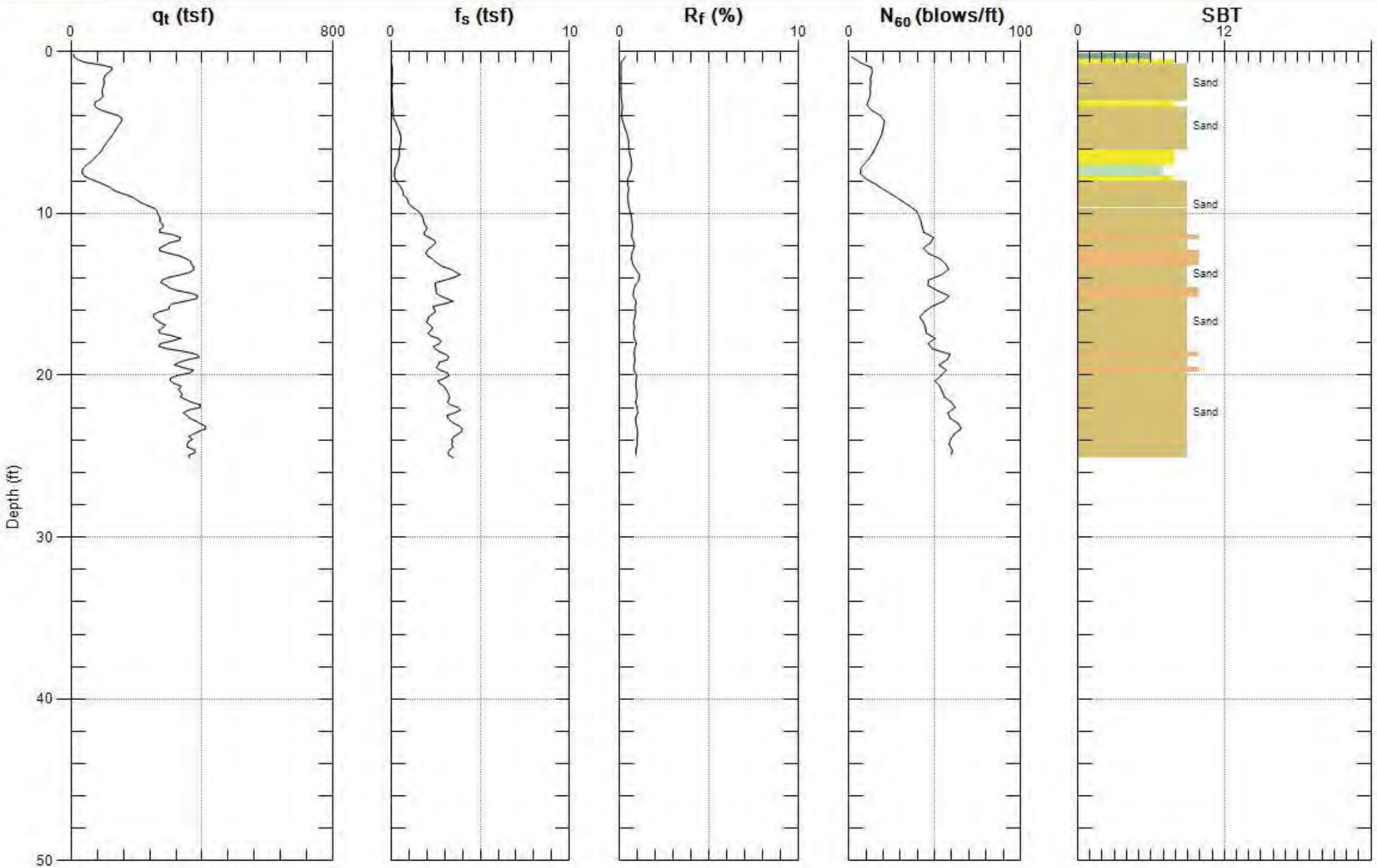
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5039

Engineer: C.AL-LAMI
Date: 7/17/2014 04:39



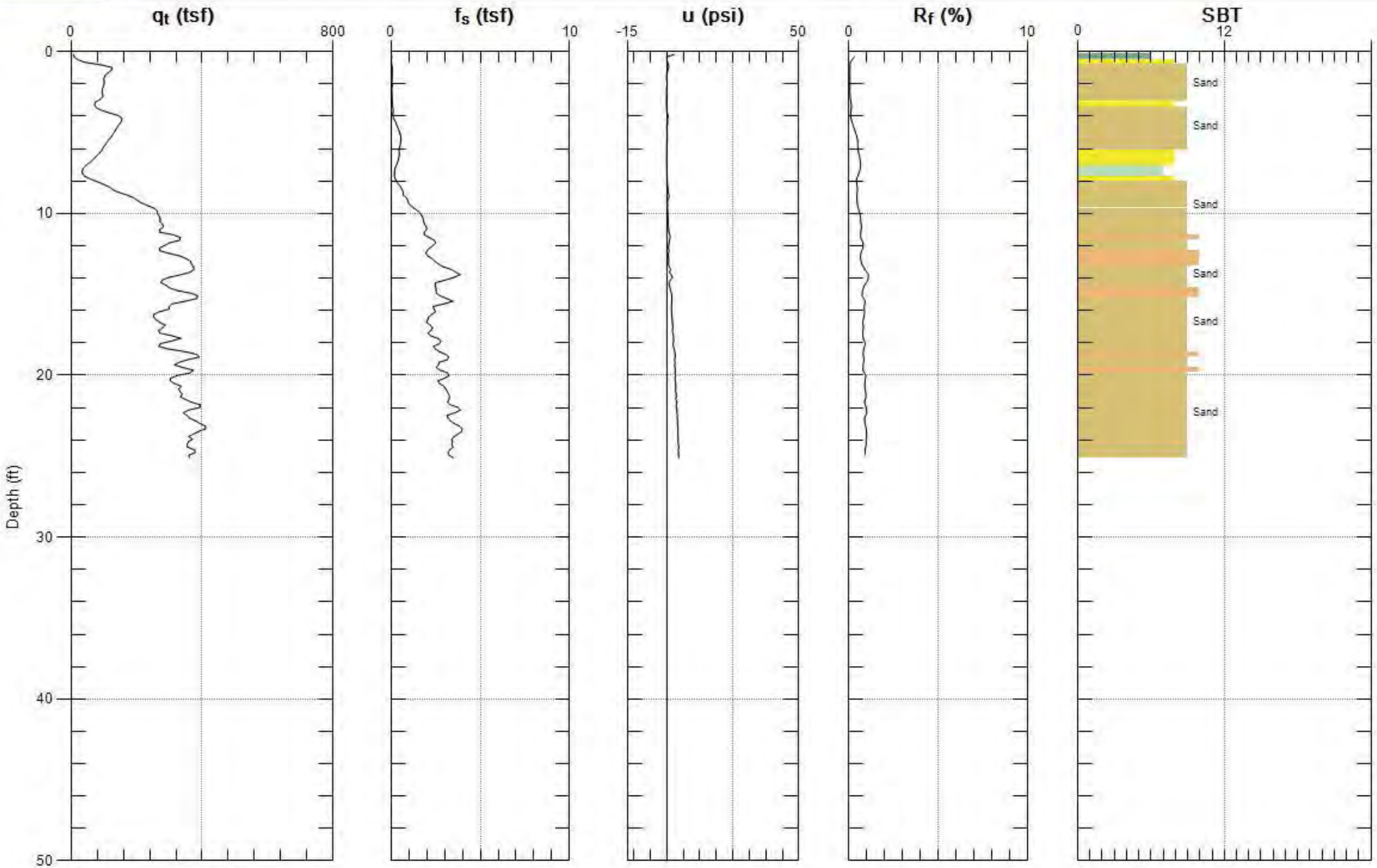
Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5039

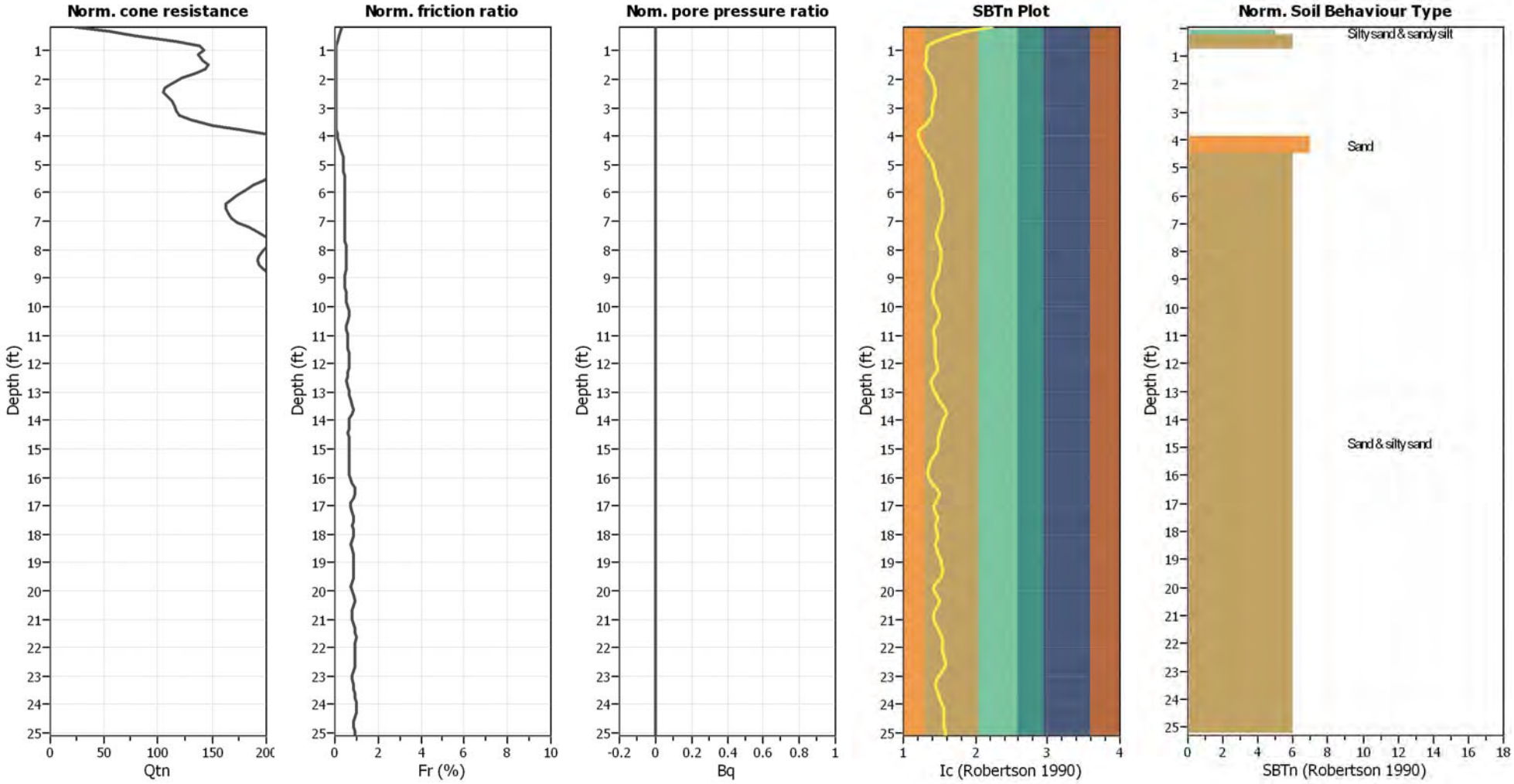
Engineer: C.AL-LAMI
Date: 7/17/2014 04:39



Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



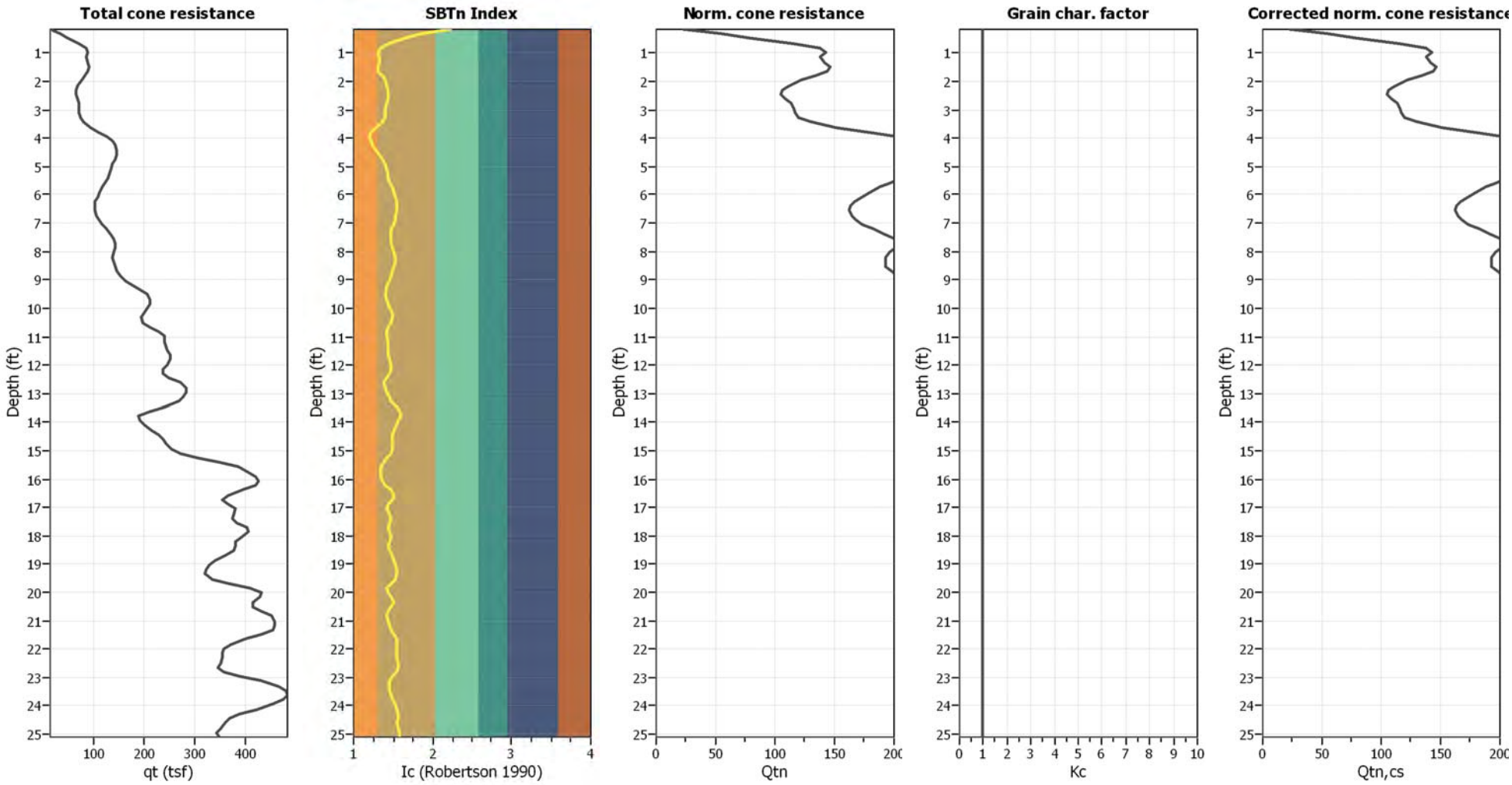
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

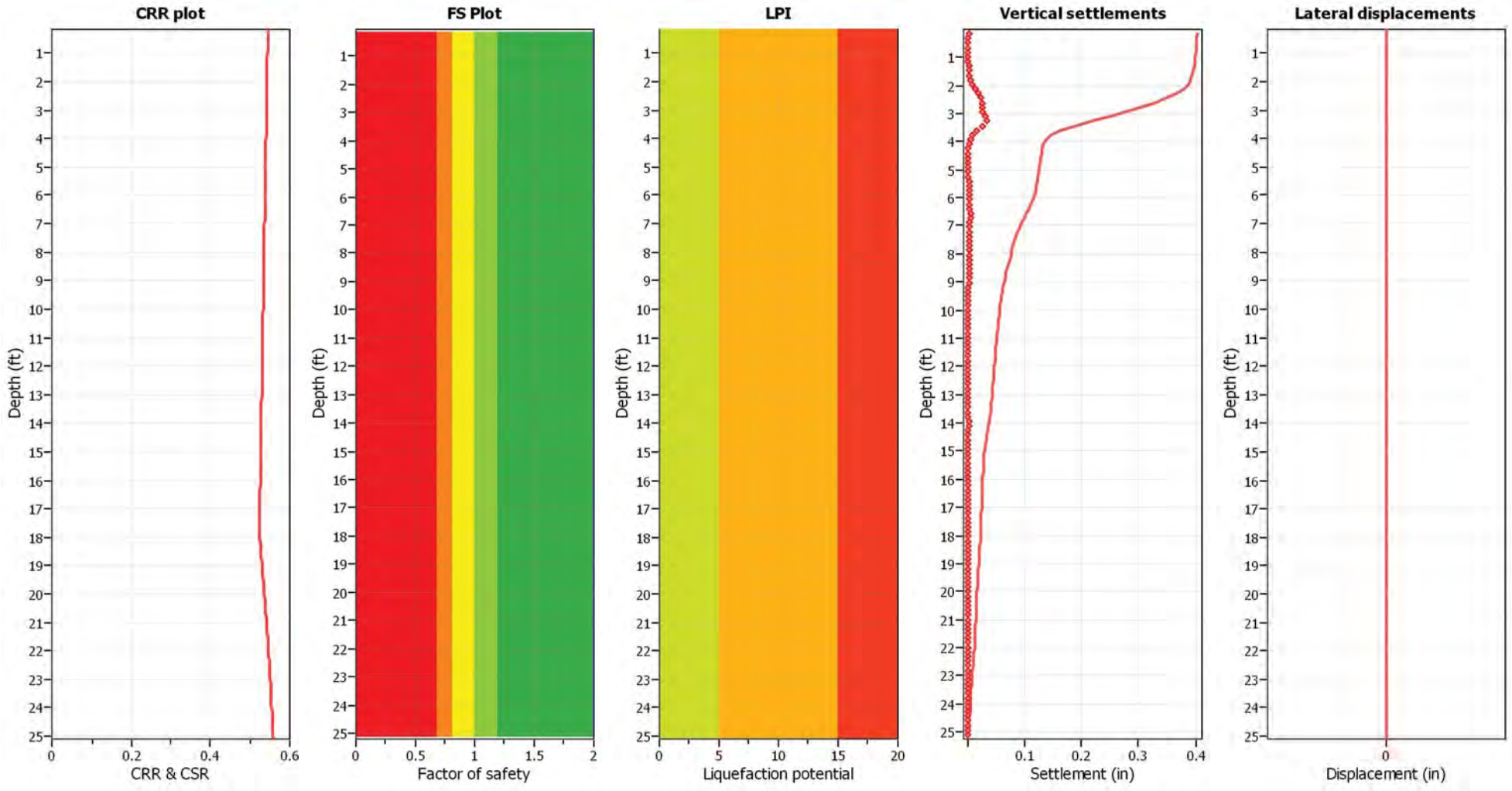
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

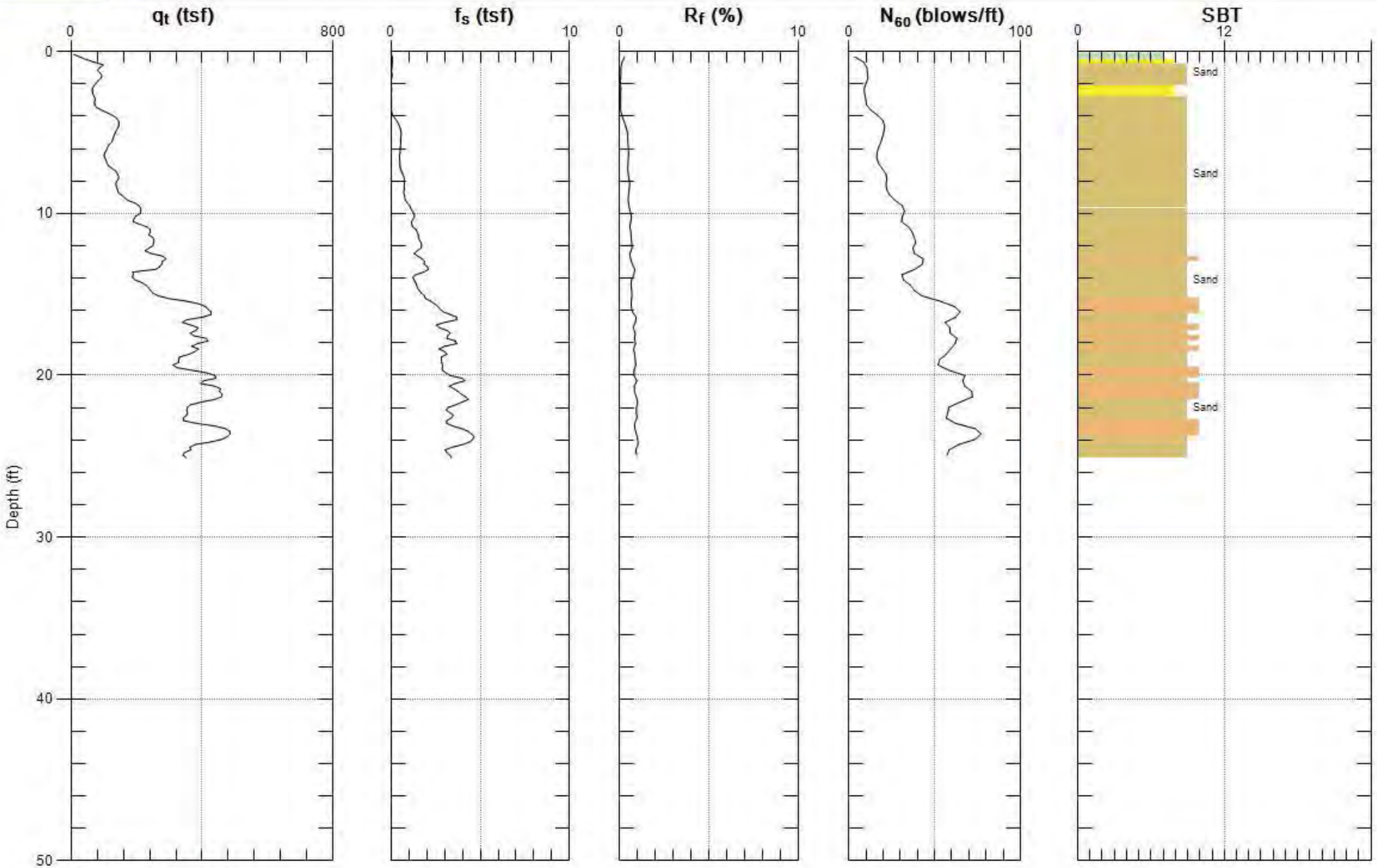
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5036

Engineer: C.AL-LAMI
Date: 7/17/2014 03:38



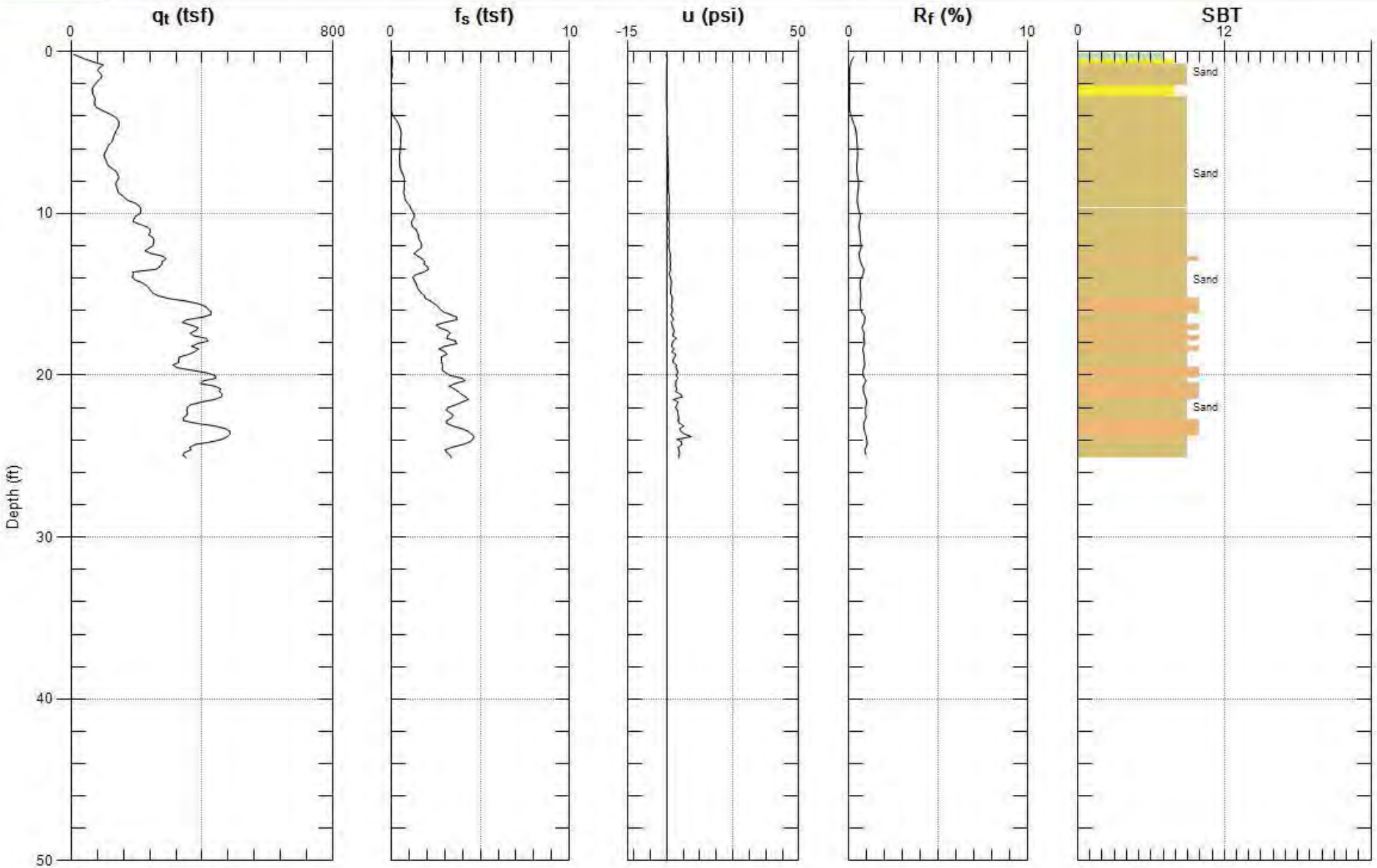
Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5036

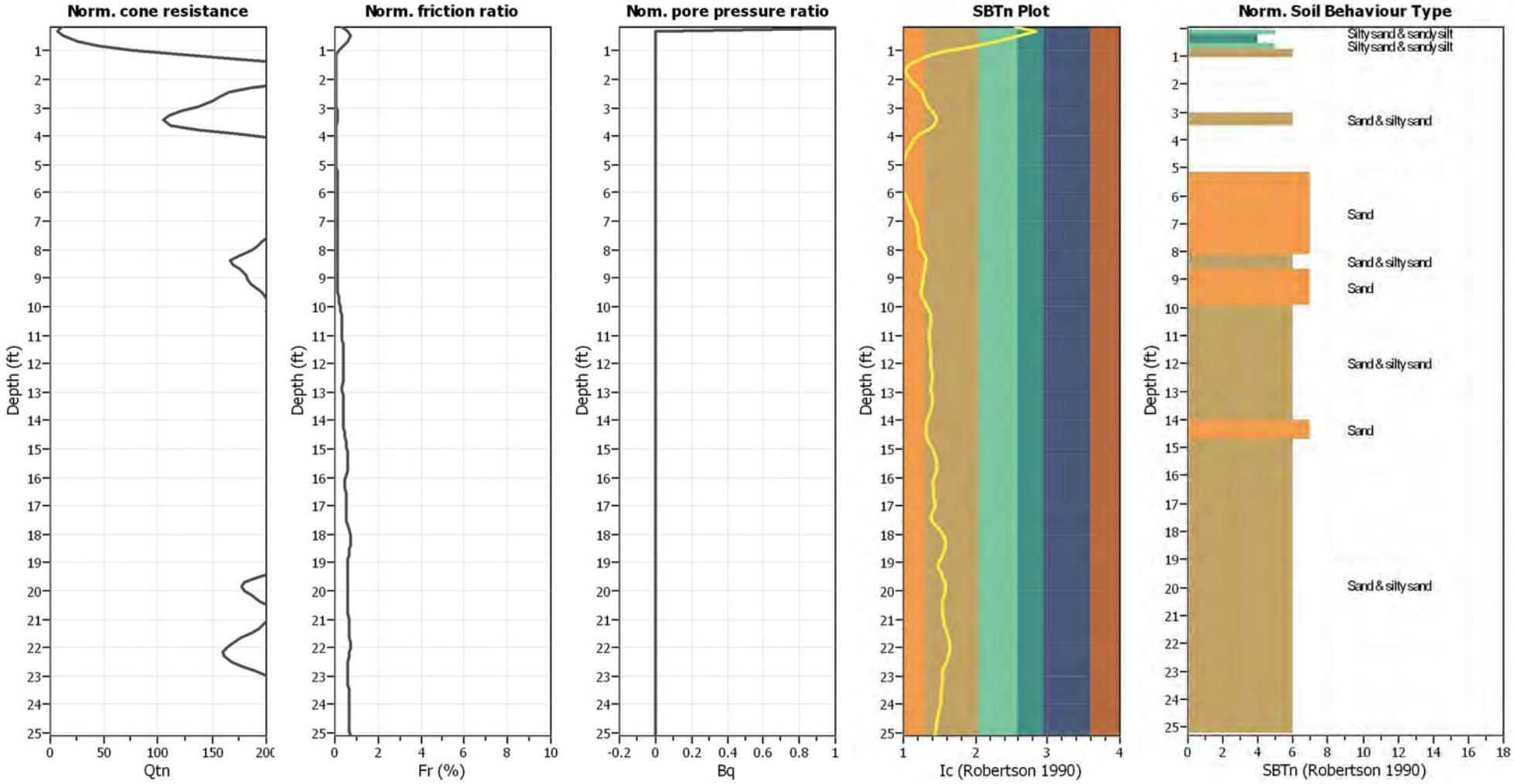
Engineer: C.AL-LAMI
Date: 7/17/2014 03:38



Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



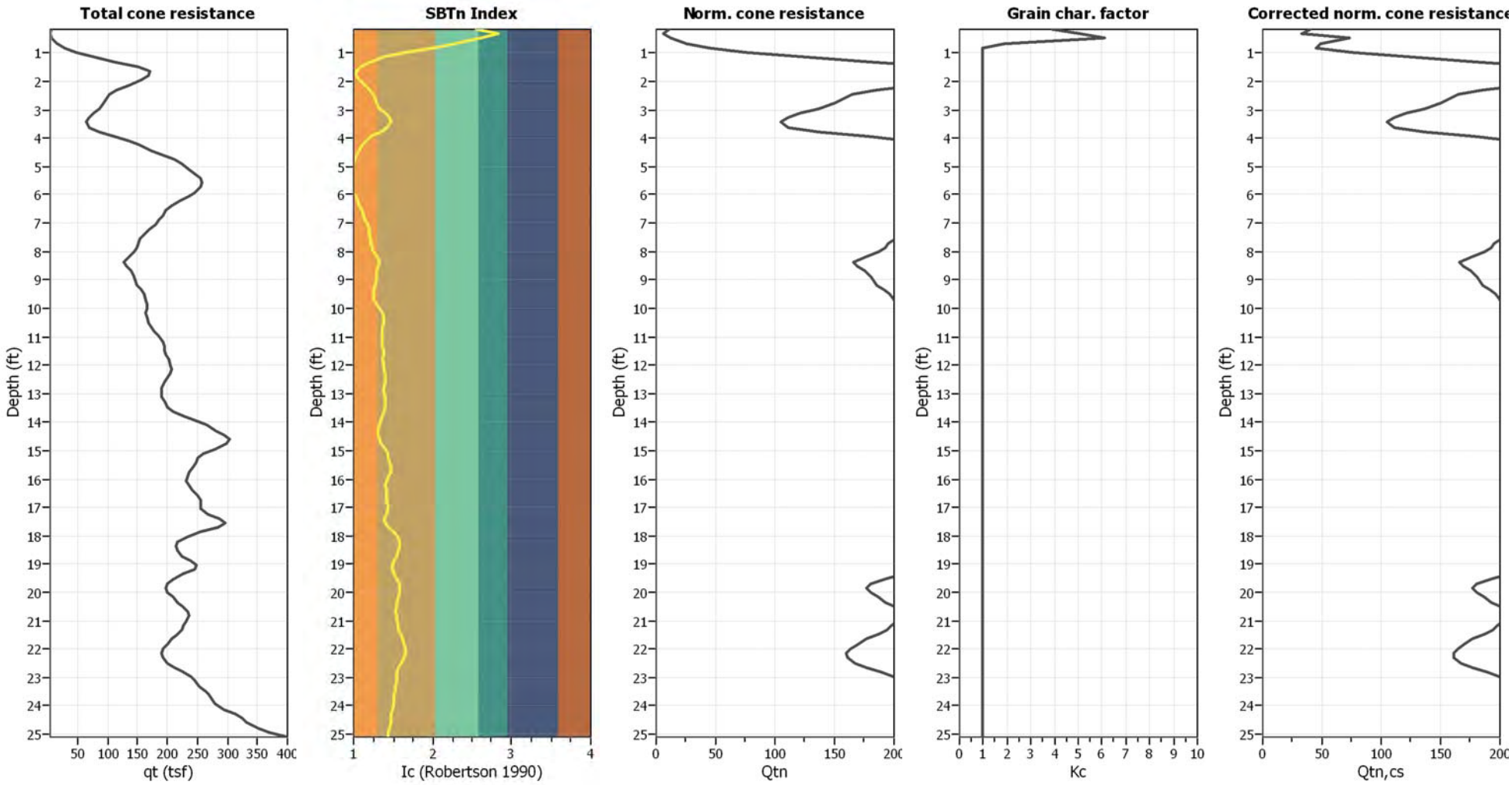
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

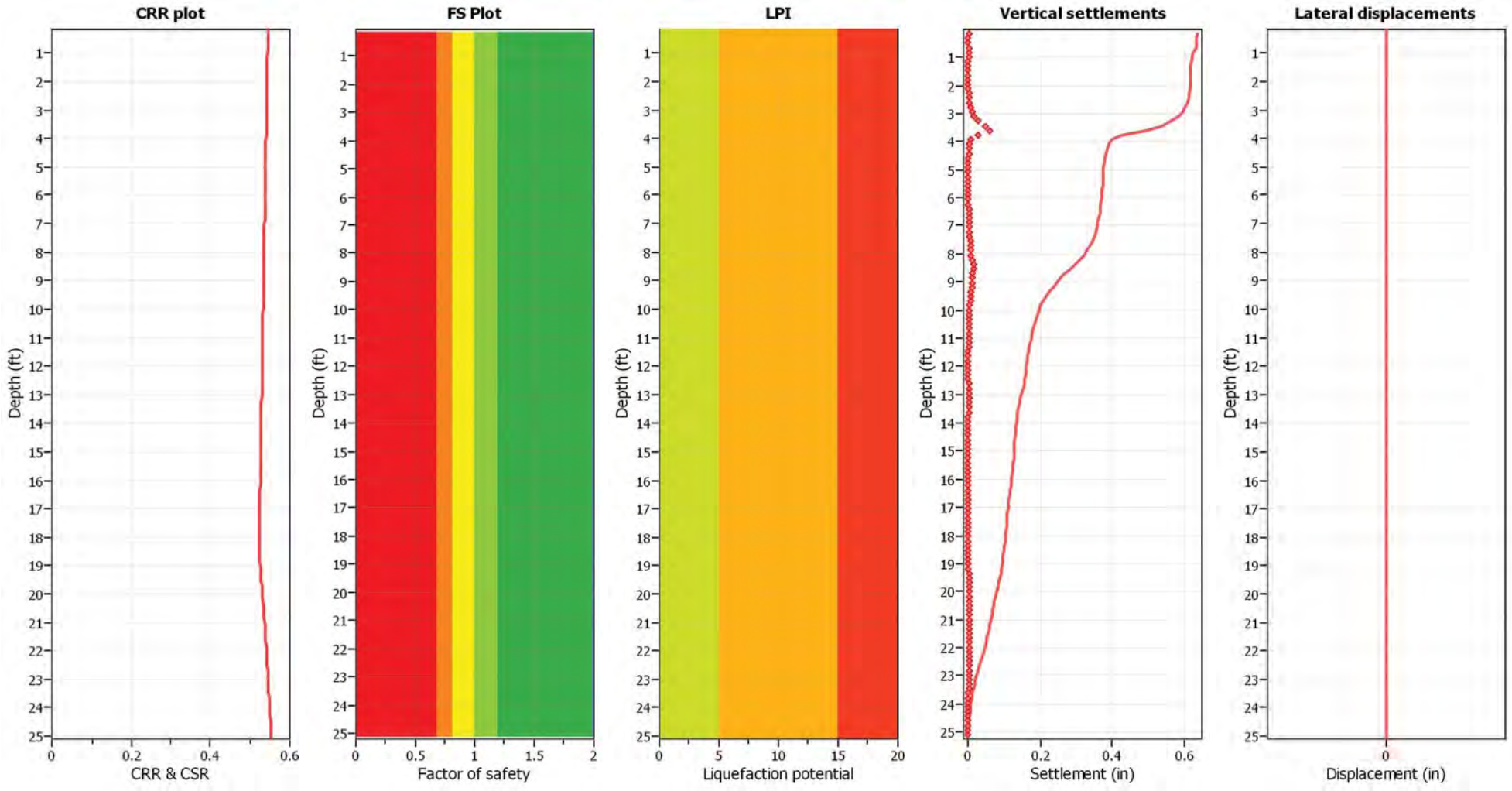
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

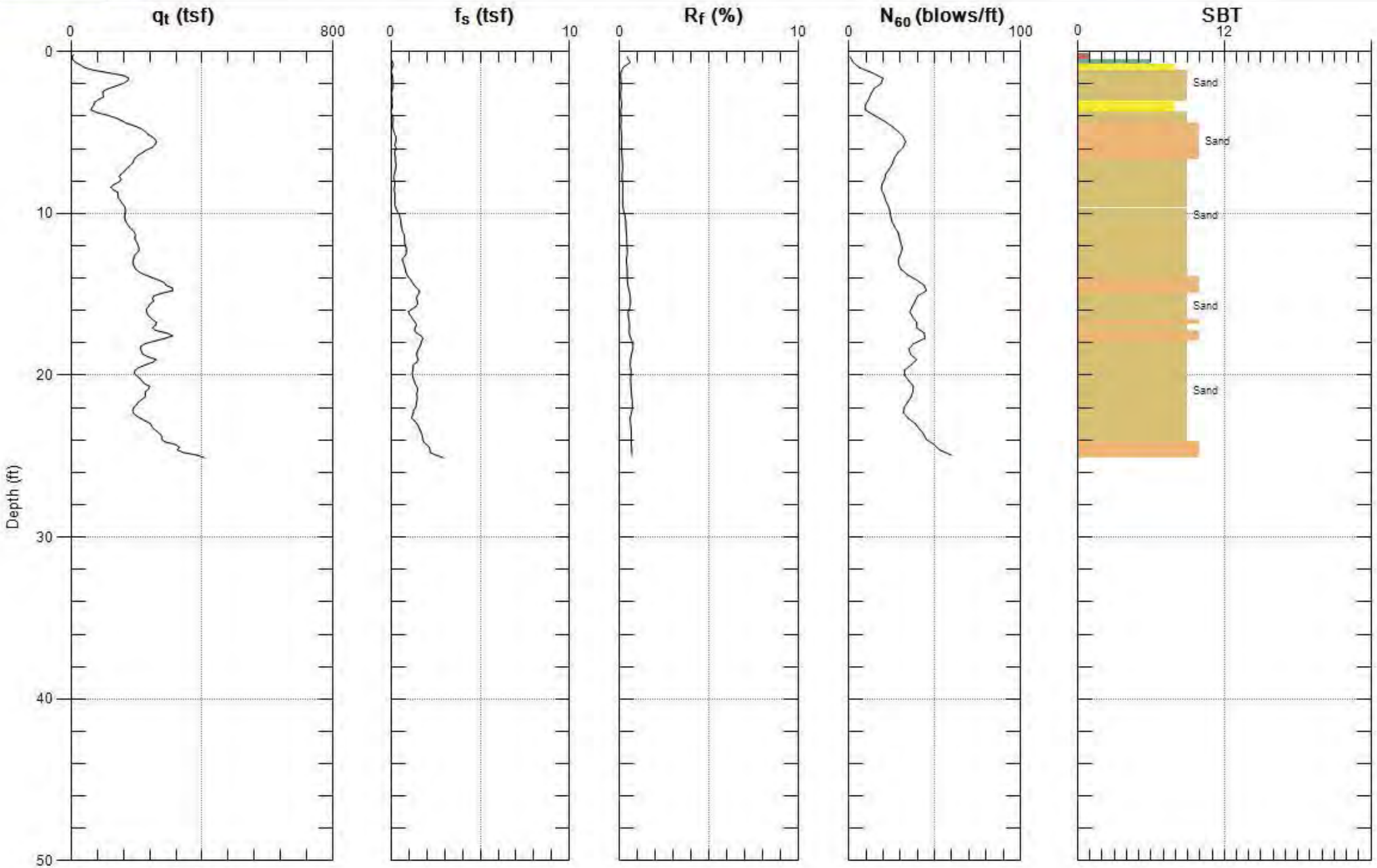
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5030

Engineer: C.AL-LAMI
Date: 7/17/2014 11:02



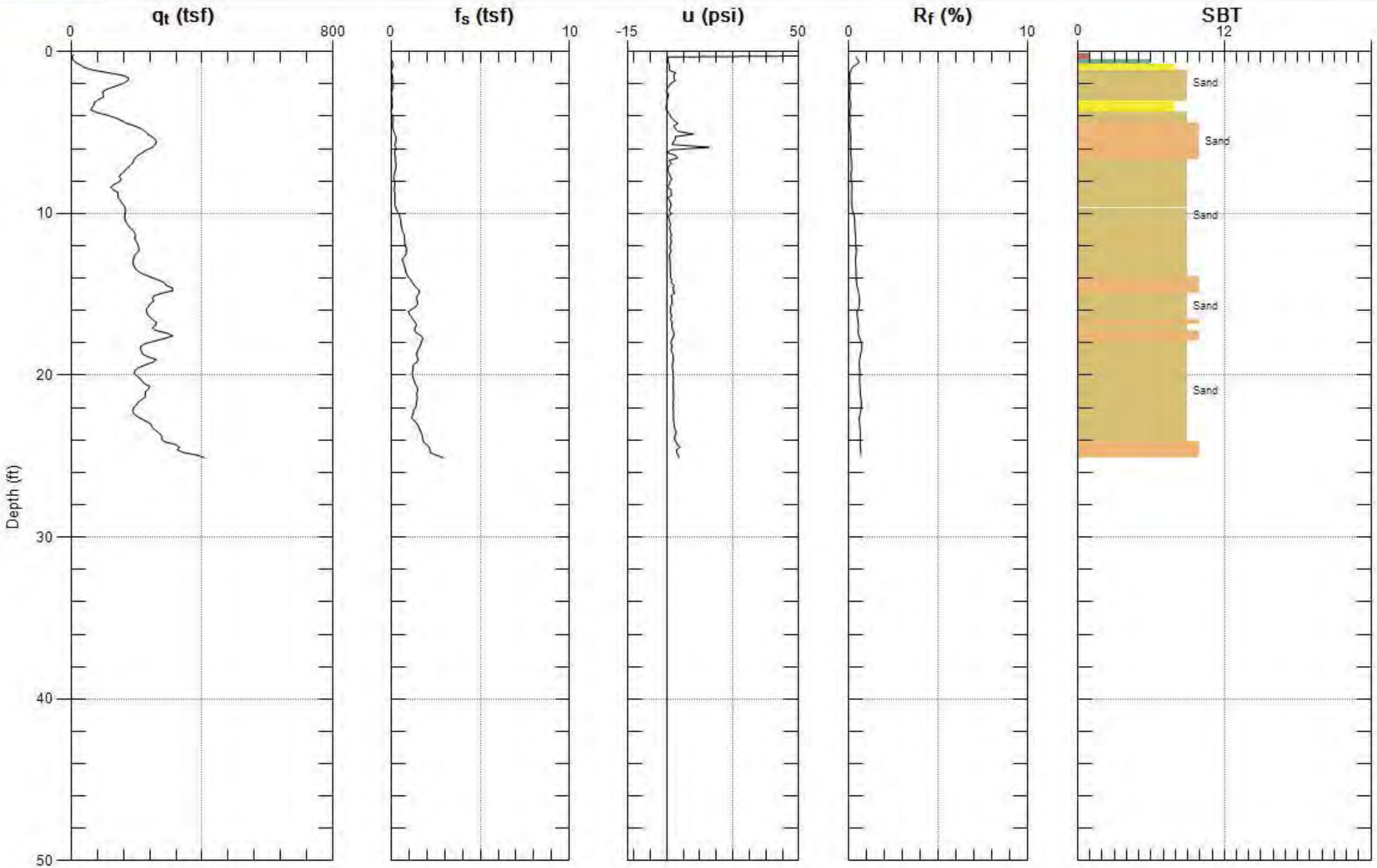
Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5030

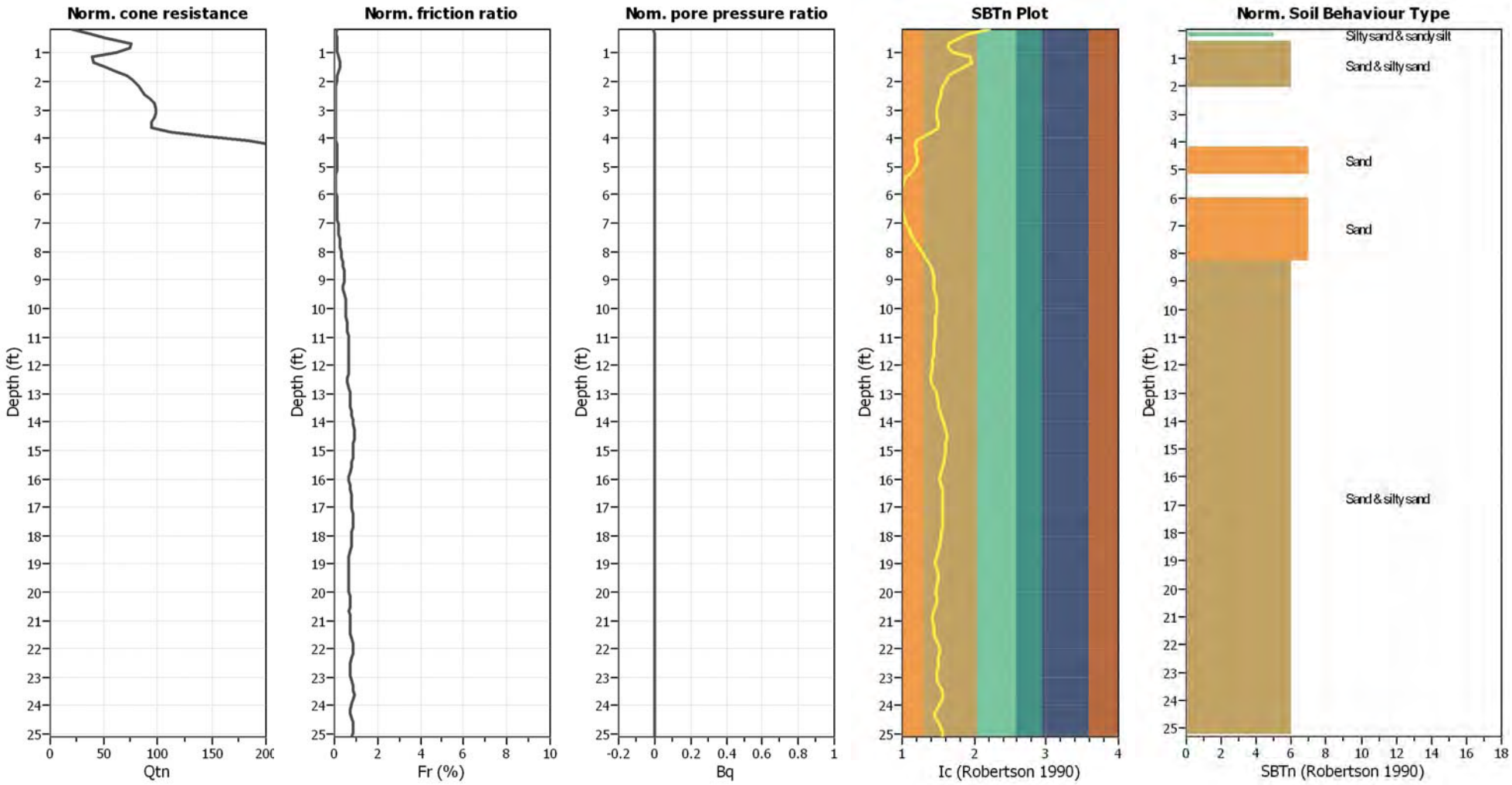
Engineer: C.AL-LAMI
Date: 7/17/2014 11:02



Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



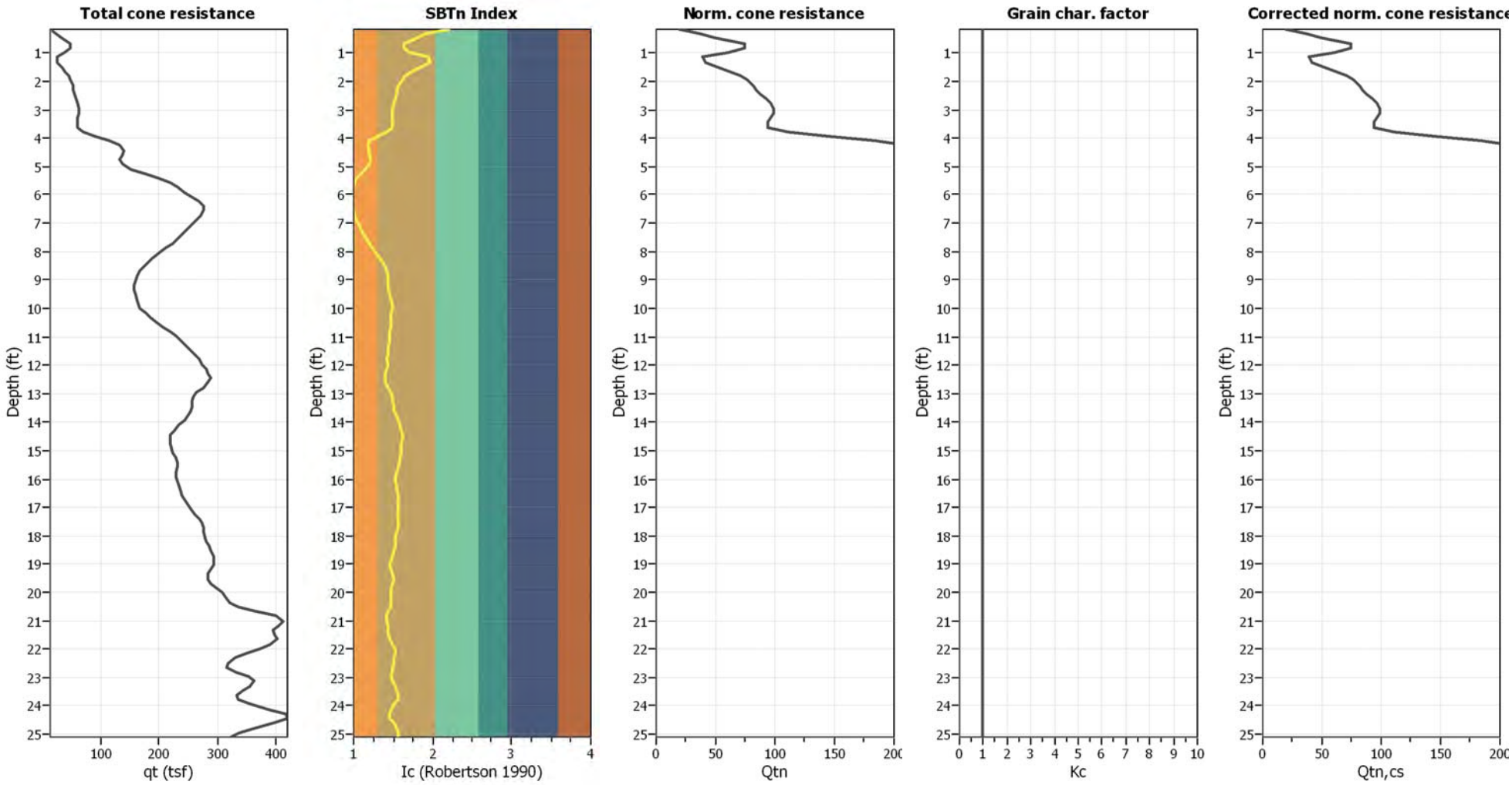
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

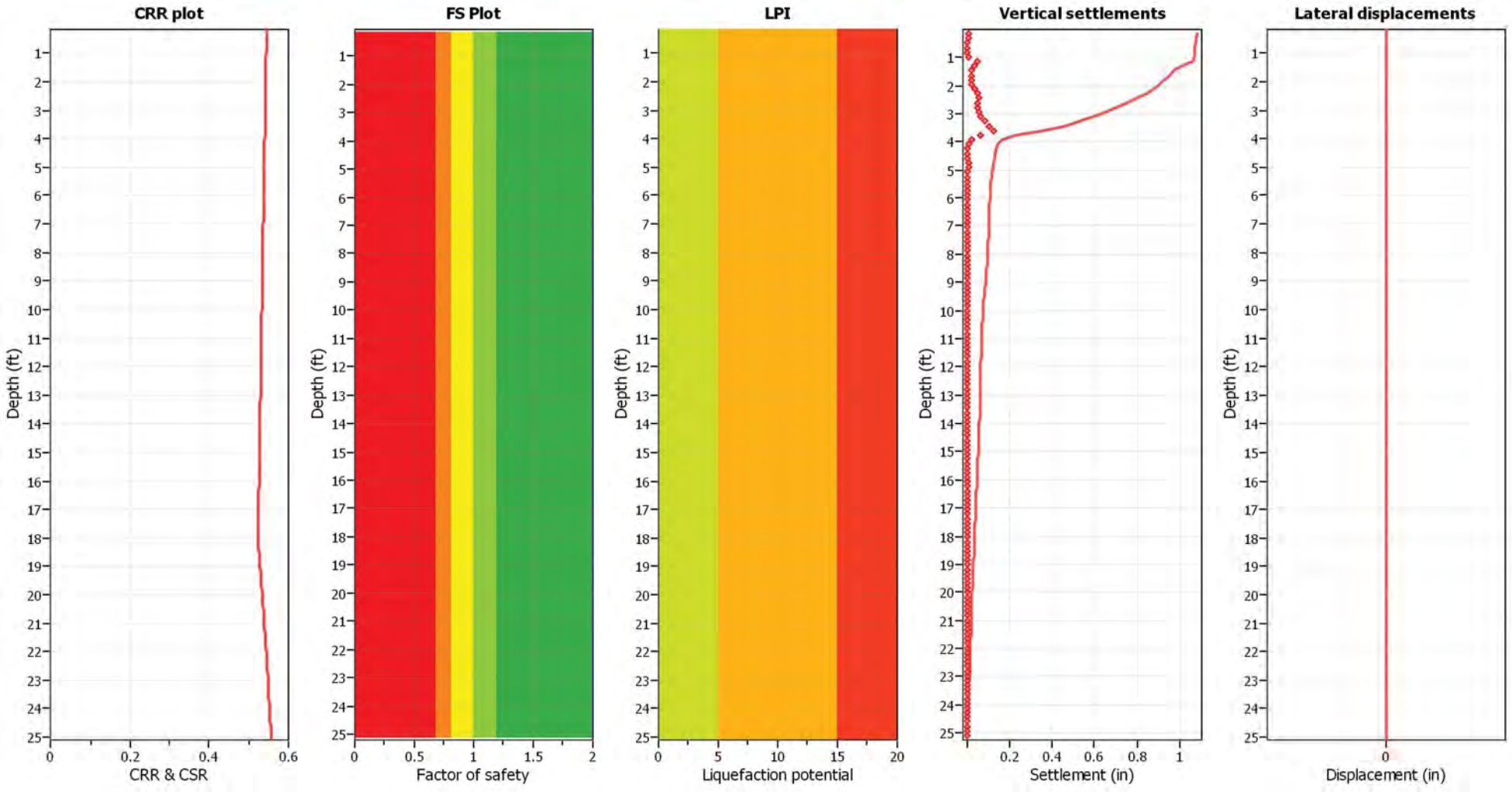
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

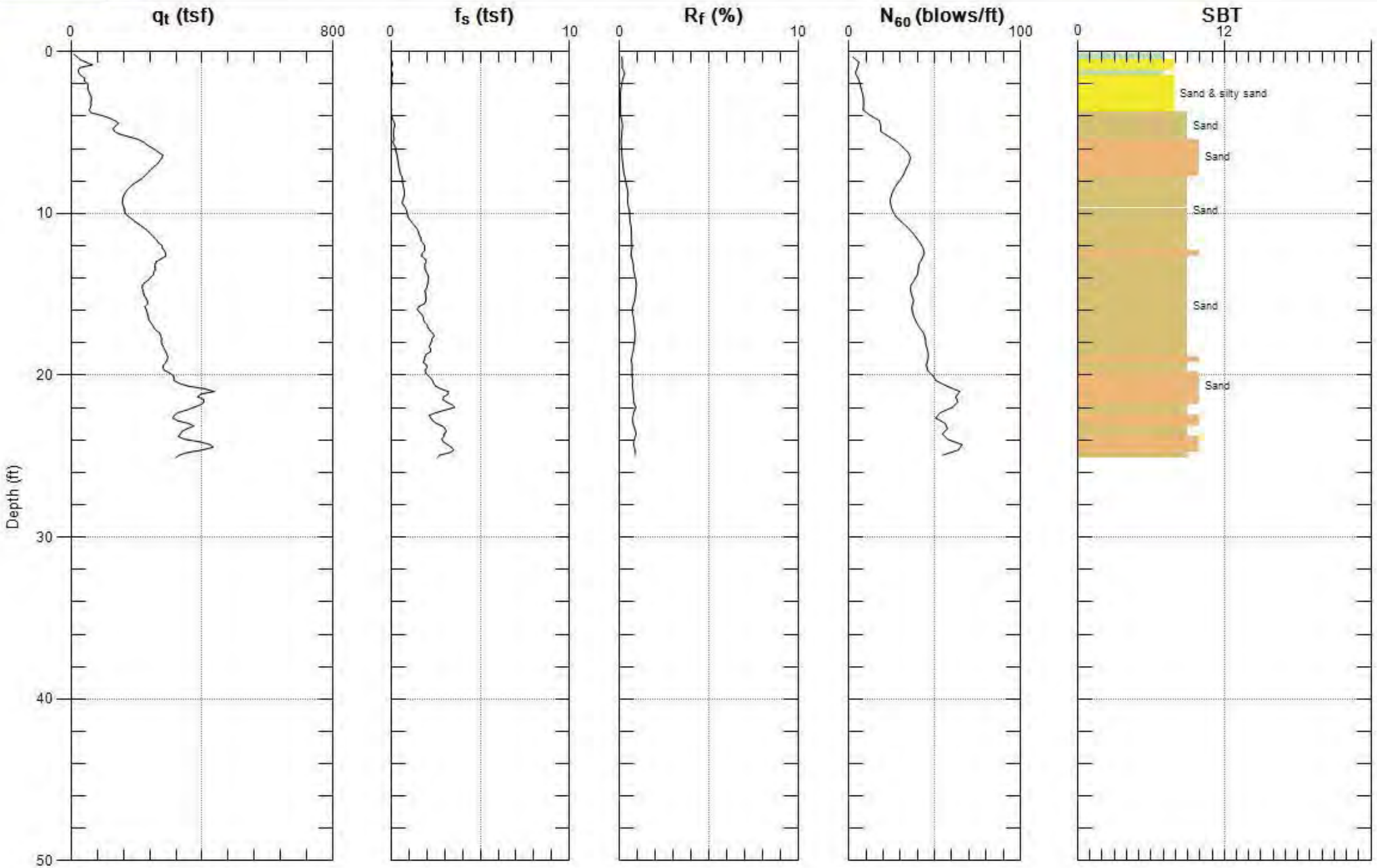
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5044

Engineer: C.AL-LAMI
Date: 7/18/2014 10:37



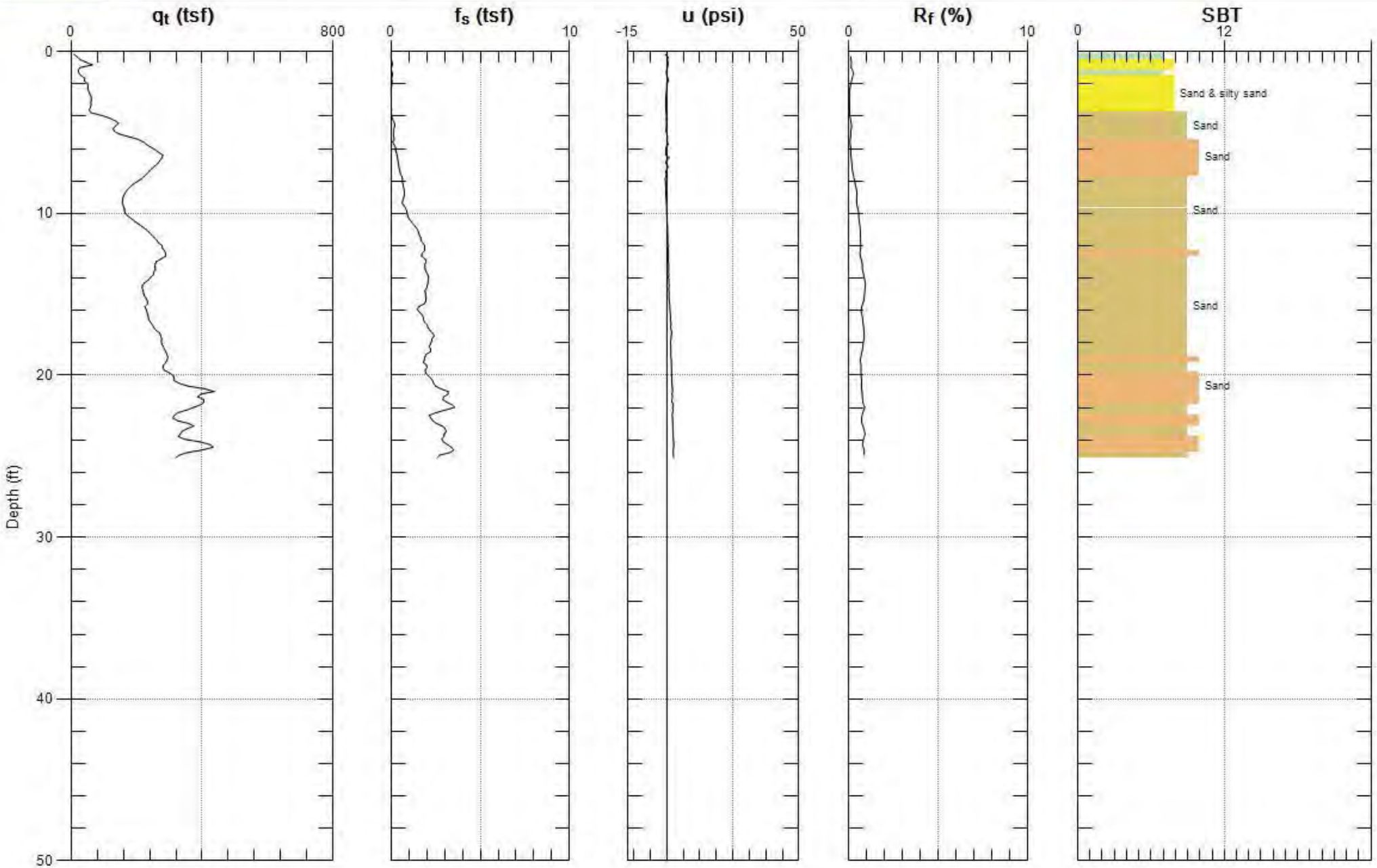
Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5044

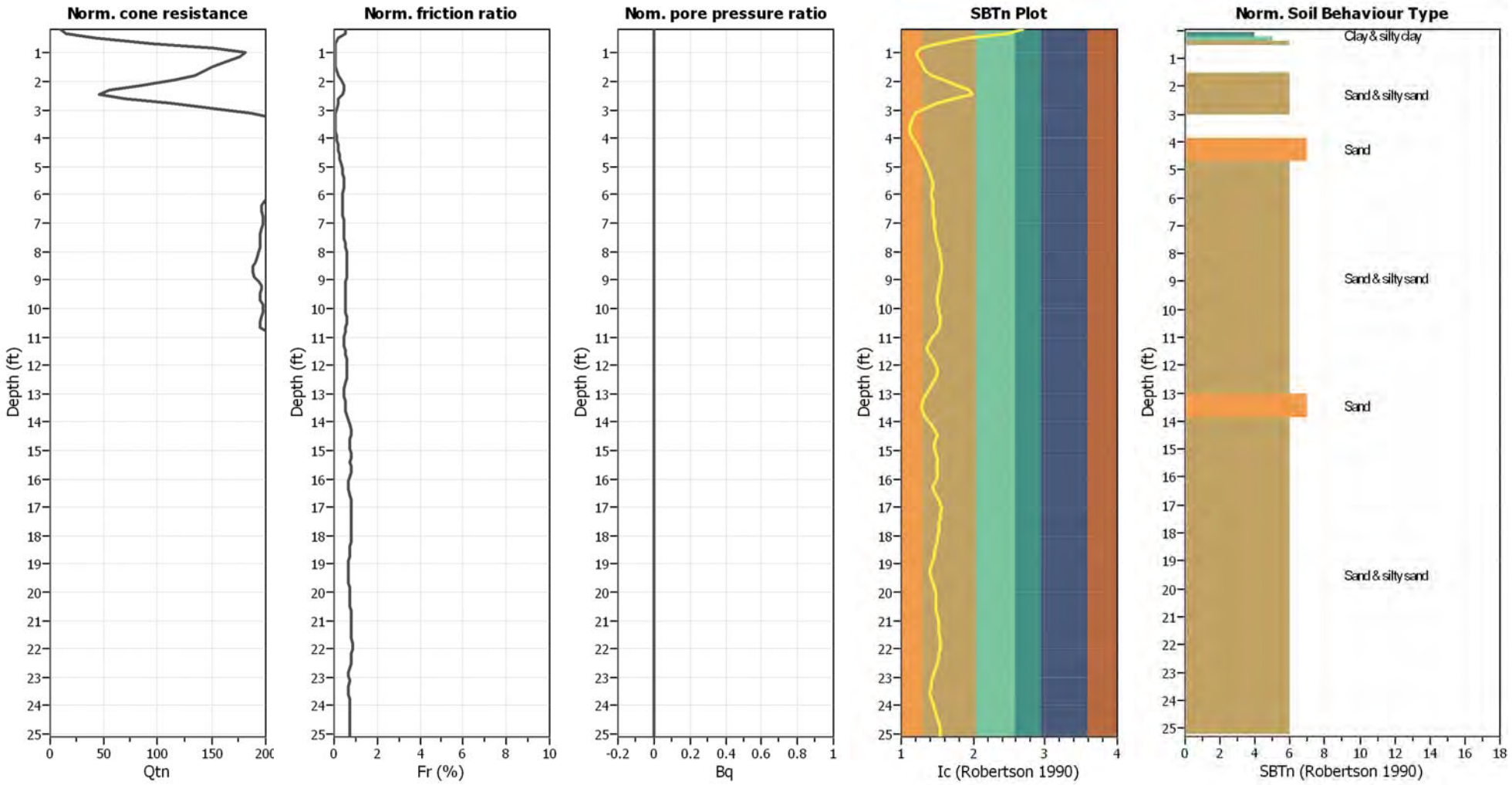
Engineer: C.AL-LAMI
Date: 7/18/2014 10:37



Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



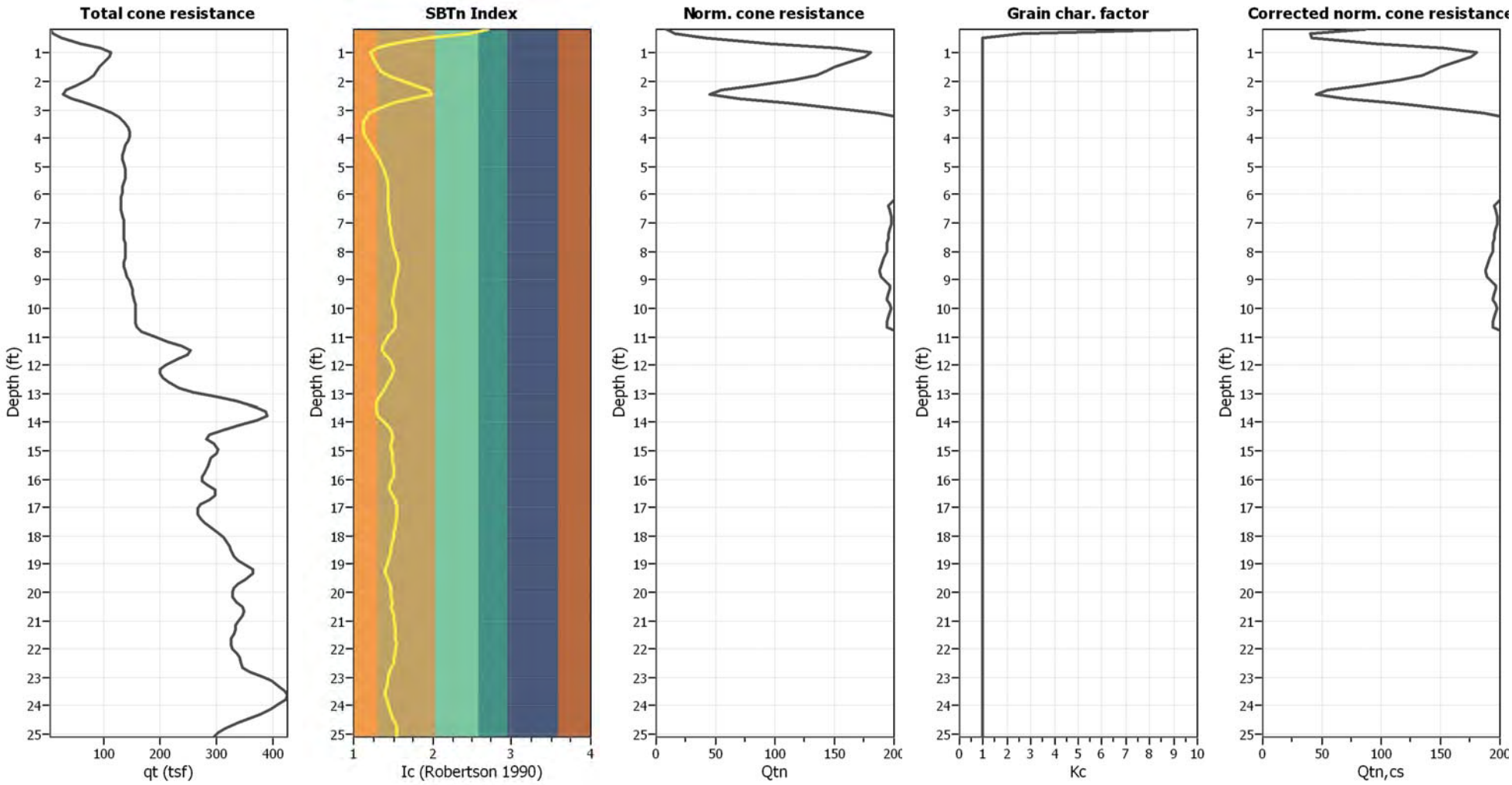
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

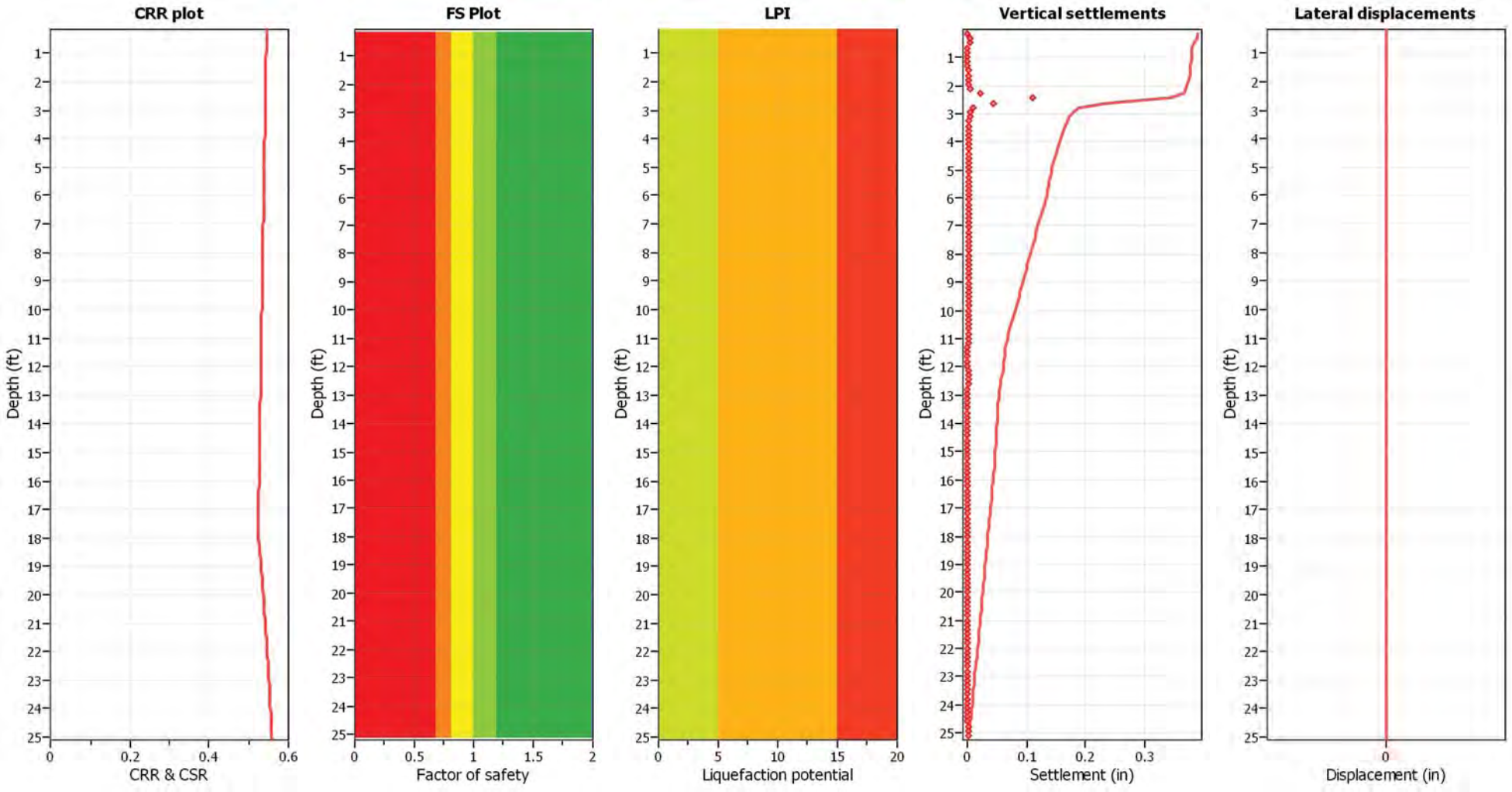
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

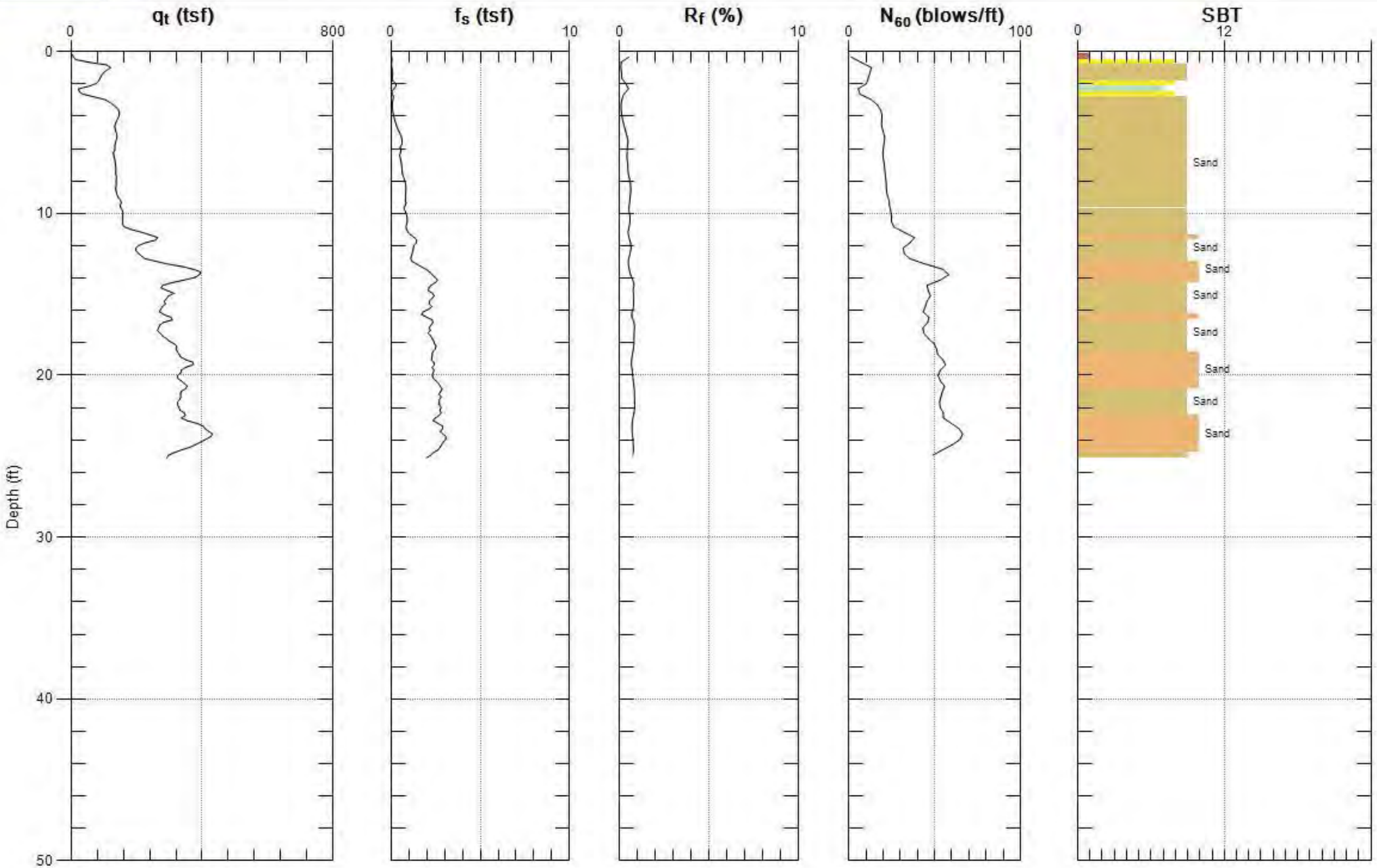
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5038

Engineer: C.AL-LAMI
Date: 7/18/2014 11:02



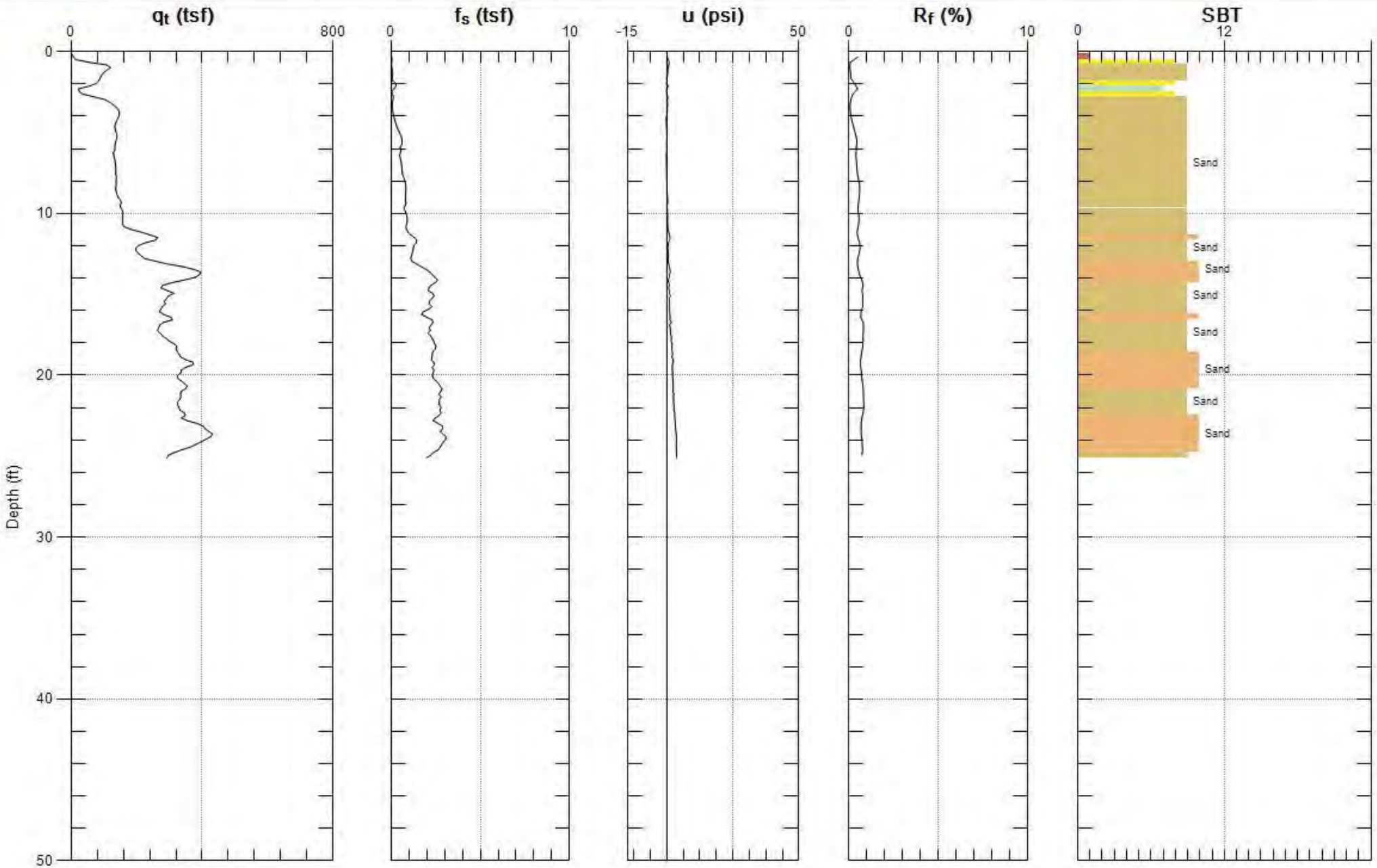
Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5038

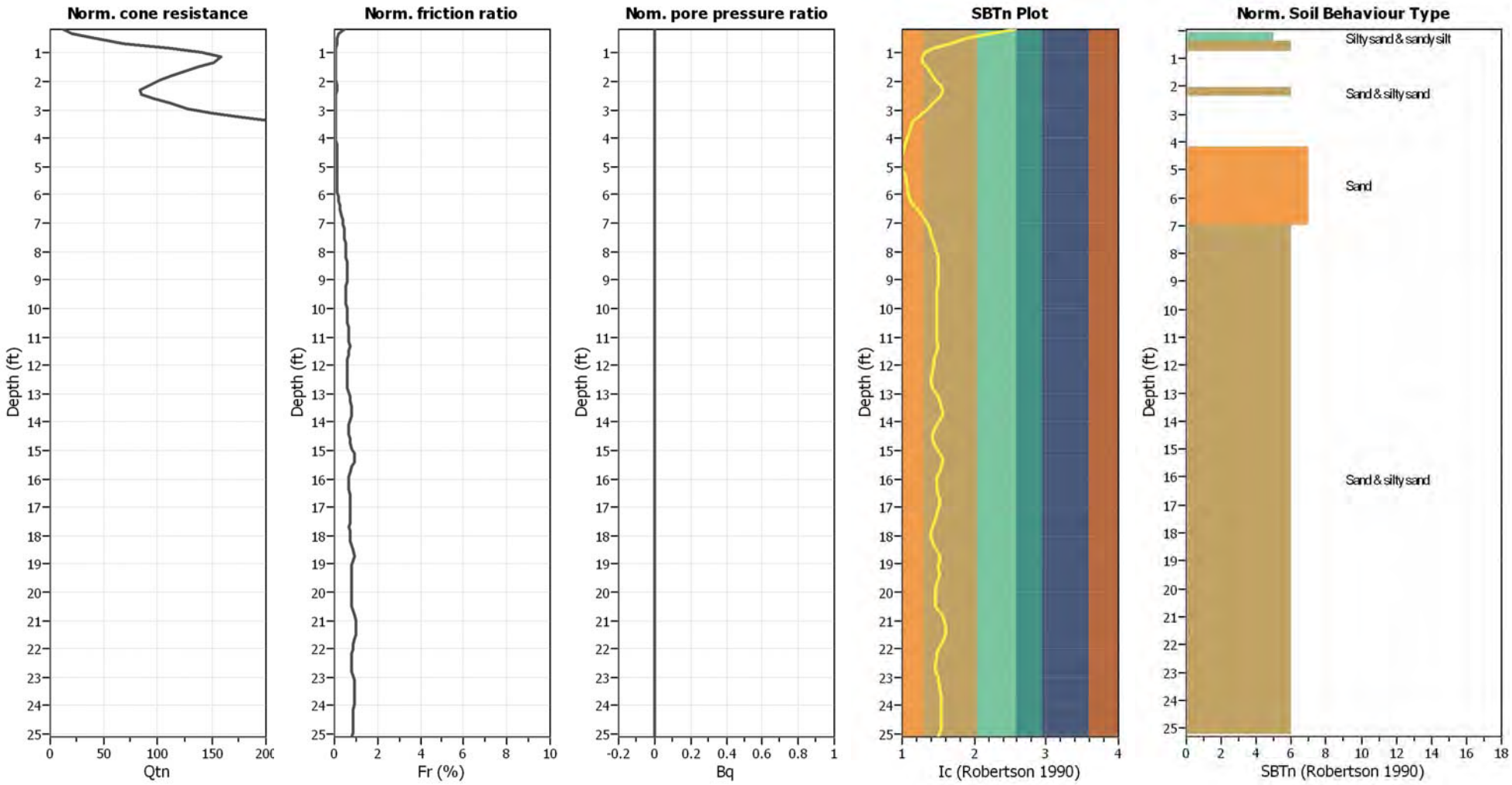
Engineer: C.AL-LAMI
Date: 7/18/2014 11:02



Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



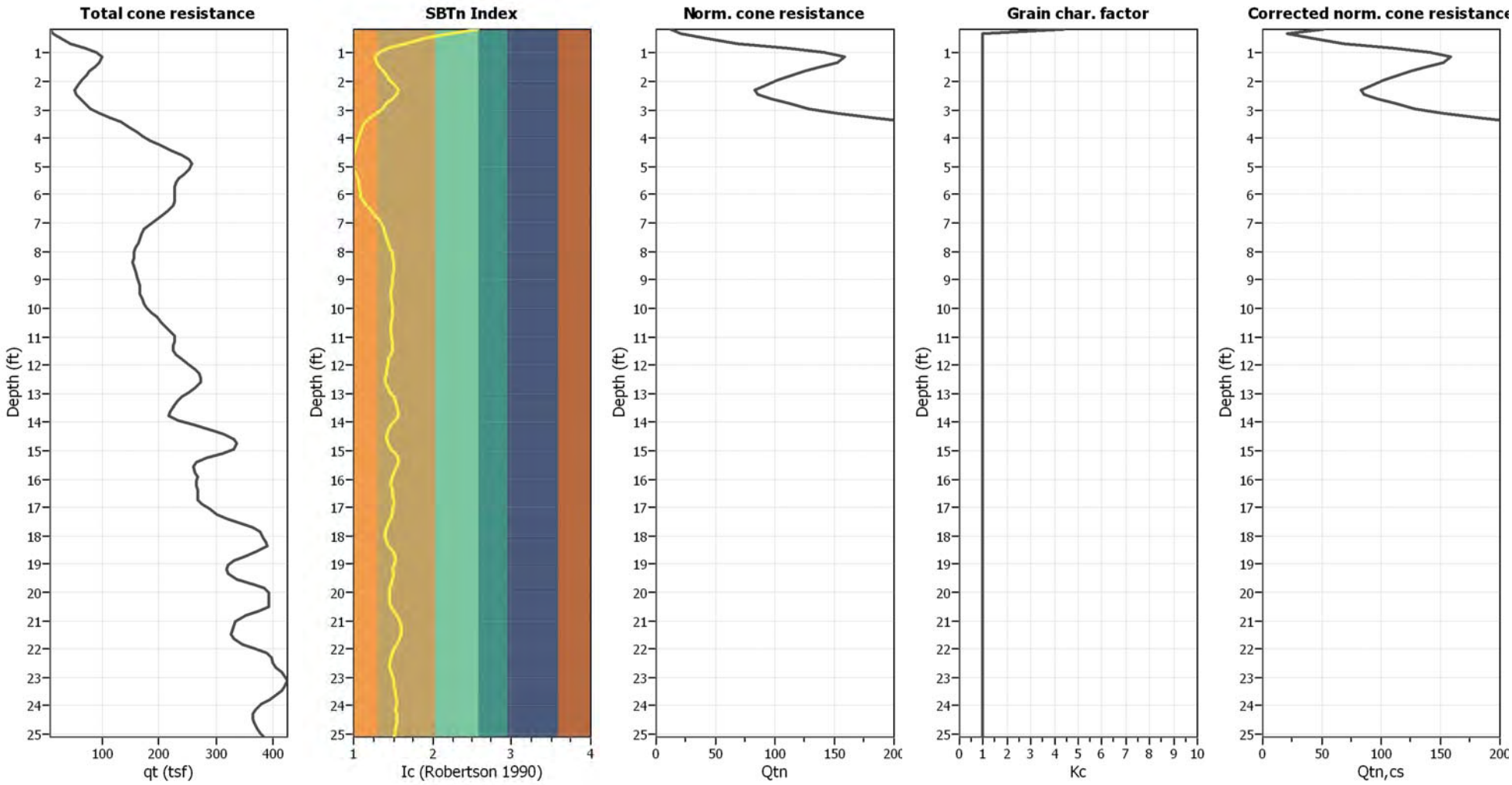
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

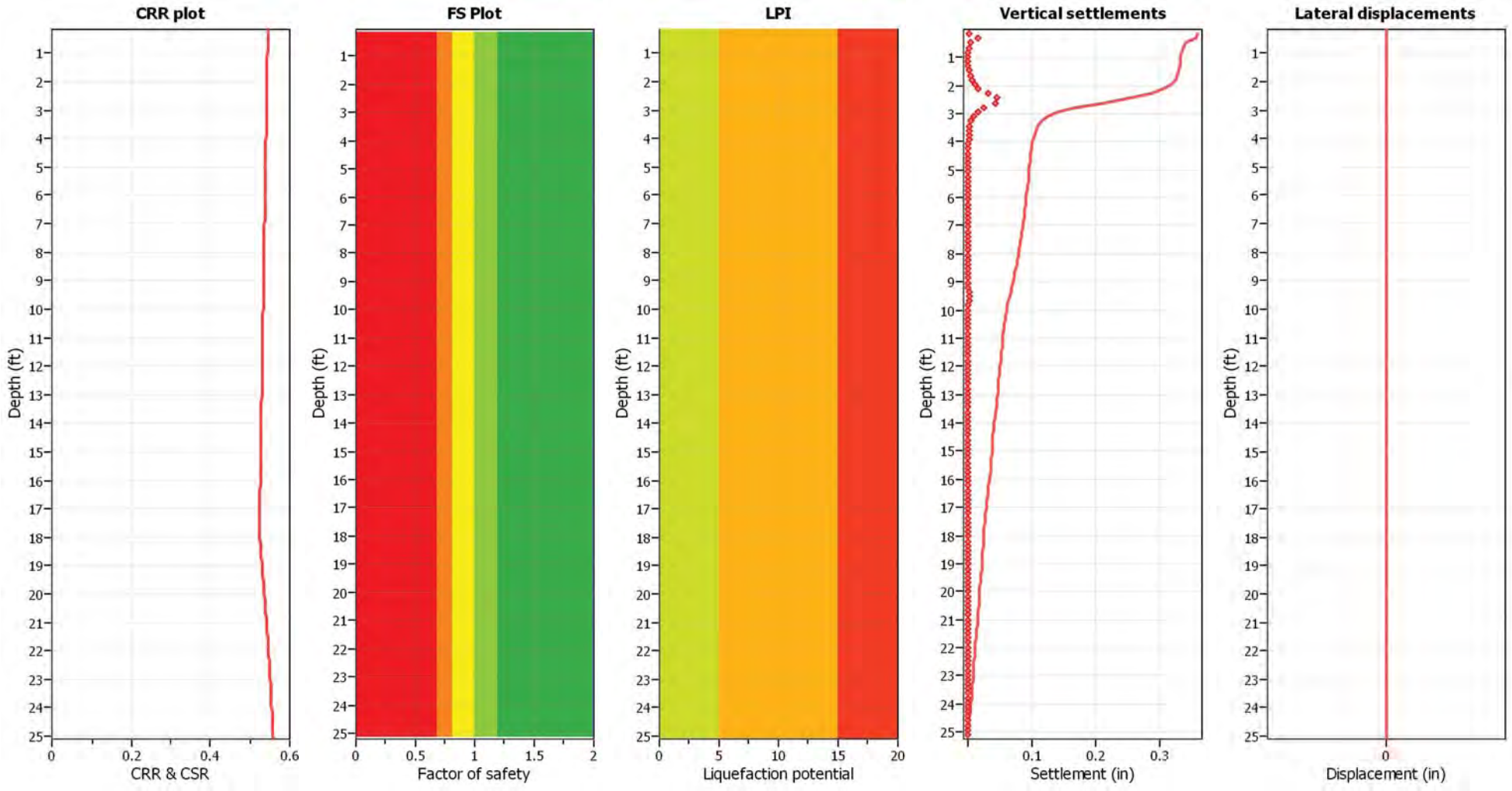
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

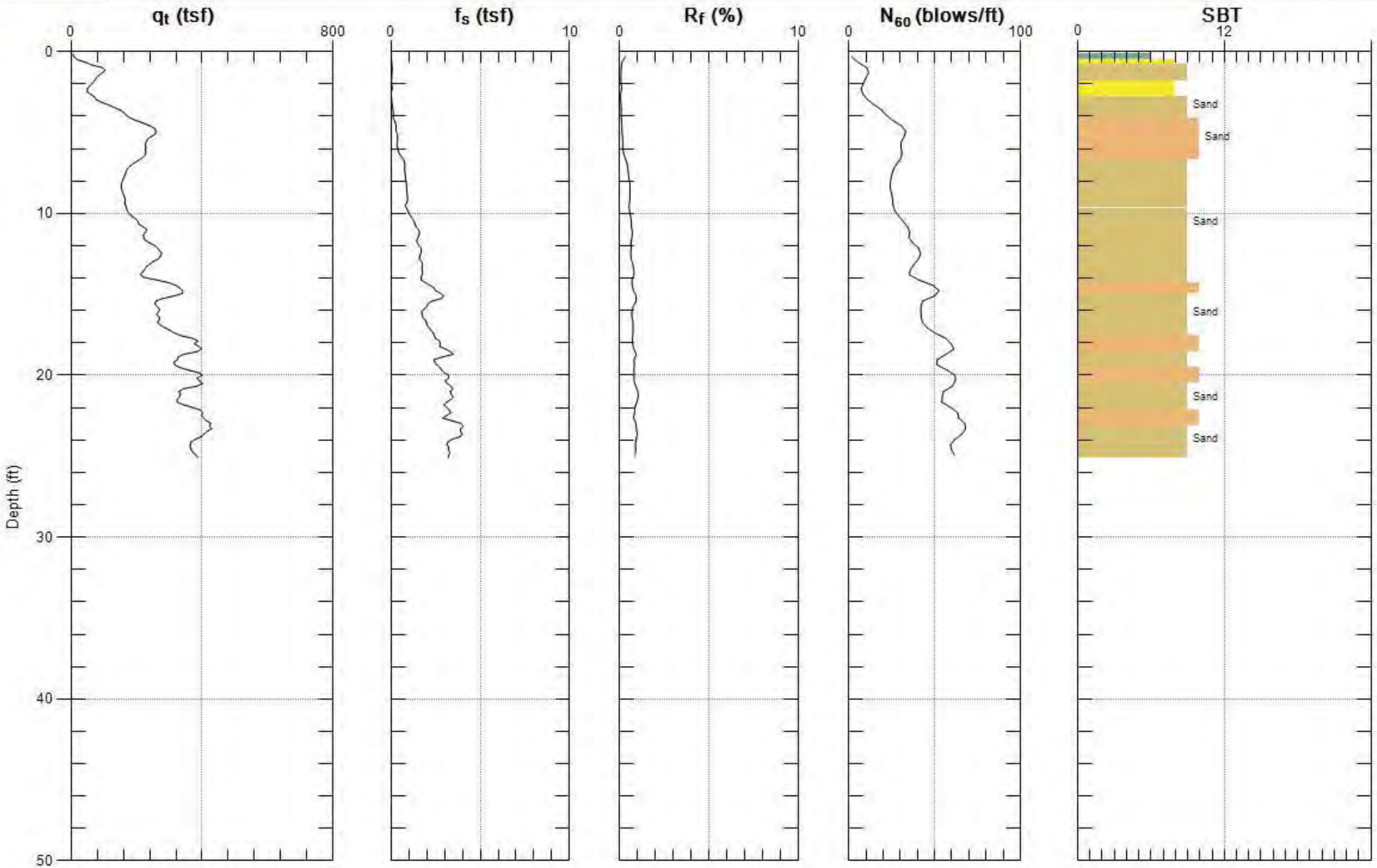
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5037

Engineer: C.AL-LAMI
Date: 7/17/2014 04:09



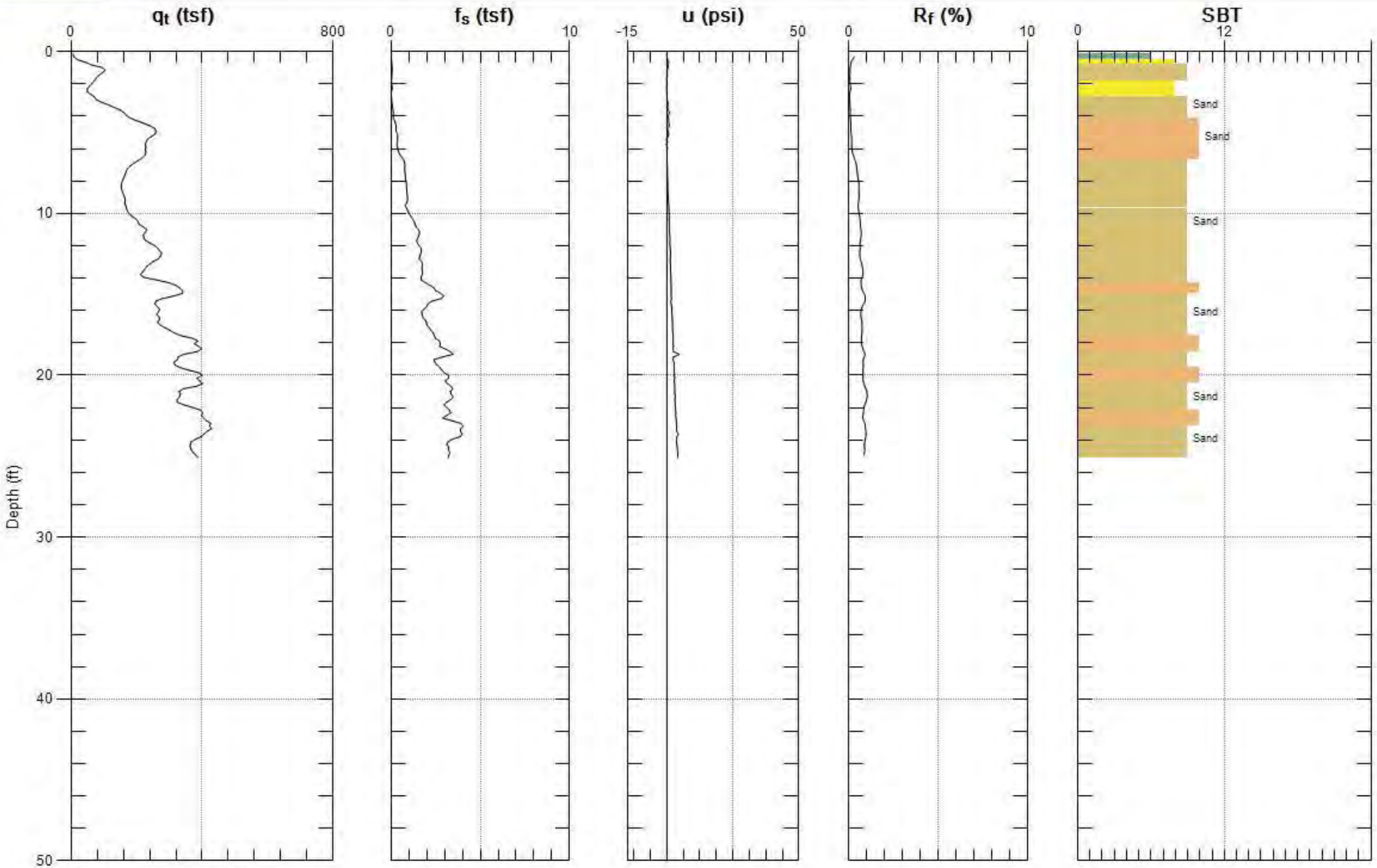
Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5037

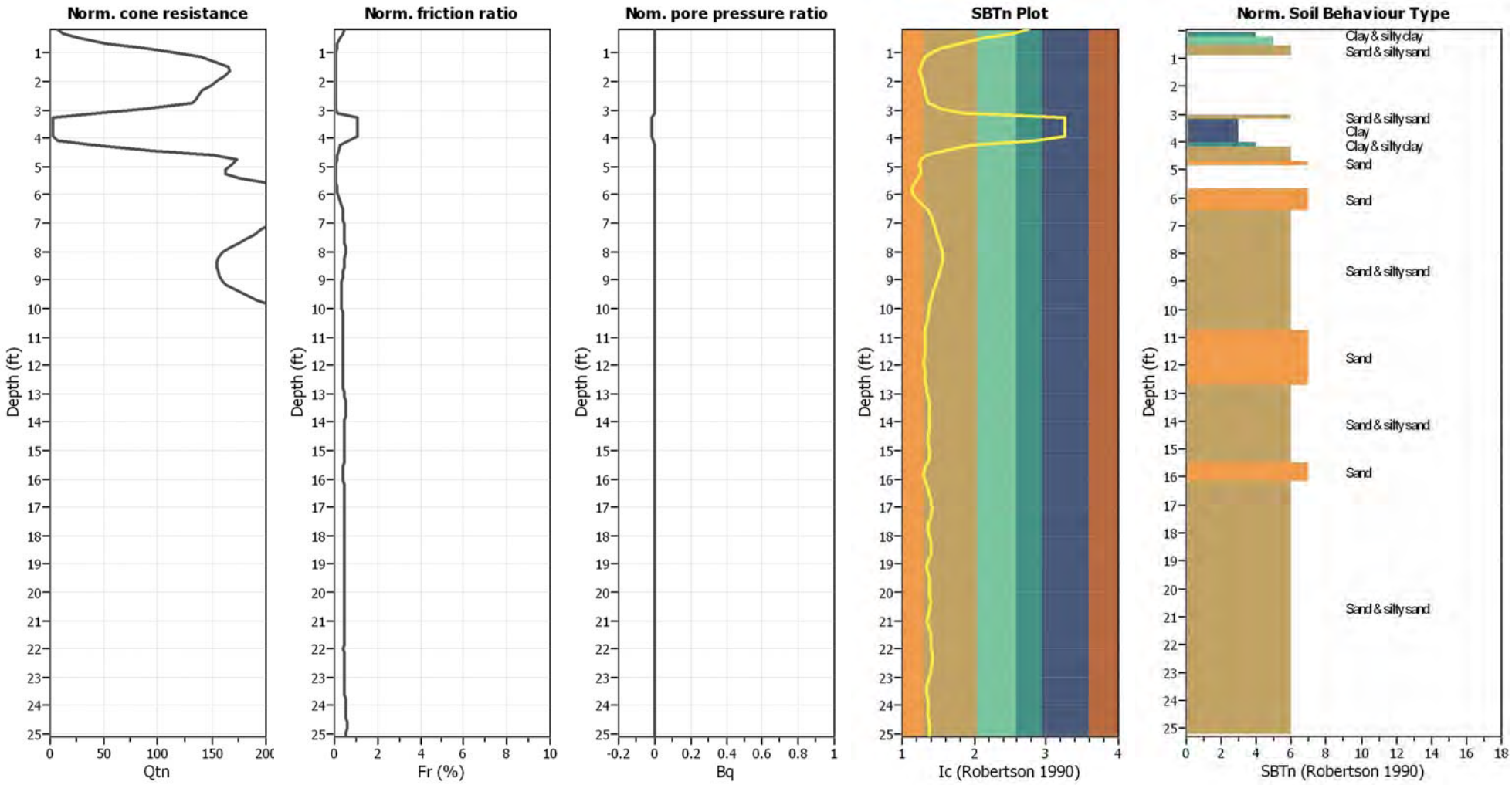
Engineer: C.AL-LAMI
Date: 7/17/2014 04:09



Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



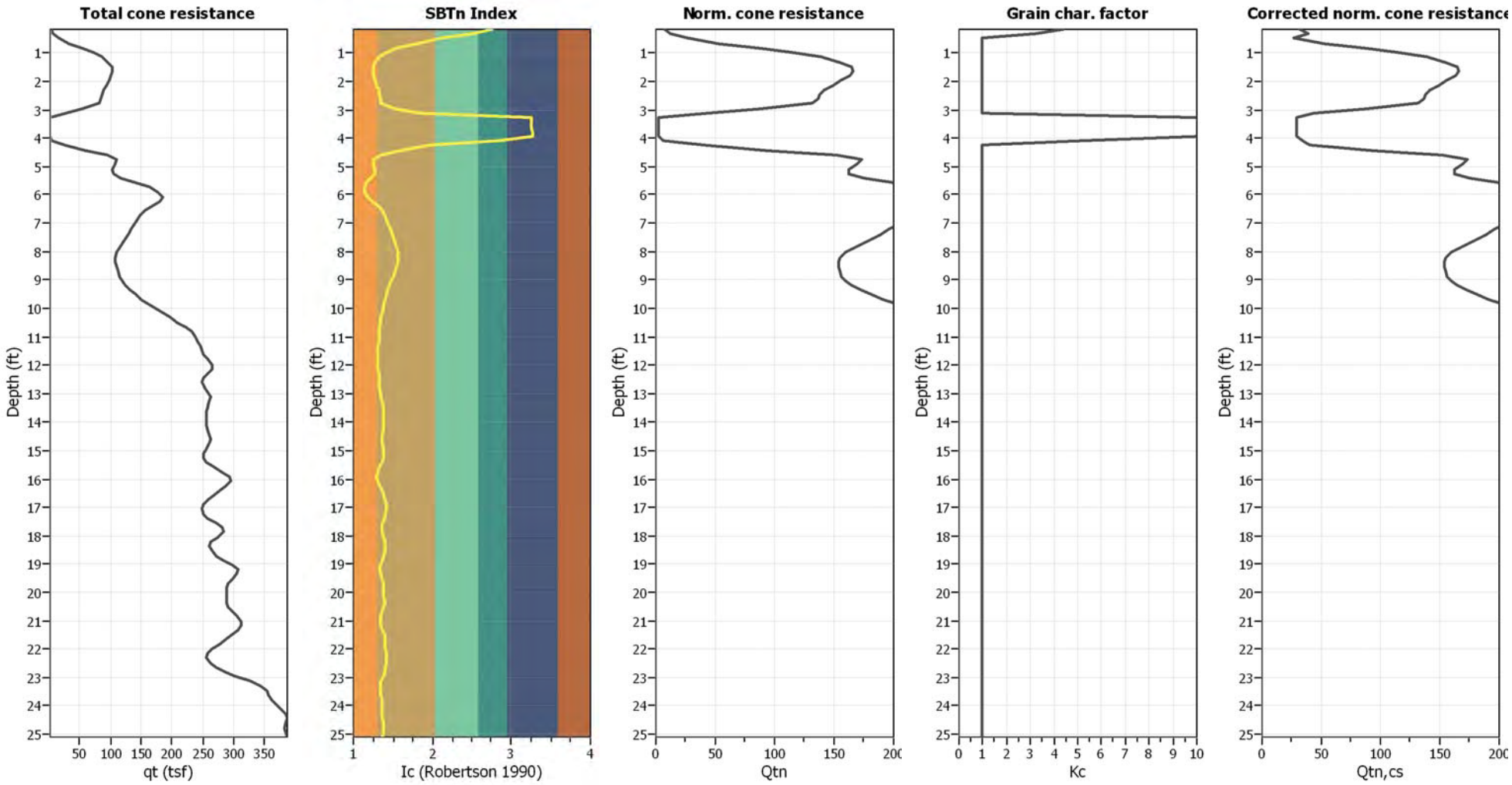
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

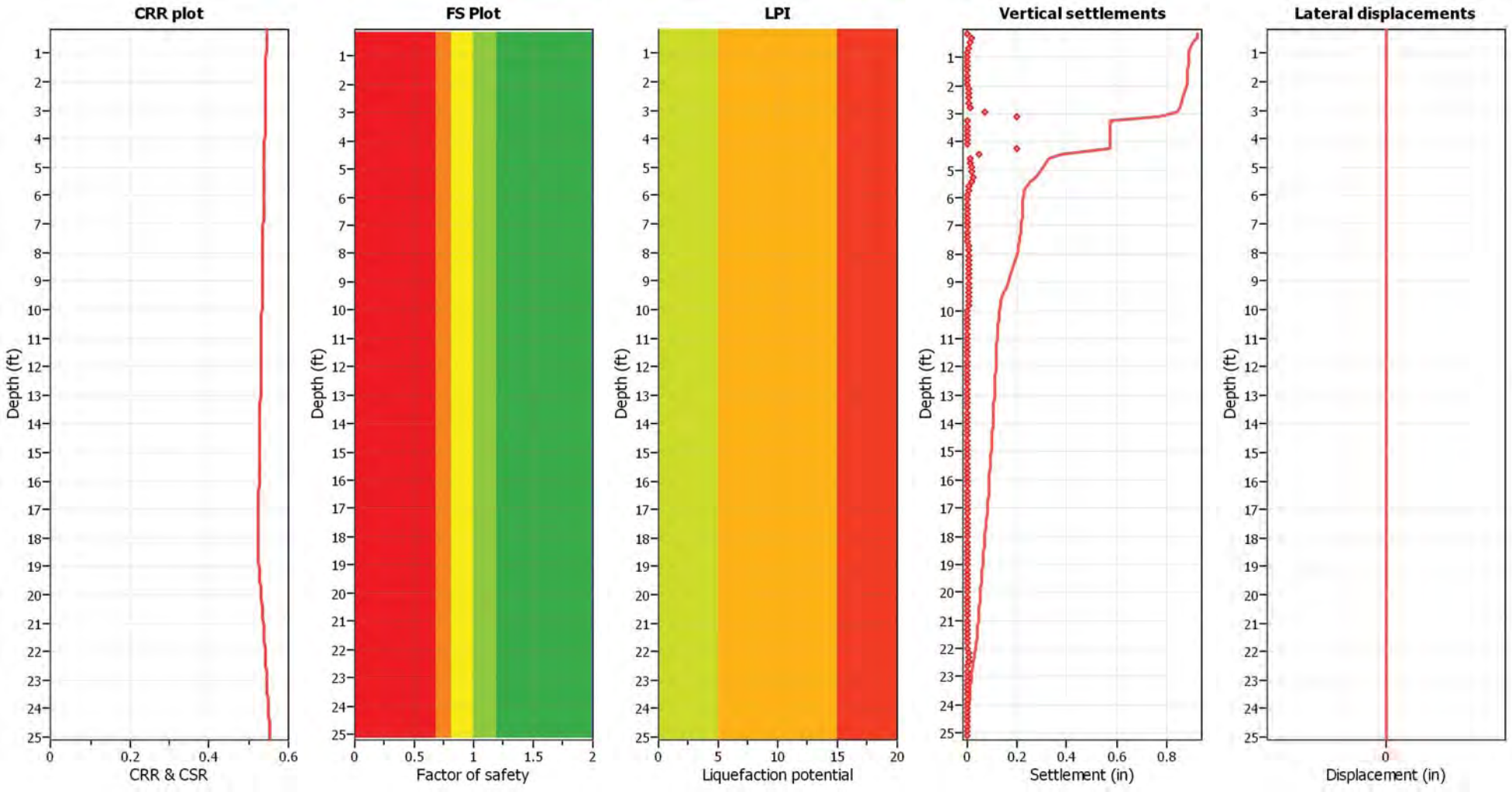
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

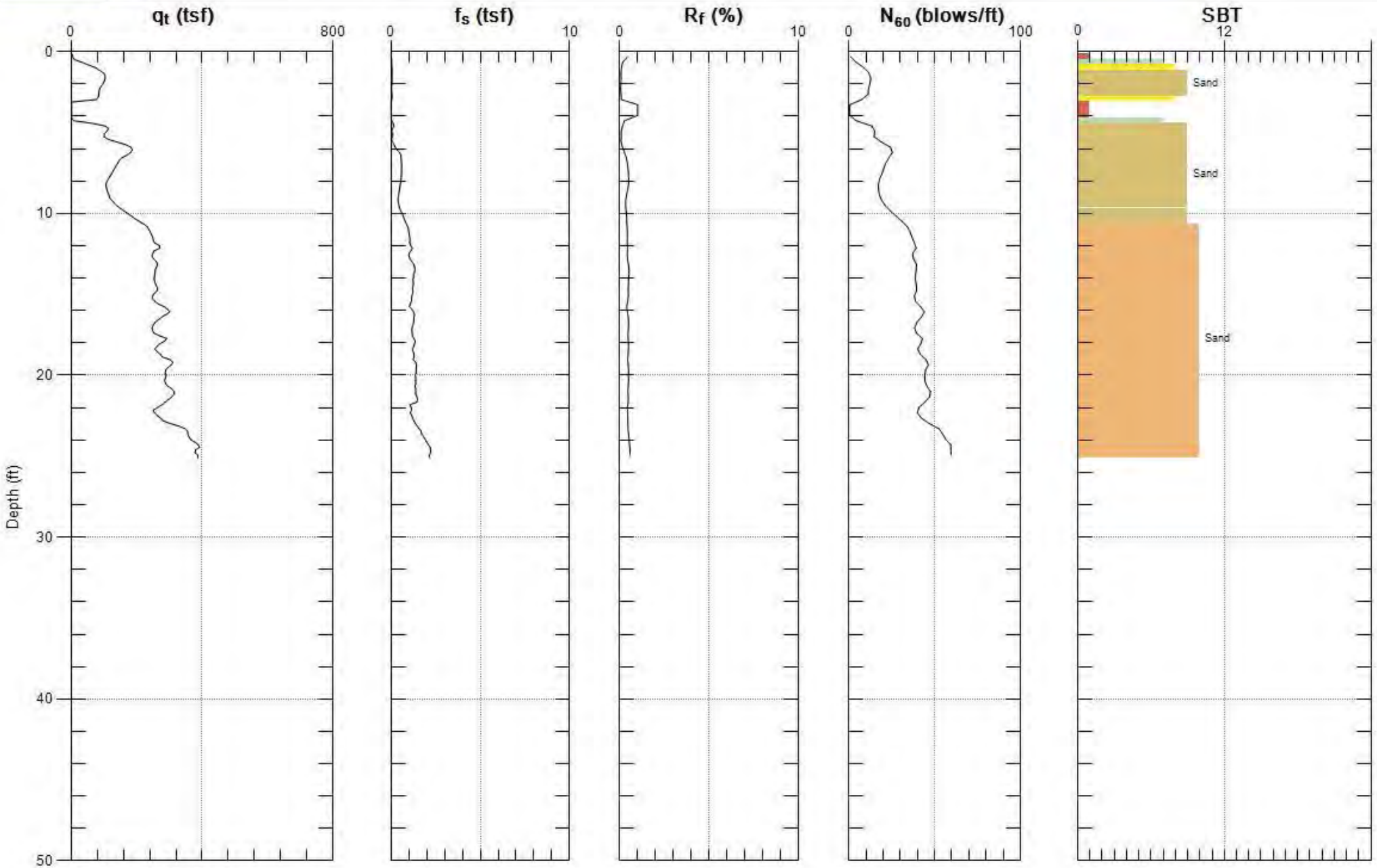
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5043

Engineer: C.AL-LAMI
Date: 7/18/2014 01:01



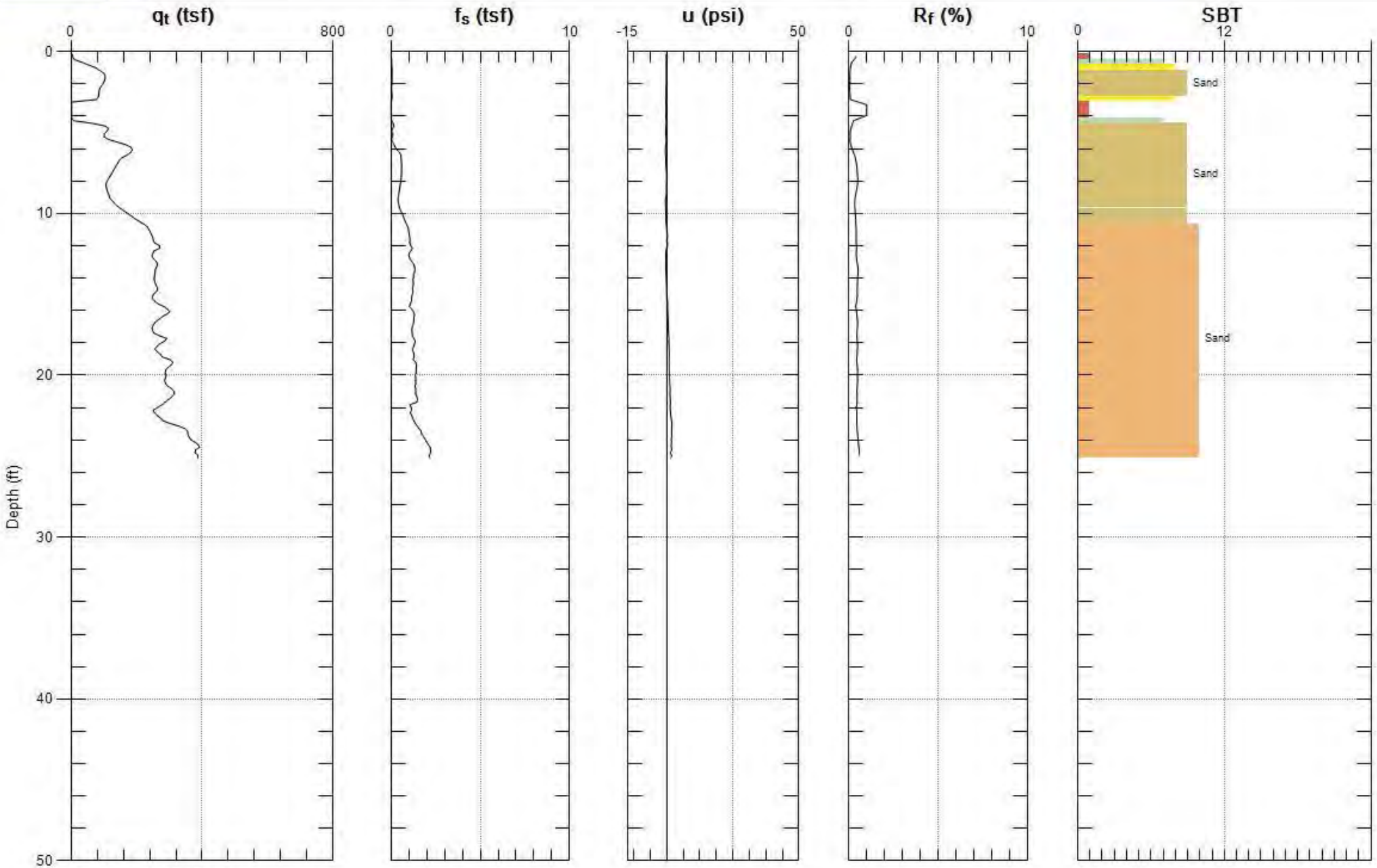
Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5043

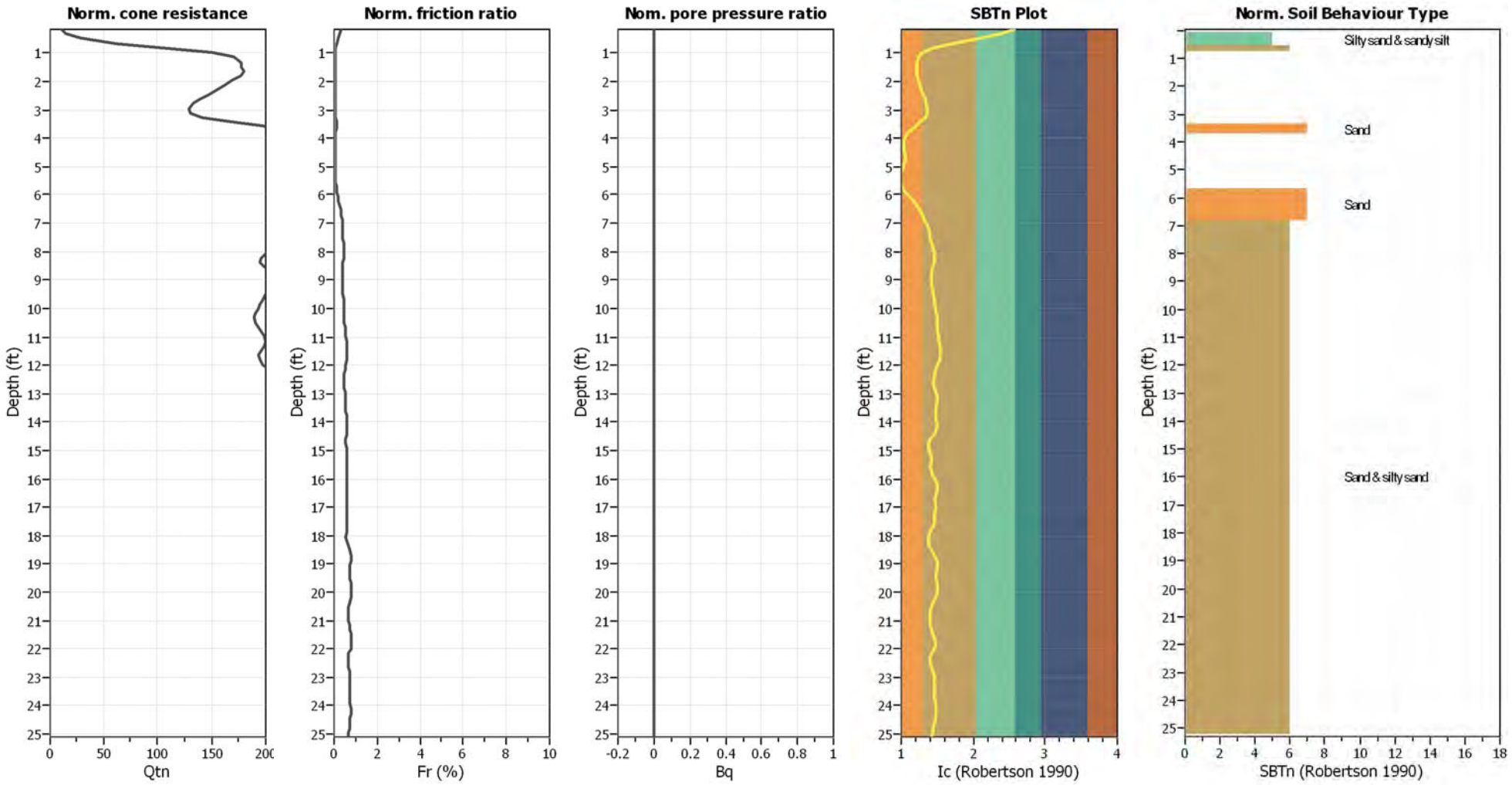
Engineer: C.AL-LAMI
Date: 7/18/2014 01:01



Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



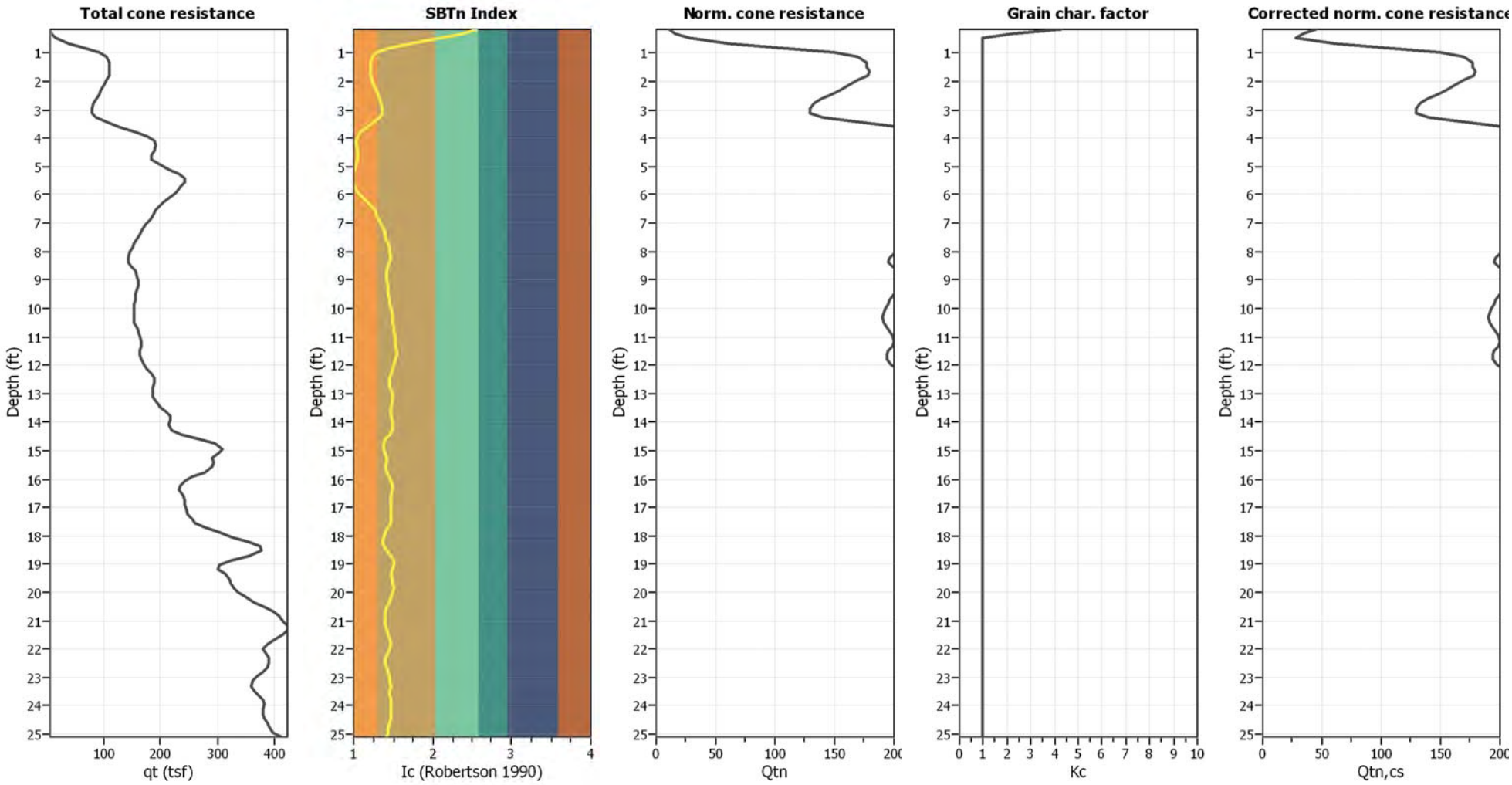
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

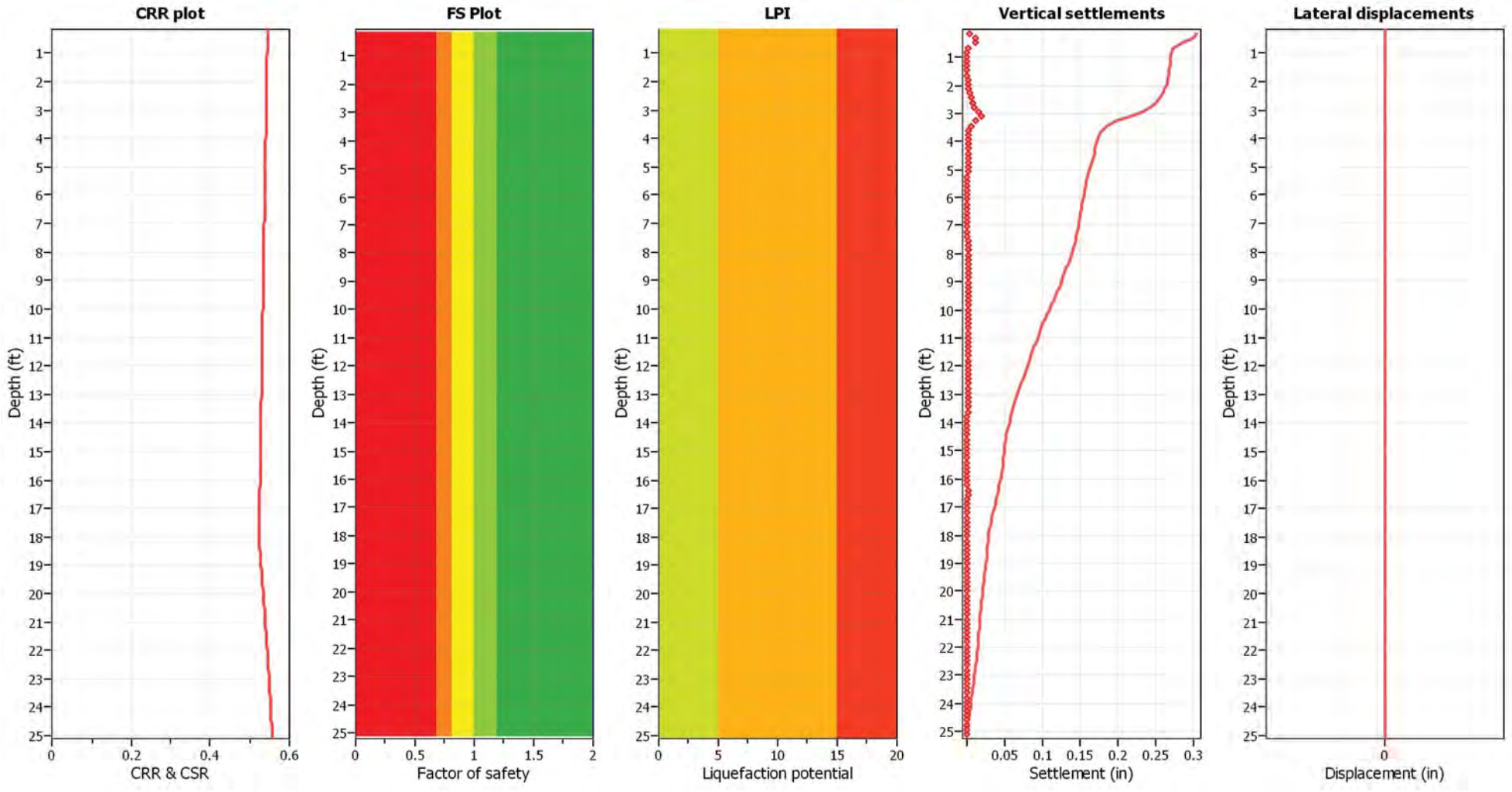
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

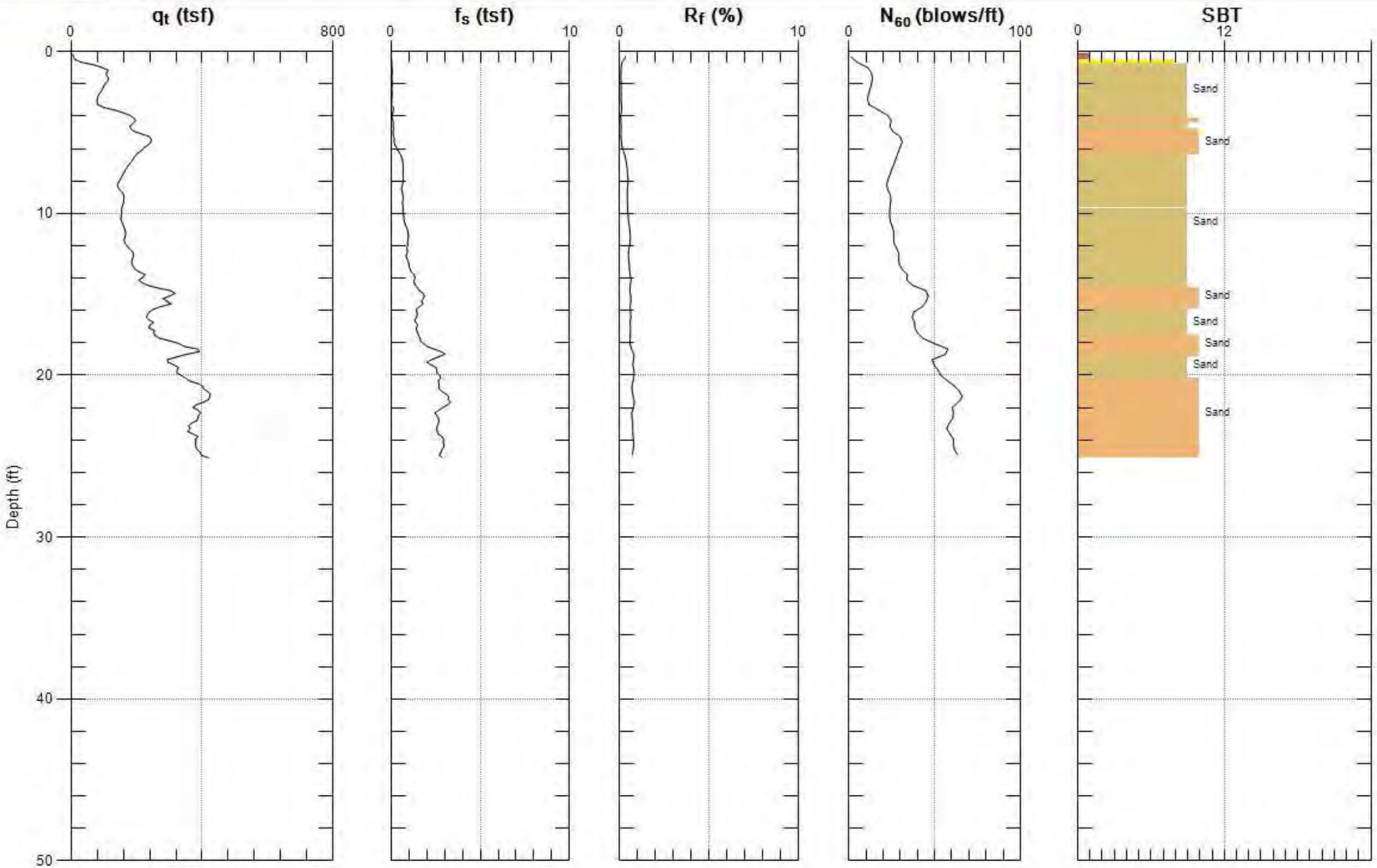
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5042

Engineer: C.AL-LAMI
Date: 7/18/2014 12:34



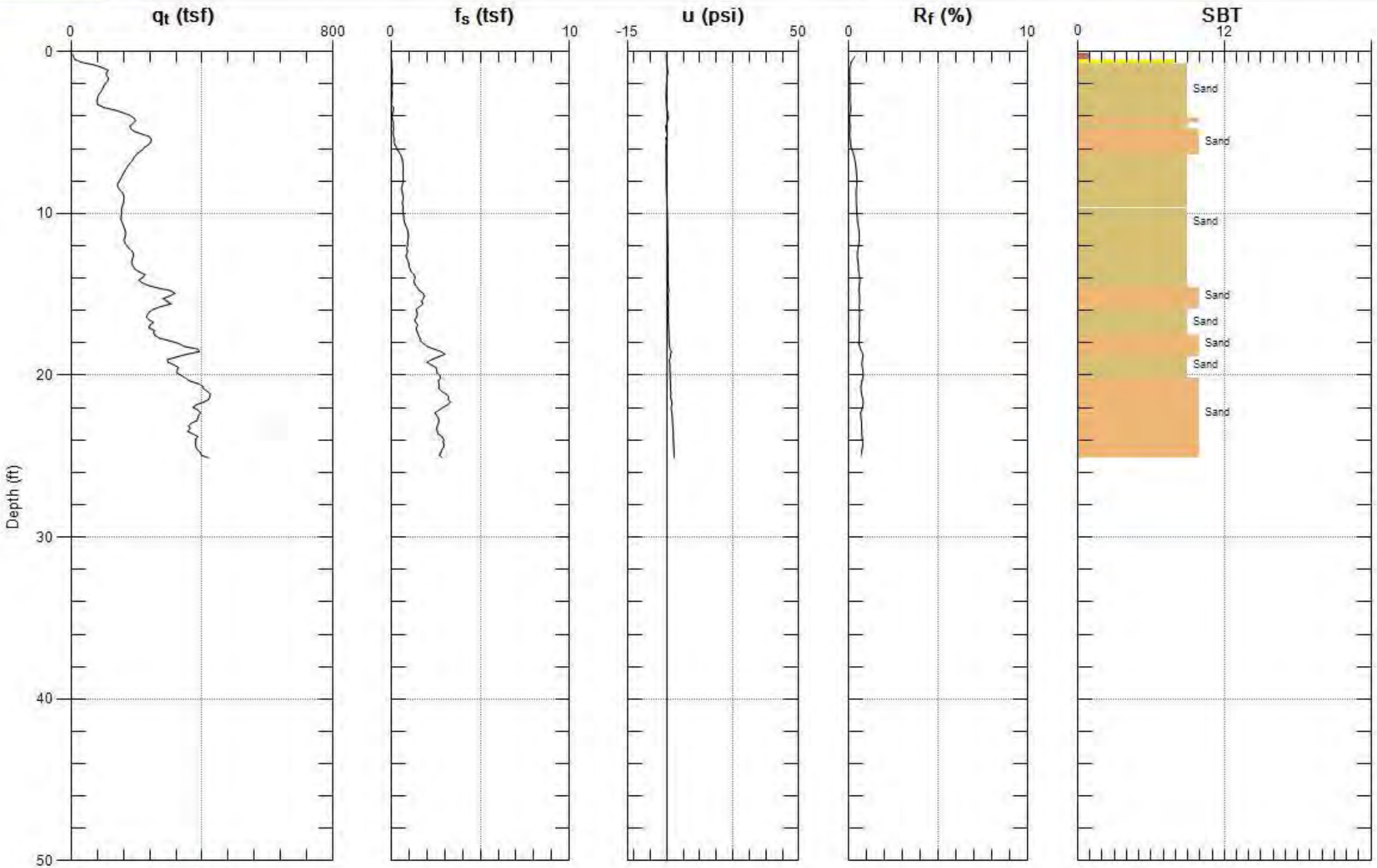
Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5042

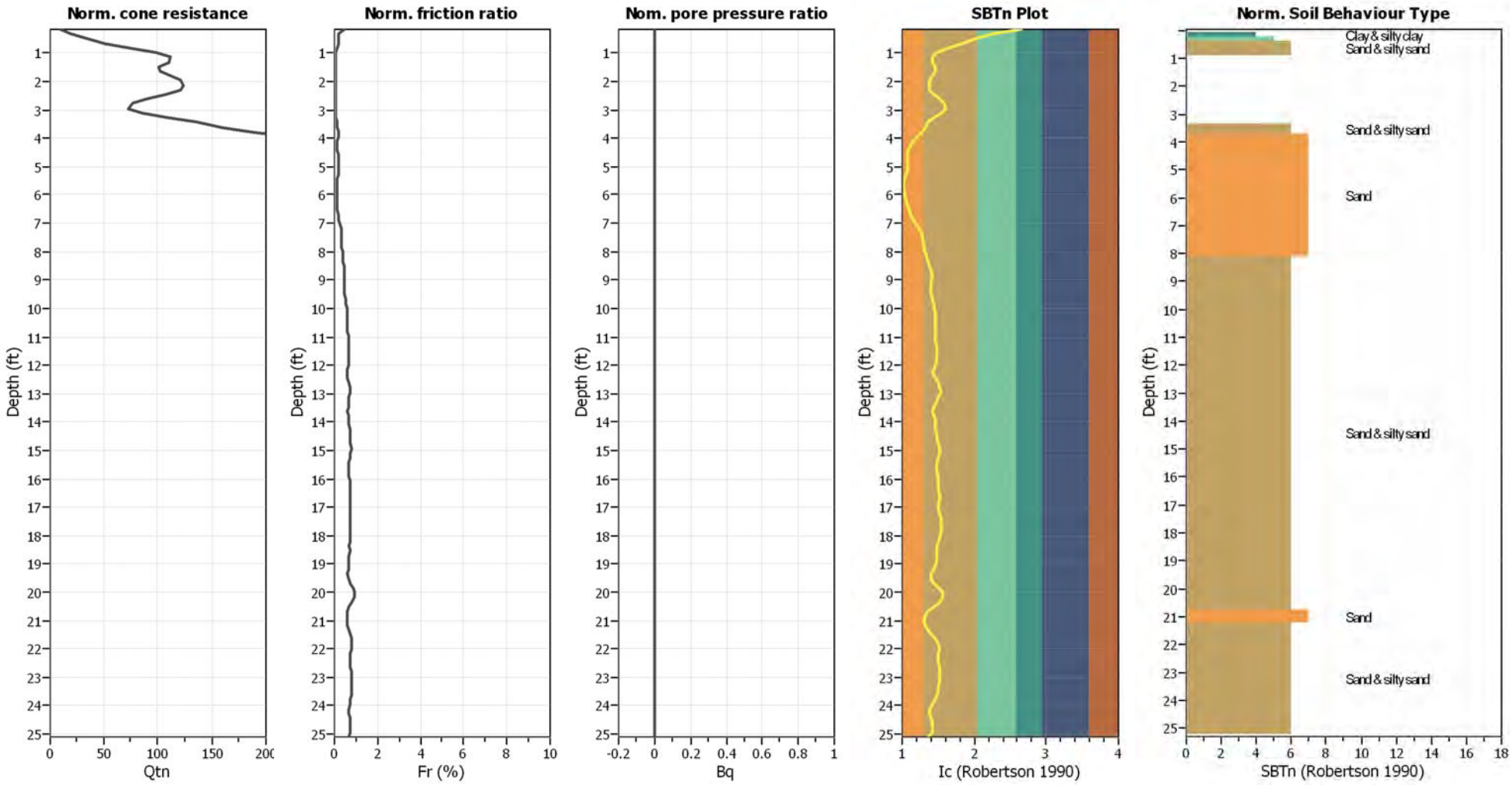
Engineer: C.AL-LAMI
Date: 7/18/2014 12:34



Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



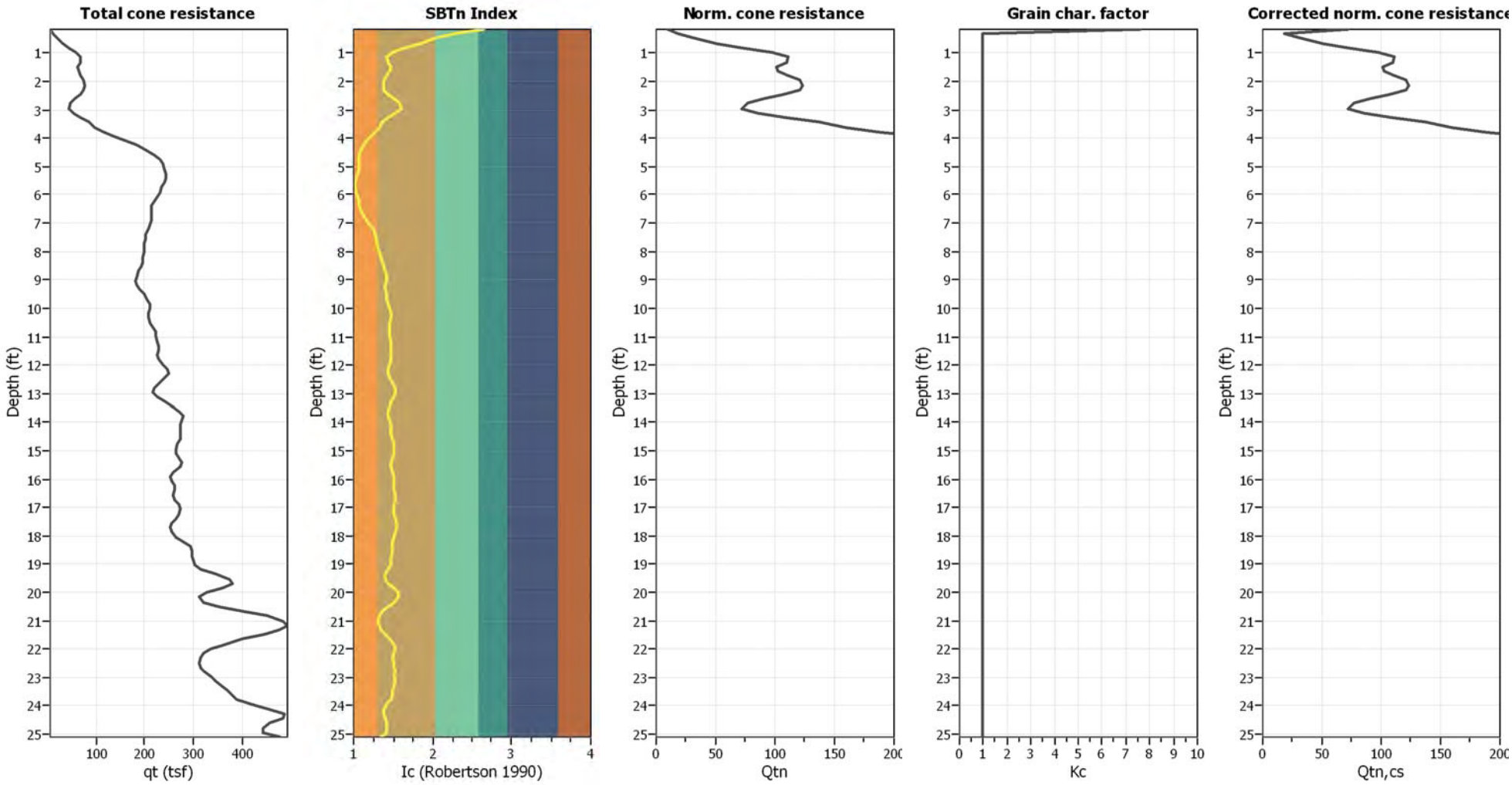
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

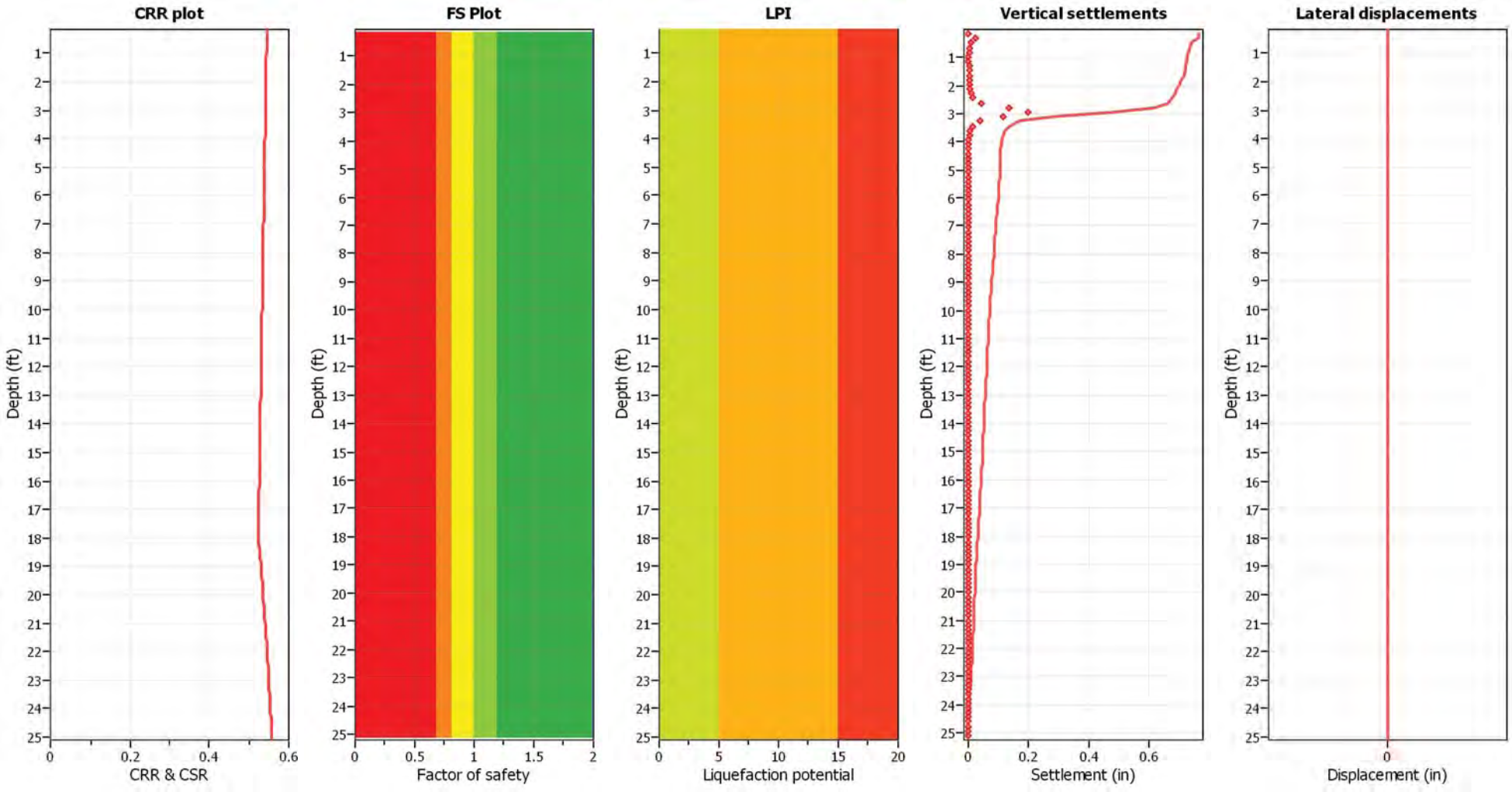
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

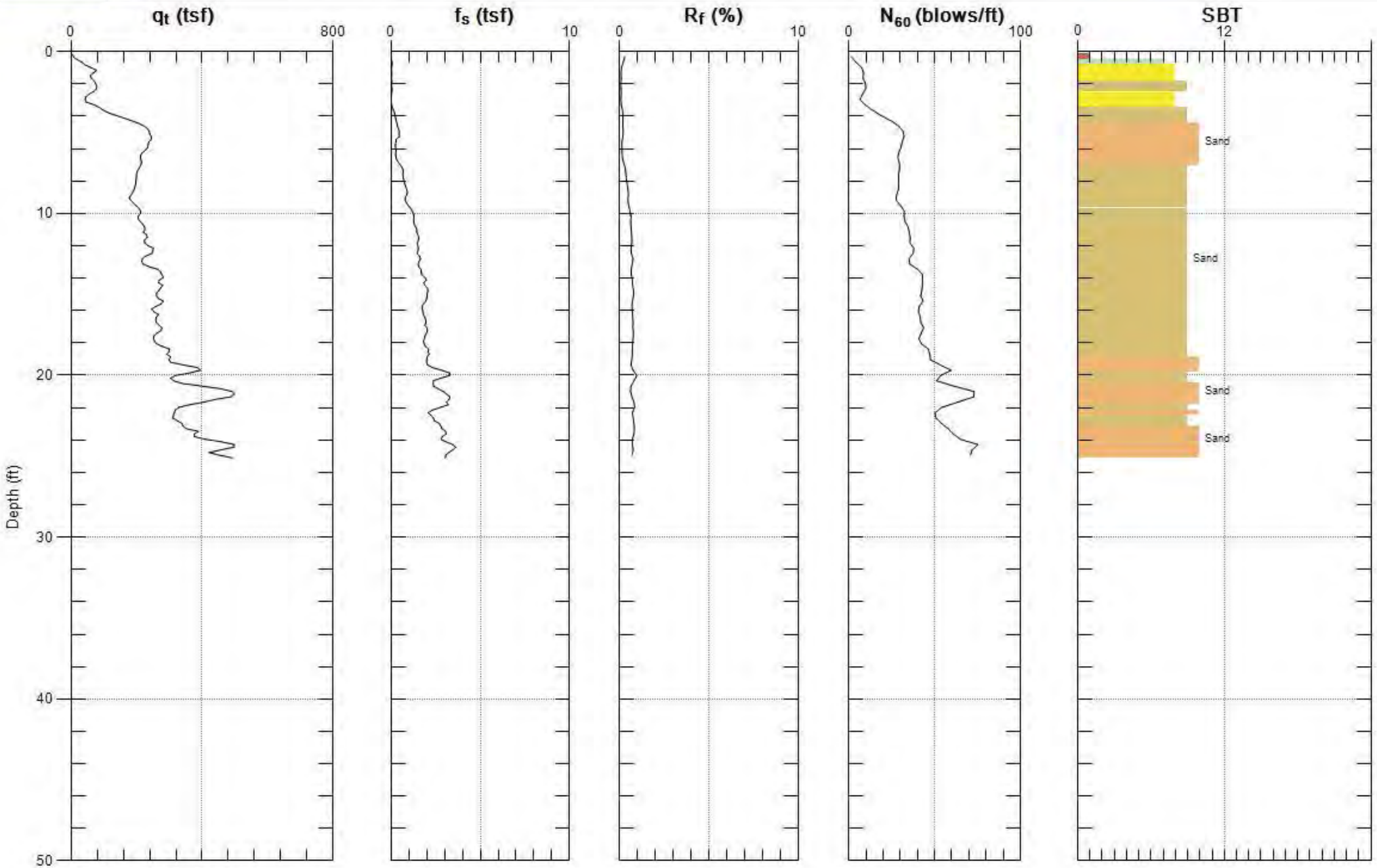
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5041

Engineer: C.AL-LAMI
Date: 7/18/2014 12:07



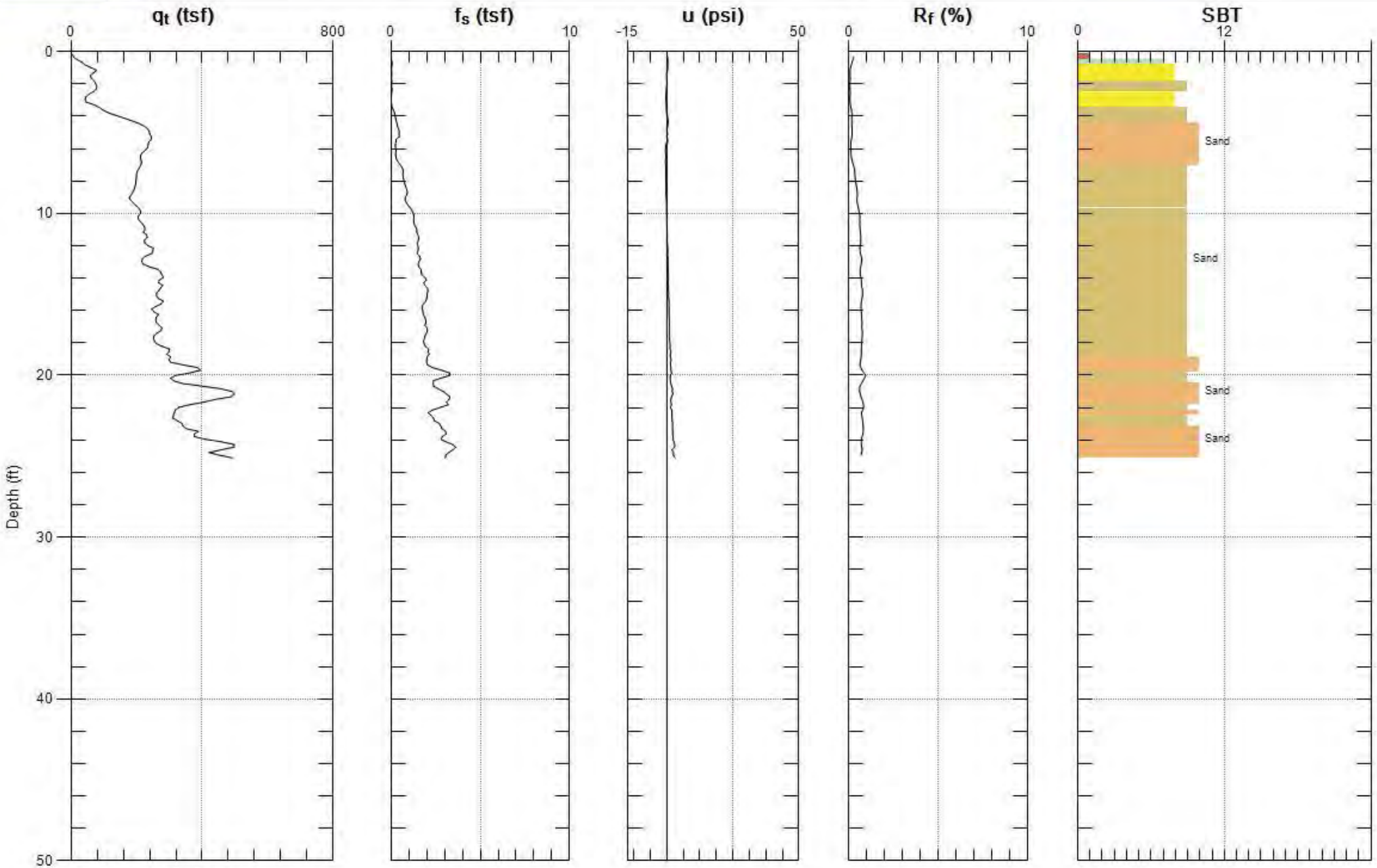
Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5041

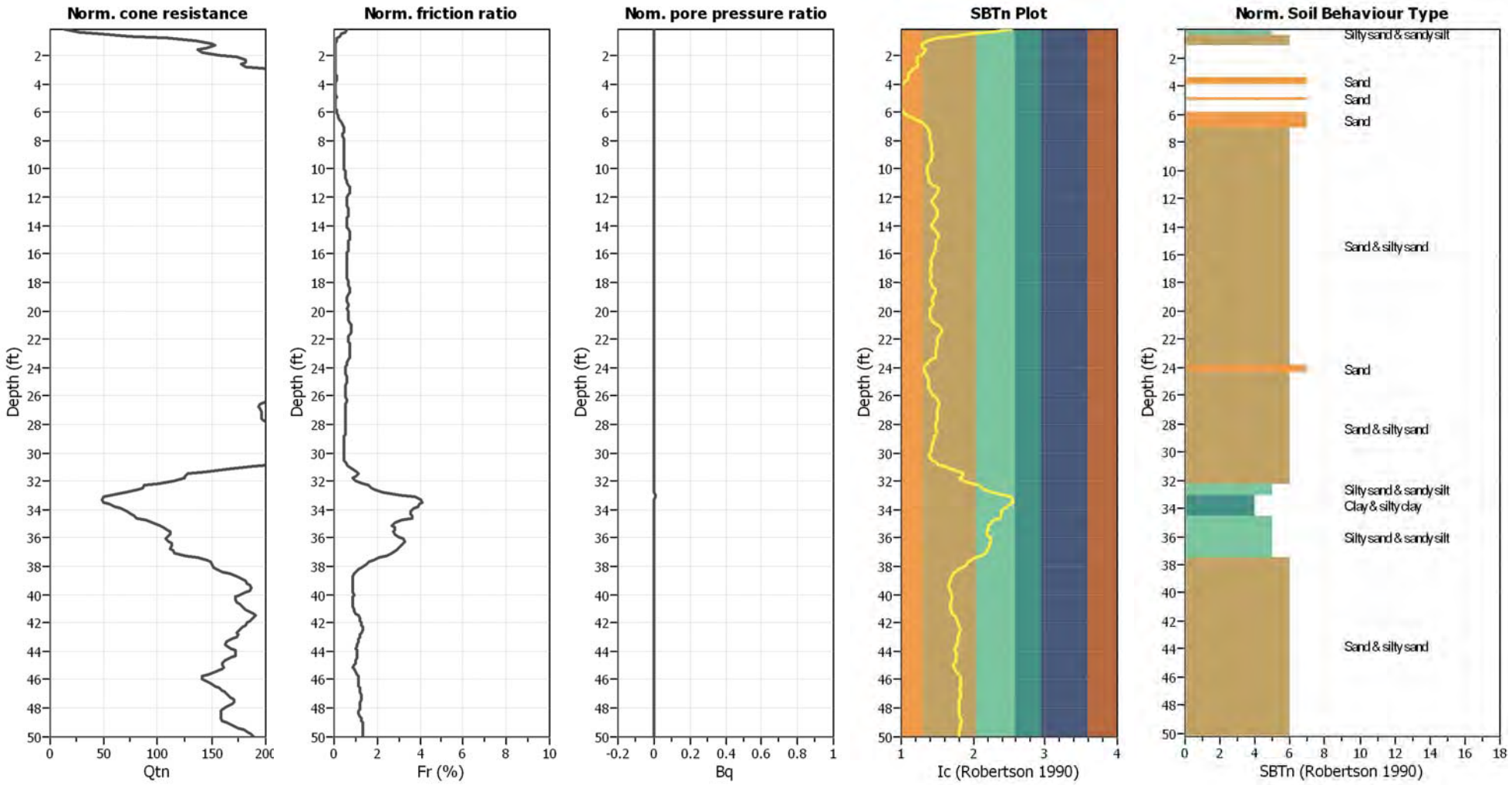
Engineer: C.AL-LAMI
Date: 7/18/2014 12:07



Max. Depth: 25.098 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

CPT basic interpretation plots (normalized)



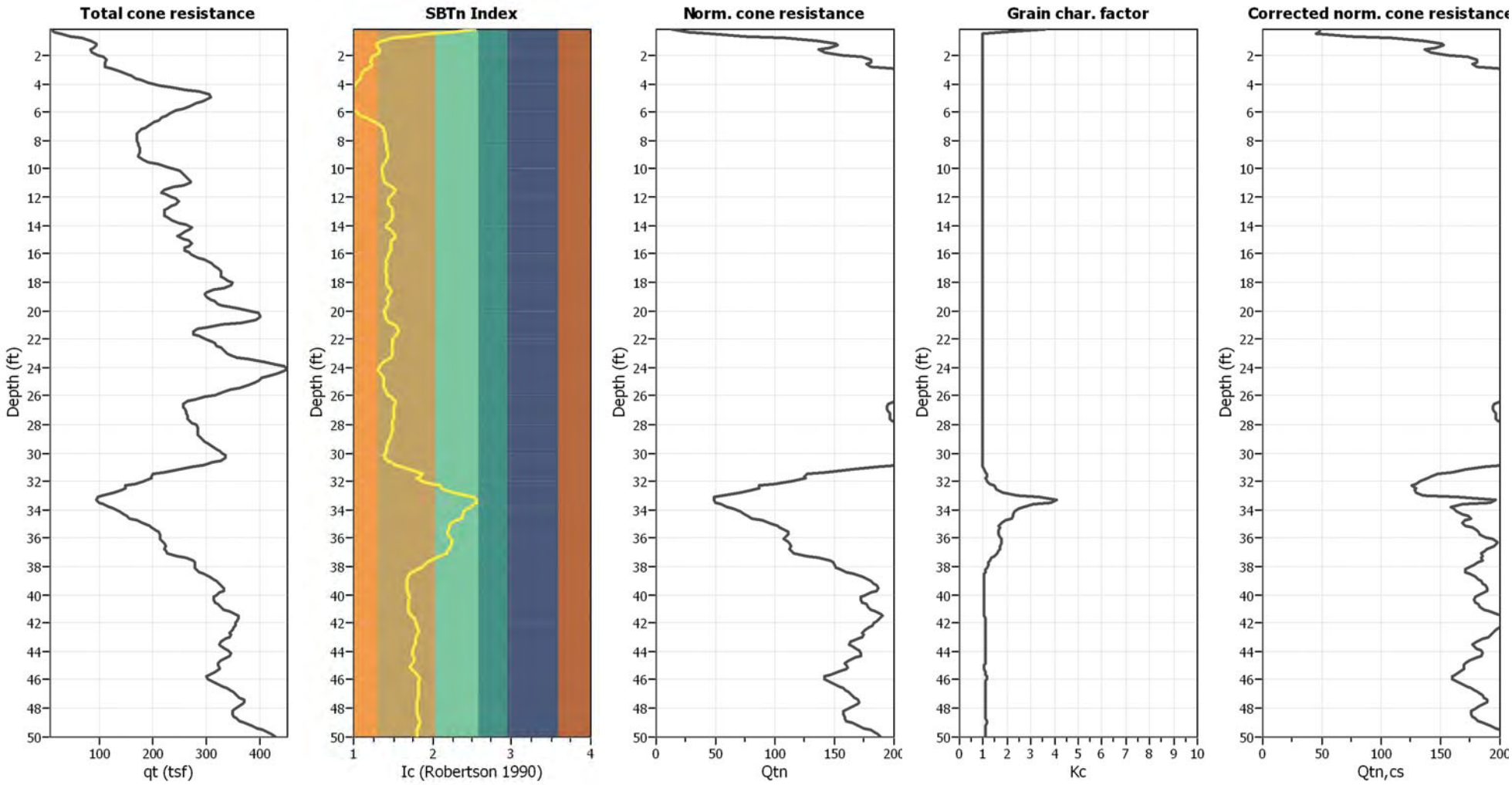
Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravely sand to sand
8. Very stiff sand to
9. Very stiff fine grained

Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
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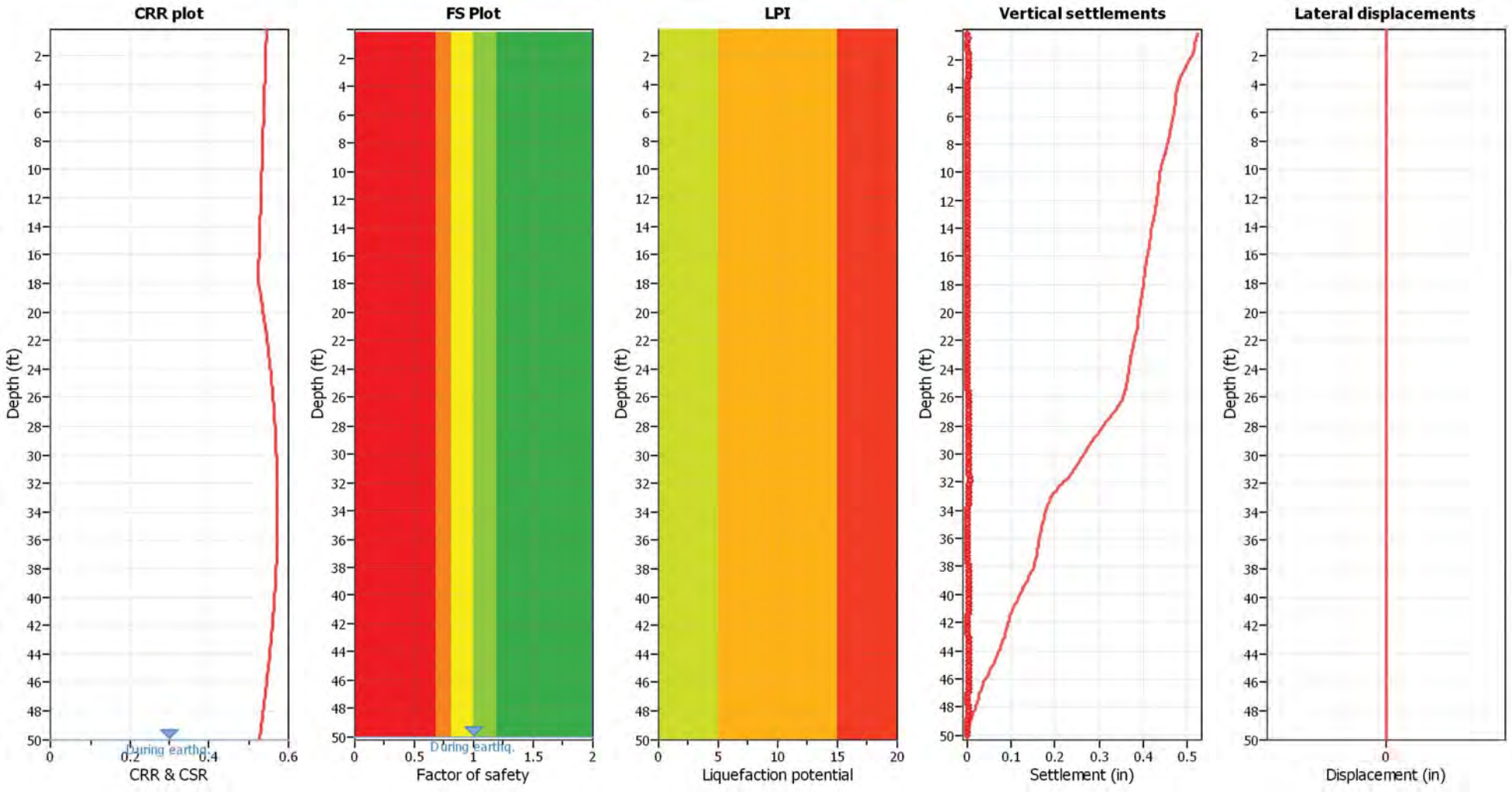
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	Robertson (2009)	Depth to water table (erthq.):	50.00 ft	Fill weight:	N/A
Fines correction method:	Robertson (2009)	Average results interval:	3	Transition detect. applied:	No
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.90	Unit weight calculation:	Based on SBT	Clay like behavior applied:	All soils
Peak ground acceleration:	0.61	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	50.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme

- Almost certain it will liquefy
- Very likely to liquefy
- Liquefaction and no liq. are equally likely
- Unlike to liquefy
- Almost certain it will not liquefy

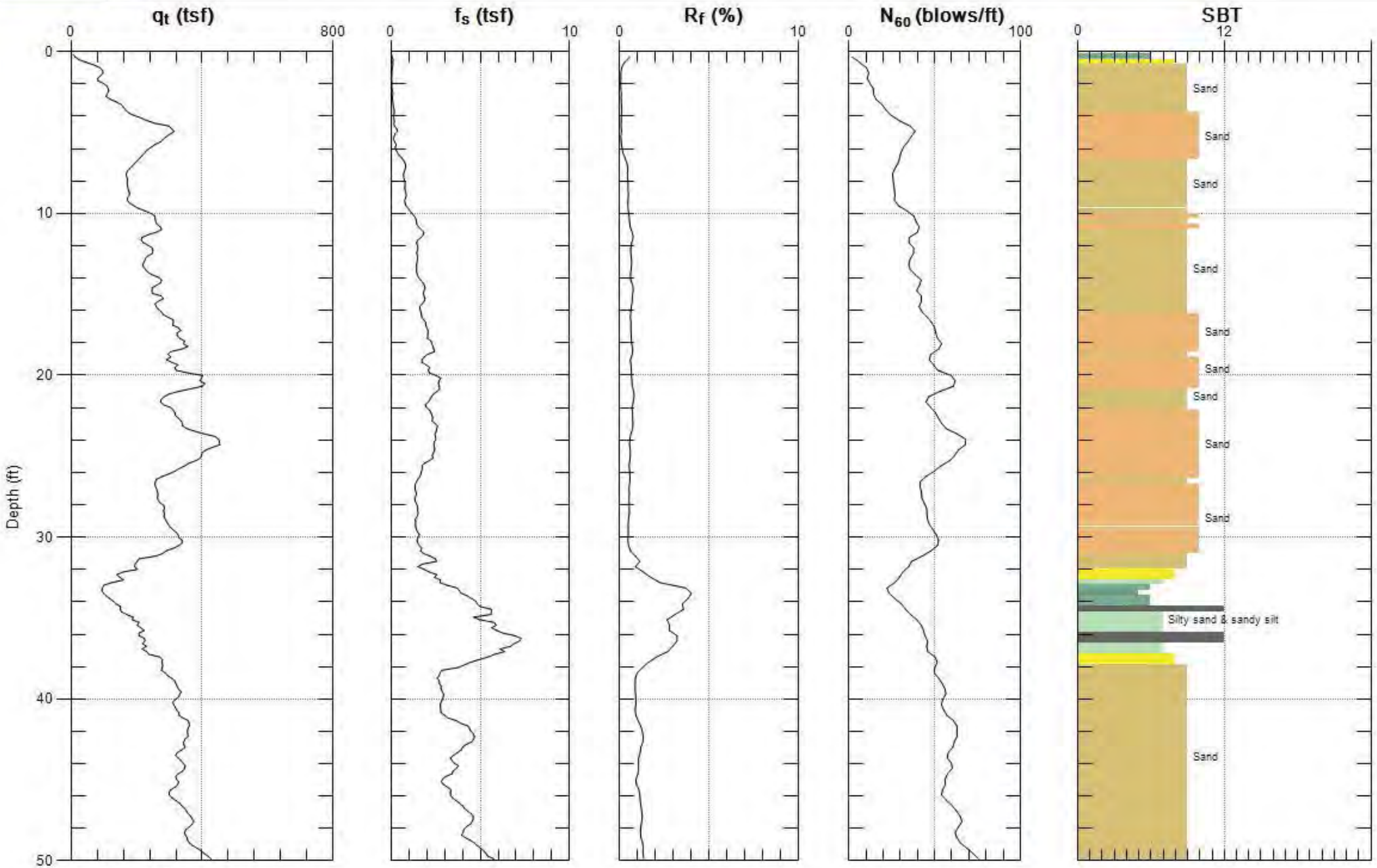
LPI color scheme

- Very high risk
- High risk
- Low risk

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5040

Engineer: C.AL-LAMI
Date: 7/18/2014 11:29



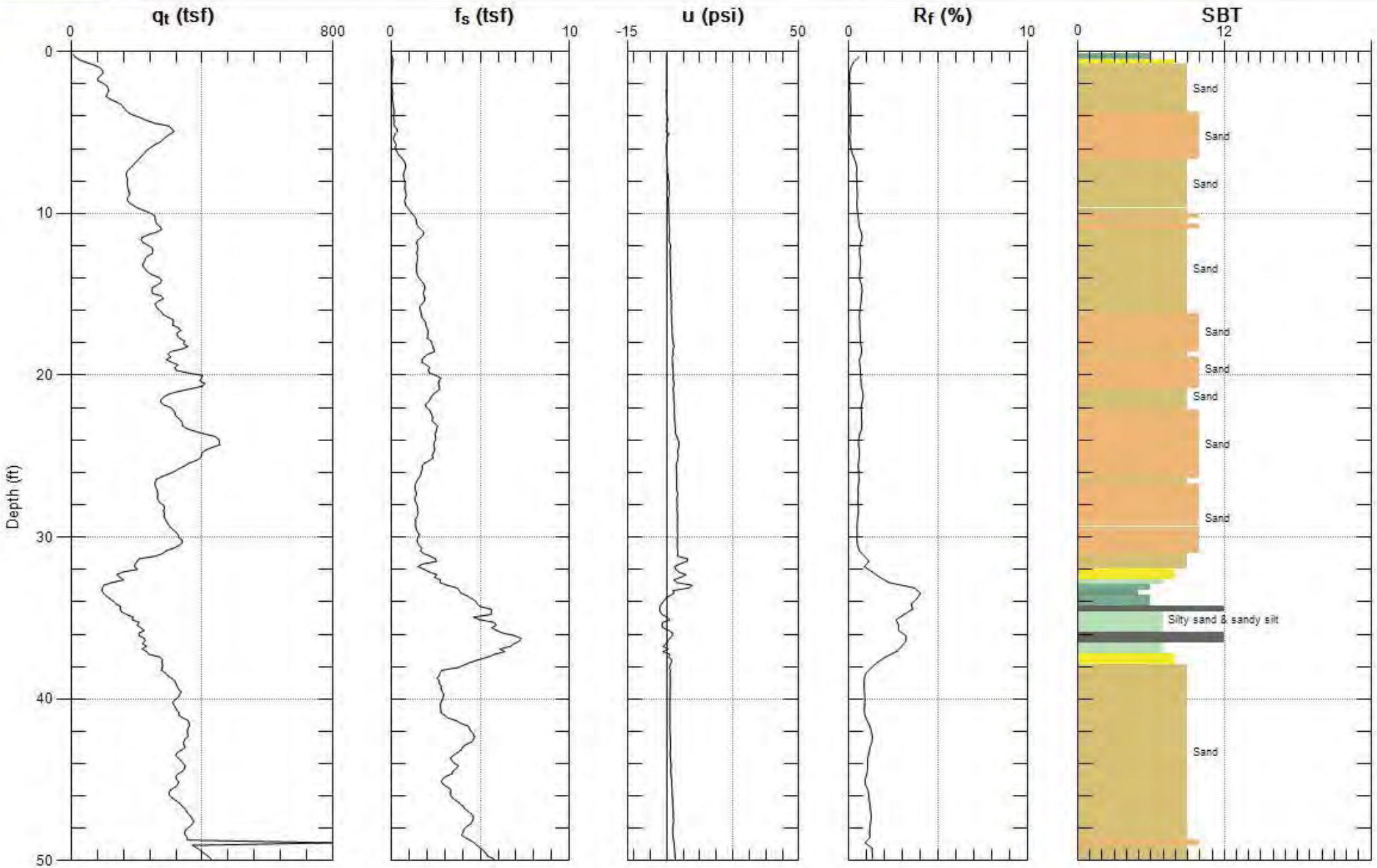
Max. Depth: 50.033 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

PACIFIC CREST ENGINEERING

Site: MONTEREY PEN.
Sounding: #5040

Engineer: C.AL-LAMI
Date: 7/18/2014 11:29



Max. Depth: 50.033 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

C-6. Stormwater Pollution Prevention Plan

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)
FOR
MPWSP DESALINATION INFRASTRUCTURE PROJECT

Site Address: Chales Benson Road
Marina, CA 93908

Site APN: 229-011-021

Risk Level: **2**

Start Date: 7/1/19 (estimated) (actual)
End Date: 10/31/21 (estimated) (actual)

WDID #: _____

Prepared for: California-American Water Company
511 Forest Lodge Rd.
Pacific Grove, CA

Prepared by: Whitson Engineers
6 Harris Court
Monterey, CA 93940
(831) 649-5225
(831) 373-5065 fax

Prepared on: March 1, 2019

WE Job Number: 3041.00

Contractor's Job Number: _____

Owner's Reference Number: _____

Other Reference Numbers: _____

_____

This document must be returned to the Owner's Representative at job completion.

Responsible Parties – Quick Reference Guide

Owner's Representative:	Tim O'Halloran
Phone / Fax / Emergency Phone:	831-646-3291/831-373-3053/831-320-1384
Site Superintendent:	Randall Redmann/CDM Smith
Phone / Fax / Emergency Phone:	909-579-3445/Emergency 562-244--6750
Qualified SWPPP Developer #1:	Richard Weber, Whitson Engineers
Phone / Fax:	831-649-5225 / 831-373-5065
Dates of Involvement / Role:	SWPPP Author
Qualified SWPPP Developer #2:	
Phone / Fax:	
Dates of Involvement / Role:	
Qualified SWPPP Practitioner #1:	
Company:	
Dates of Involvement / Role:	
Phone / Fax / Emergency Phone:	
Qualified SWPPP Practitioner #2:	
Company:	
Dates of Involvement / Role:	
Phone / Fax / Emergency Phone:	
Erosion/Sediment Control Sub:	
Company:	
Phone / Fax:	

Personnel performing WPC work under QSP's direction, including: spill response personnel, personnel performing inspections, monitoring, sampling and testing, and erosion and sediment control provider(s) (attach additional sheets as necessary)[†]:

Name: _____ **Company:** _____

Role: _____

Contact: _____

Name: _____ **Company:** _____

Role: _____

Contact: _____

Name: _____ **Company:** _____

Role: _____

Contact: _____

Name: _____ **Company:** _____

Role: _____

Contact: _____

Name: _____ **Company:** _____

Role: _____

Contact: _____

Name: _____ **Company:** _____

Role: _____

Contact: _____

Name: _____ **Company:** _____

Role: _____

Contact: _____

[†]Training records for all personnel involved in WPC work must be included in Appendix 8.

Useful Acronyms and Definitions

AS	Approved Signatory (for the LRP)
CGP	Construction General Permit: "*Storm Water Discharges Associated with Construction and Land Disturbance Activities*," SWRCB Order No. 2009-0009-DWQ, NPDES General Permit No. CAS000002
CSMP	Construction Site Monitoring Program
LRP	Legally Responsible Person
NAL	Numeric Action Level
NEL	Numeric Effluent Limitation
NOI	Notice of Intent
NOT	Notice of Termination
QSD	Qualified SWPPP Developer
QSP	Qualified SWPPP Practitioner
REAP	Rain Event Action Plan
WDID	Waste Discharge Identification (Number)
WPC	Water Pollution Control

See Appendices 5 and 6 of the CGP for more Acronyms and Definitions.

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APPENDIX 2 – SWPPP EXHIBITS AND CONSTRUCTION SCHEDULE

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- Minimum Required Construction BMPs

APPENDIX 4 – SWPPP CALCULATIONS
- Project Risk Level Determination
- Post-Construction Water Balance Calculator / Storm Water Control Plan
- Sediment Basin Sizing

APPENDIX 5 – CONSTRUCTION SITE MONITORING PROGRAM RECORDS
- Inspection Forms for Weekly, Non-Storm Water, and Qualifying Rain Event Inspections *
- Inspection Forms for Non-Storm Water Discharge
- Pollutant Source Assessment
- Commonly Used Construction Materials and their Pollutant Indicators
- Spill/ Leak History
- Field Meter Information (Risk Levels 2 and 3)
- Field Meter Calibration Records (Risk Levels 2 and 3)
- Other Sampling Records (laboratory samples)
- NAL Exceedance Reports (Risk Levels 2 and 3)

APPENDIX 6 – RAIN EVENT ACTION PLAN
- Rain Event Action Plan *

APPENDIX 7 – MATERIALS MANAGEMENT PLAN AND SPILL RESPONSE PLAN
- Materials Management Plan and Spill Response Plan * **– BY QSP PRIOR TO CONSTRUCTION**
- Secondary Containment and Spill Kit Inventory **– BY QSP PRIOR TO CONSTRUCTION**

APPENDIX 8 – TRAINING DOCUMENTATION
- Training Documentation for QSD, QSP, and Spill Response Personnel
- Training Documentation for Personnel Performing WPC work under the QSP
- Training Documentation for Contractor's Personnel and Subcontractors

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- Amendment Form *

APPENDIX 10 – RECORD OF SUBMITTALS TO SWRQB / RWQCB
- Project Registration Documents
- Letter from SWRCB providing WDID Number
- Approved Signatory Delegation (original), if applicable
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- Annual Reports *
- NAL Exceedance Reports (Risk Levels 2 and 3)
- NOT Application
- NOT Approval by SWRCB

* Blank forms are provided in Appendix 1 for items marked with an asterisk (*).

Attachments

ATTACHMENT A –CONSTRUCTION GENERAL PERMIT

SWRCB Order No. 2009 - 0009 – DWQ, NPDES General Permit No. CAS000002, WDRs for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities

Permit Amendments

- Order 2010-0014-DWQ, February 14, 2011 (Changes to LRP and AS Designations)
- Order 2012-0006-DWQ, July 17, 2012 (Deleting NEL language pursuant to outcome of California Building Industry Ass'n et al. v. State Water Resources Control Bd.)

ATTACHMENT B – BMP FACT SHEETS

Sections 3 and 4 from *Construction Site Best Management Practice Handbook Portal: Construction,* by California Storm Water Quality Association (CASQA), updated January 2015.

Section 3 – Erosion and Sediment Control BMPs

- Erosion Control
- Sediment Control
- Wind Erosion Control
- Tracking Control

Section 4 – Non-Stormwater Management and Material Management BMPs

- Non-Stormwater Management BMPs
- Waste Management and Materials Pollution Control BMPs

ATTACHMENT C – FIELD MONITORING AND ANALYSIS GUIDANCE

Appendix D from *Stormwater Best Management Practice Handbook Portal: Construction,* by California Storm Water Quality Association (CASQA), updated January 2015

Note: the PDF copy of the SWPPP uploaded to SMARTS does not include the Attachments. All other copies of this SWPPP, including the Job Copy SWPPP, shall include the Attachments.

1.0 SWPPP Certification

1.1 Legally Responsible Person's (LRPs) Certification

Project Name: MPWSP Desalination Infrastructure Project
Project Location: Charles Benson Road
Marina, CA 93908

This SWPPP has been prepared for a **Risk Level 2 Traditional Project** in accordance/compliance with the State Water Resources Control Board (SWRCB) Order No. 2009-0009DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002 Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities.

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete.
>
> I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signed:

LRP or AS* Signature Date

Name of Legally Responsible Person (LRP) Telephone

Title

Name of Approved Signatory (AS) if assigned * Telephone

Title

* The delegation of authority for the Approved Signatory is provided in Appendix 10, if signed by the AS.

1.2 SWPPP Preparer's Certification

Project Name: MPWSP Desalination Infrastructure Project
Project Location: Charles Benson Road
Marina, CA 93908

This SWPPP has been prepared for a **Risk Level 2 Traditional Project** in compliance with the State Water Resources Control Board (SWRCB) Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002 Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities.

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete.
>
> I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Signed:

		20534
QSD Signature	Date	QSD Cert. #
Richard P. Weber		(831) 649-5225
Name of Qualified SWPPP Developer (QSD)		Telephone
Principal		
Title		
Whitson Engineers, 6 Harris Court, Monterey, CA 93940		
Company		

2.0 General Information

2.1 Background

This Storm Water Pollution Prevention Plan (SWPPP) has been prepared in accordance with the State Water Resources Control Board (SWRCB) Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, *Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities* (Construction General Permit) (hereto referred to as the CGP). The CGP became effective on July 1, 2010.

The goal of this SWPPP is to protect overall water quality during construction activities. Construction activities could potentially affect water quality by the storage, handling and use of various construction-related materials as well as by causing soil erosion or sedimentation. With the implementation of the Best Management Practices (BMPs) outlined in this plan, the potential for the transport of contaminants or sediment to receiving waters should be minimized.

This SWPPP shall be implemented concurrently with commencement of soil-disturbing activities associated with construction. The requirements of the CGP are intended to be implemented on a year-round basis. All conditions of the CGP must be complied with.

This SWPPP shall be kept at the construction site during construction activity and shall be made available upon request to representatives of the Regional Water Quality Control Board (RWQCB).

This SWPPP must be evaluated on an ongoing basis by the QSP to document the changes and progression of construction activity throughout the life of the project, and to document the resulting changes in BMP deployment.

2.2 Objectives and Intended Outcomes

This SWPPP was prepared with the following objectives:

1. Identify Best Management Practices, which are measures performed during construction that are intended to reduce or eliminate pollutants and their sources, including sources of sediment associated with construction
2. Identify and provide methods to implement BMP inspection, visual monitoring, Rain Event Action Plan (REAP) and Construction Site Monitoring Program (CSMP) requirements (as applicable) to comply with the General Permit

The intent of this SWPPP is that it would result in the following outcomes:

1. All pollutants and their sources, including sources of sediment associated with construction, construction site erosion and all other activities associated with construction activity are controlled;
2. Where not otherwise required to be under a Regional Water Quality Control Board (RWQCB) permit, all non-stormwater discharges are identified and either eliminated, controlled, or treated;
3. Site BMPs are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges from construction activity to the Best Available Technology/Best Control Technology (BAT/BCT) standard;

4. Final site stabilization BMPs are installed to reduce or eliminate pollutants after construction are completed.

The effluent standards required by the CGP for this project are as follows:

1. Narrative Standards:
    a. Storm water discharges and authorized non-storm water discharges regulated by the General Permit shall not contain a hazardous substance equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4, unless a separate NPDES Permit has been issued to regulate those discharges.
    b. Dischargers shall minimize or prevent pollutants in storm water discharges and authorized non-storm water discharges through the use of controls, structures, and management practices that achieve BAT for toxic and non-conventional pollutants and BCT for conventional pollutants.
2. Numeric Standards (Risk Levels 2 and 3 projects only):
    a. Numeric Action Level (NAL) for pH: 6.5 minimum, 8.5 maximum
    b. Numeric Action Level (NAL) for turbidity: 250 NTU.

2.3 Permit Registration Documents (PRDs)

At the time of the authoring of this SWPPP, the PRDs for the project had not yet been filed. It will be the responsibly of the LRP to electronically upload the PRDs and certify the project via the SWRCB SMART System.

A copy of the NOI shall be contained in Appendix 10 in the field copy of the SWPPP. Copies of any other PRD updates will also be contained in Appendix 10.

2.4 SWPPP Amendments

The SWPPP must be amended:

- To reflect changes in construction, operations, or water pollution control practices that has our could have a significant effect on the discharge of pollutants to surface waters, ground water, or municipal separate storm sewer systems, that has not been previously addressed in the SWPPP.
- If during inspections or investigations by site staff, or by local, state, tribal or federal officials, it is determined that the existing BMPs are ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the construction site.
- Based on the results of an inspection, as necessary to properly document additional or modified BMPs designed to correct problems identified.
- If directed by the Owner's Representative, or local, state, tribal, or federal officials.

A Qualified SWPPP Developer (QSD) must prepare and certify each SWPPP Amendment. Revisions to the SWPPP must be completed in a timely manner.

Blank forms for SWPPP Amendment and Certification are located in Appendix 1. Completed SWPPP Amendment and Certification Forms shall be kept in Appendix 9.

SWPPP Amendment Log

No.	Brief Description of Amendment	Requested By	Approval Date

2.5 Availability of the SWPPP

The General Permit requires the SWPPP to be available at the construction site during working hours while construction is occurring and shall be made available upon request by a State or Municipal inspector. When the original SWPPP is retained by a crewmember in a construction vehicle and is not currently at the construction site, current copies of the BMPs and map/drawings will be left with the field crew and the original SWPPP shall be made available via a request by radio/telephone.

Upon completion of construction activities, the SWPPP shall be given to the Owner's Representative.

2.6 Implementation of the SWPPP

The SWPPP must be implemented concurrently with the start of ground disturbing activities.

2.7 Prohibition of Non-Storm Water Discharges

The CGP prohibits non-storm water discharges. Non-storm water discharges include a wide variety of sources, including improper dumping, spills, or leakage from storage tanks or transfer areas. Non-storm water discharges may contribute significant pollutant loads to receiving waters. Measures to control spills, leakage, and dumping, and to prevent illicit connections during construction must be taken.

Examples of prohibited discharges common to construction activities include:

- Vehicle and equipment wash water, including concrete washout water;
- Slurries from concrete cutting and coring operations, PCC grinding or AC grinding operations;
- Slurries from concrete or mortar mixing operations;
- Blast residue from high-pressure washing of structures or surfaces;
- Wash water from cleaning painting equipment;
- Super-chlorinated water normally associated with the disinfection of potable water systems;
- Runoff from dust control applications of water or dust palliatives;
- Sanitary and septic wastes; and
- Chemical leaks and/or spills of any kind including but not limited to petroleum, paints, cure compounds, etc.;

However, certain non-storm water discharges may be authorized for the completion of construction. Authorized non-storm water discharges may include those from dechlorinated potable water sources such as:

- fire hydrant flushing,
- irrigation of vegetative erosion control measures,
- pipe flushing and testing,
- water to control dust,
- uncontaminated ground water from dewatering,
- other discharges not subject to a separate general NPDES permit adopted by a Regional Water Board.

The discharge of non-storm water is authorized under the following conditions:

- The discharge does not cause or contribute to a violation of any water quality standard
- The discharge does not violate any other provision of the General Permit
- The discharge is not prohibited by the applicable Basin Plan
- The discharger has included and implemented specific BMPs required by the General Permit to prevent or reduce the contact of the nonstorm water discharge with construction materials or equipment
- The discharge does not contain toxic constituents in toxic amounts or (other) significant quantities of pollutants
- The discharge is monitored and meets the applicable NALs
- The discharger reports the sampling information in the Annual Report

If any of the above conditions are not satisfied, the discharge is not authorized by the General Permit. The discharger shall notify the Regional Water Board of any anticipated non-storm water discharges not already authorized by the General Permit or another NPDES permit, to determine whether a separate NPDES permit is necessary.

2.8 Responsible Parties

Implementation of the SWPPP involves a number of responsible parties including, but not limited to:

Legally Responsible Person (LRP) – The person legally responsible under the Permit. The LRP is required to sign various documents required under the Permit (e.g., this SWPPP, SWPPP Amendments, and Annual Reports), unless an AS has been assigned by the LRP. The LRP's legal responsibility under the Permit may not be transferred or delegated.

Approved Signatory (AS) – If assigned, the AS is delegated the authority by the LRP to sign various documents required under the Permit (e.g., this SWPPP, SWPPP Amendments, and Annual Reports).

Qualified SWPPP Developer (QSD) – A QSD is required to develop, sign and certify certain documents (e.g., this SWPPP and any SWPPP Amendments). Various QSDs may be utilized during the course of the project (e.g., one QSD may prepare this SWPPP, and a second may prepare the Amendments).

Qualified SWPPP Practitioner (QSP) – The QSP is the primary person responsible for implementation of the SWPPP, and for ensuring that the project conforms to the requirements of the CGP. The QSP may be Owner-provided, or may be one of the Contractor's personnel, or may be a subcontractor, depending on what is stated in the Contract Documents. The QSP may delegate some of his/her work to certain qualified individuals under his/her responsible charge, including to Contractor's personnel.

2.9 Training

The QSP shall ensure that all persons responsible for implementing the requirements of the CGP are appropriately trained in accordance with the requirements described in Section VII of the CGP.

The QSP shall include documentation in Appendix 8 of all training for persons responsible for implementing the requirements of the CGP.

Contractor and subcontractor employees shall be trained prior to working on the site in the following subjects:

- Water pollution control rules and regulations
- Implementation and maintenance for:
    - Temporary Soil Stabilization
    - Temporary Sediment Control
    - Tracking Control
    - Wind Erosion Control
    - Material pollution prevention control
    - Waste Management
    - Non-stormwater Management
    - Identifying and handling hazardous substances
    - Potential dangers to humans and the environment from spills and leaks or exposure to toxic or hazardous substances.

Informal employee training shall include tailgate site meetings to be conducted periodically to address the following topics:

- Water pollution control best management practices (BMPs) deficiencies and corrective actions
- BMPs that are required for work activities during the week
- Spill prevention and control
- Material delivery, storage, use, and disposal
- Waste management
- Non-stormwater management procedures

Attendance records shall be kept for each training session in Appendix 8. Training relevant for the QSD, QSP and individuals supervised by the QSP are also located in Appendix 8.

2.10 Conformance with Contract Documents

In the event that there are any discrepancies between the requirements of this SWPPP and any other contract documents (e.g., the Plans or Specifications), contact the Owner's Representative immediately. The Owner's Representative shall determine which requirement shall govern; the most stringent requirement shall apply.

2.11 Conformance with the Construction General Permit

Nothing in this SWPPP shall be construed as to allow nonconformance with any part of the CGP. The QSP shall ensure that all work is performed in conformance with the CGP.

3.0 Reporting and Recordkeeping

3.1 Reporting for Anticipated Non-Compliance Discharges

If there are any anticipated non-compliance discharges for the Project, the QSP shall provide an Anticipated Non-Compliance Report to the Owner's Representative. Reports shall be retained in Appendix 5.

This report must be submitted in advance of the planned change in construction activity that may result in non-compliance with the CGP. It must be submitted to the RWQCB and local storm water management agency.

3.2 Reporting for Non-Compliance Discharges and Exceedances

The General Permit identifies several triggers for non-compliance reporting. The QSP shall properly document reportable discharges or other violations of the General Permit, and shall provide the documentation to the Owner's Representative. Exceedances and violations are reported by the Owner using the SMARTS system and include the following (as applicable):

For All Projects:

- Report discharges which contain a hazardous substance in excess of reportable quantities established in 40 CFR §§ 117.3 and 302.4 unless a separate NPDES Permit has been issued to regulate those discharges.
- Self-report any other discharge violations or to comply with RWQCB enforcement actions.

For Risk Level 2 and 3 Projects:

- Numeric Action Limit (NAL) Exceedance Reports shall be submitted to the RWQCB no later than 10 days after the storm event. NAL Exceedance Reports shall be provided to the RWQCB upon request. The NAL Exceedance Report shall include:
    - test results, analytical methods, reporting units, and detection limits;
    - date, sampling location, time of sampling, and visual observation;
    - predicted quantity of precipitation of the rain event, and estimated quantity of precipitation at the time of sampling;
    - description of BMPs deployed; and
    - corrective actions taken to manage the NAL exceedance.

For ATS:

- Numeric Effluent Limitation (NEL) Violation Reports shall be submitted to the RWQCB no later than 5 days after the storm event. The NEL Violation Reports shall include:
    - test results, analytical methods, reporting units, and detection limits;
    - date, sampling location, time of sampling, and visual observation;
    - predicted quantity of precipitation of the storm event and estimated quantity of precipitation at the time of sampling;
    - description of BMPs; and
    - corrective actions taken to manage the NEL exceedance.

3.3 Receiving Water Monitoring (Risk Level 3 w/ Direct Discharge, or ATS)

The General Permit requires receiving water monitoring to be performed for Risk Level 3 projects with direct discharges to surface waters when stormwater effluent pH values fall outside of the range of 6.0 and 9.0 pH units, or when effluent turbidity exceeds 500 NTU. (Exceedance of a Receiving Water Monitoring Trigger does not constitute a violation of the Permit.)

In the event that an Active Treatment System (ATS) discharge violates an ATS Numeric Effluent Limitation (NEL) contained in this General Permit and has a direct discharge into receiving waters, the discharger shall subsequently sample receiving waters for turbidity and suspended sediment concentration for the duration of ATS operation. The ATS NEL is 10 NTU daily weighted average and 20 NTU any single sample.

3.4 Annual Reporting

An Annual Report must be submitted and certified by the LRP / AS by no later than September 1 of each year until coverage is terminated. The reporting period for each Annual Report is July 1 through June 30. (*Note: Projects with WDID numbers assigned between April 2 and June 30 do not need to submit an Annual Report for this first partial year.*) Reporting requirements are identified in Section XVI of the General Permit and include providing:

1. A summary and evaluation of all sampling and analysis results, including copies of laboratory reports.
2. The analytical method(s), method report unit(s), and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit shall be reported as "less than the method detection limit").
3. A summary of all corrective actions taken during the compliance year.
4. Identification of any compliance activities or corrective actions that were not implemented.
5. A summary of all violations of the General Permit.
6. The names of individual(s) who performed the facility inspections, sampling, visual observation (inspections), and/or measurements.
7. The date, place, time of facility inspections, sampling, visual observation (inspections, and/or measurements, including precipitation (rain gauge).
8. Documentation of training for individuals responsible for activities associated with compliance with the General Permit.
9. Documentation of training for individuals responsible for BMP installation, inspection, maintenance, and repair.
10. Documentation of training for individuals responsible for overseeing, revising, and amending the SWPPP.

The QSP shall provide the LRP with the above information in an Annual Compliance Certification. A blank form is included in Appendix 1 of this SWPPP.

3.5 Changing Permit Coverage

The General Permit (Section II.C) allows a permittee to reduce or increase the total acreage covered under the General Permit when a portion of the project is complete and/or conditions for termination of coverage have been met; when ownership of a portion of the project is sold to a different entity; or when new acreage is added to the project.

To change the acreage covered, the LRP must electronically file modifications to the PRDs (revised NOI, site map, SWPPP revisions as appropriate). If a portion of the property is sold, the certification shall include a statement that new landowners have been notified of applicable requirements to obtain permit coverage (including name, address, phone number, and e-mail address of new landowner). Revised PRDs must be submitted within 30 days of a reduction or increase in total disturbed area.

Records of changes in permit coverage should be kept in Appendix 10 of this SWPPP.

3.6 Notice of Termination

To terminate coverage under the General Permit, the LRP or AS must submit a Notice of Termination (NOT) electronically via SMARTS. A "final site map" and photos are required to be submitted with the NOT. Filing a NOT certifies that all General Permit requirements have been met for final site cleanup and stabilization.

Final site cleanup and stabilization will be considered complete when all of the following have been achieved:

1. The site will not pose any additional sediment discharge risk than it did prior to the commencement of construction activity;
2. There is no potential for construction-related storm water pollutants to be discharged into site runoff;
3. Final stabilization has been reached;
4. Construction materials and wastes have been disposed of properly;
5. Post-construction storm water management measures have been installed;
6. All construction-related equipment, materials and any temporary BMPs no longer needed are removed from the site.

Final stabilization shall be determined by one of the following methods:

1. At least 70% of the disturbed soil on each individual parcel is uniformly covered by live, actively growing plant matter in contact with the soil;
    a. Alternately, 70% of the disturbed soil on each individual parcel may be uniformly covered in another manner acceptable to the Owner and the RWQCB.
2. RUSLE or RUSLE2 method, as outlined in the Permit; computational proof is required;
3. A custom method demonstrating compliance with the final stabilization requirements in the Permit, in some other manner than 1 or 2, above.

3.7 Record Retention

Records of all storm water monitoring information and copies of all reports (including Annual Reports) shall be retained for a period of at least three years. If, after three years the RWQCB has not required the records to be retained for a longer period, these records shall be managed in accordance with the Owner's record retention policy. These records include:

- The date, place, time of facility inspections, sampling, visual observation (inspections), and/or measurements, including precipitation;
- The individual(s) who performed the facility inspections, sampling, visual observation (inspections), and or measurements; for laboratory analysis, all sampling, sample preservation, and analyses must be conducted according to test procedures under 40 CFR Part 136. Field discharge samples shall be collected and analyzed according to the specifications of the manufacturer of the sampling devices employed;
- The date and approximate time of analyses;
- The individual(s) who performed the analyses;
- A summary of all analytical results from the last three years, the method detection limits and reporting units, and the analytical techniques or methods used, and the chain of custody forms;
- Rain gauge readings from visual observations (inspections);
- Quality assurance/quality control records and results;
- Non-storm water discharge inspections and visual observation (inspections) and storm water discharge visual observation records (see Sections I.3 and I.6 of the CGP);

- Visual observation and sample collection exception records (see Section I.4 of the CGP), including the corrective actions taken in response to the observations;
- The records of any corrective actions and follow-up activities that resulted from analytical results, visual observation (inspections), or inspections; and
- All field and/or analytical data.

Copies of the Annual Reports are stored in Appendix 10. Monitoring records can be found in Appendix 5 of this SWPPP.

4.0 Project Information

4.1 Project Characteristics

4.1.1 Site Information

Site Name:	MPWSP Desalination Infrastructure Project
Site Address:	Charles Benson Road
Address Line 2:	
City, State, Zip:	Marina, CA 93908
Total Site Area (legal parcel):	45.96
Latitude:	36.7154
Longitude:	-121.7728
Total Area to be disturbed: [1]	20
Imperviousness Before Construction:	0%
Imperviousness After Construction:	17%
Tract Number(s):	-
Mile Post Marker:	-
APN:	229-011-021
Is the construction site part of a larger common plan of development?	☒ Yes ☐ No
Name of development:	Monterey Peninsula Water Supply Project
Construction Commencement Date:	7/1/2019
Complete Grading Date:	-
Complete Project Date:	10/31/2021
Type of Construction:	☐ Residential ☐ Commercial ☒ Industrial ☐ Reconstruction ☐ Transportation ☐ Utility: _____ ☐ Other: _____

[1] Changes to this initial estimate will be documented in the copies of any revised Notice of Intent (NOI) documents submitted to the SWRCB (see Section 3.5) (if applicable).

4.1.2 Additional Site Information

If applicable, has the local agency reviewed/approved a required erosion/ sediment control plan?	☒ Yes ☐ No
Does the erosion/sediment control plan address construction activities such as infrastructure and structures?	☒ Yes ☐ No
Name of Local Agency:	Monterey County
Phone:	-
Is this project or any part thereof subject to conditions imposed under a CWA Section 404 Water Quality Certification?	☒ Yes ☐ No
If yes, provide details:	Project will obtain a 401 Permit for treatment plant operations.
Does the storm water runoff from the construction site discharge to (check all that apply):	☒ Indirectly to Waters of the US ☐ Storm Drain System Owner's Name: _____ ☐ Directly to Waters of the US (e.g., river, lake, creek, stream, bay, ocean, etc.)
Qualified SWPPP Developer	Richard Weber
QSD Certification Number	20534

4.1.3 Risk

Sediment Risk	Value	Method
R Factor:	91.75	Low Erosivity Waiver Online EPA Calculator
K Factor:	0.1	GIS (SMARTS database)
LS Factor (weighted average, by area, for all slopes):	1.41	GIS (SMARTS database)
Watershed Erosion Estimate:	12.94	(=R*K*LS) in tons/acre
Sediment Risk Factor:	**Low**	Low: < 15 tons/acre Medium: >/= 15 and <75 tons/acre High: >/= 75 tons/acre
Receiving Water Risk	**Value**	**Method**
Receiving Water Risk:	High	SWRCB GIS Database
Calculated Risk Level:	**2**	Low Sed. Risk & Low RW Risk = Risk Level 1 High Sed. Risk & High RW Risk = Risk Level 3 All Other Combinations = Risk Level 2

4.1.4 Post-Construction

Is project located within an area subject to post-construction standards of an active Phase I or II MS4 permit that has an approved Storm Water Management Plan?	☐ Yes – The Post-Construction Calculator is optional. [1] ☒ No – Project must satisfy the Post-Construction Calculator. Calculations must be uploaded in the SMARTS system. See SWPPP Appendix 4.

[1] Non-traditional small MS4s that lie within a Phase I or II MS4 area but are not designated must comply with the Construction General Permit post construction calculator.

4.1.5 Verbal Project Description

The project involves the development of a desalination water treatment plant on a portion of an existing undeveloped (agricultural) parcel.

The following phases are anticipated to be applicable to this Project:

- ☒ Grading and Land Development Phase
- ☒ Streets and Utilities Phase
- ☒ Vertical Construction Phase
- ☒ Final Landscaping and Site Stabilization
- ☒ Inactive Construction Phase (i.e., 14 or more days of inactivity)

4.1.6 Stormwater Run-On from Offsite Areas

Site topography generally slopes from south to north, with stormwater run-on occurring along the south perimeter of the project. Due to the sandy nature of the soils, run-of is not anticipated to be significant.

4.2 Receiving Waters

This section identifies the receiving waters into which the project discharges and the conditions and specific requirements for this project.

4.2.1 Narrative

Stormwater runs off the construction site to the north (across an existing dirt road) and to the west (toward an existing depression). The work site boundary is approximately 300 feet distant from the property line to the north.

4.2.2 Receiving Water Body TMDLs

Receiving Water Body Name(s): Salinas River (lower, estuary to near Gonzales Rd crossing, watersheds 30910 and 30920)

Has a TMDL been adopted that identifies "construction activity" or land disturbance as a source of sediment?	No

If the project is located in a watershed where a Total Maximum Daily Load (TMDL) has been adopted or approved by the Regional Water Board or U.S. EPA, the project may be required by a separate Regional Water Board action to implement additional BMPs, conduct additional monitoring activities, and/or comply with an applicable waste load allocation and implementation schedule. Such dischargers may also be required to obtain an individual Regional Water Board permit specific to the area.

Dischargers located within the watershed of a CWA § 303(d) impaired water body, for which a TMDL has been approved by the U.S. EPA, shall comply with the approved TMDL if it identifies "construction activity" or land disturbance as a source of the pollution.

4.4 Existing Soil Contamination

At the time of the authoring of this SWPPP, no existing soil contamination is known or suspected by the QSD.

If soil contamination is found or suspected, and a responsible party is not identified, or the responsible party fails to promptly take the appropriate action, the CGP requires that the LRP have those soils sampled and tested to ensure proper handling and public safety measures are implemented. Sampling and testing records shall be retained in Appendix 5. The LRP shall notify the appropriate local, state, and federal agency(ies) when contaminated soil is found at a construction site, and will notify the appropriate RWQCB.

The QSP shall ensure that trench spoils or any other soils disturbed during construction activities that are contaminated are not discharged with storm water or non-storm water discharges into any storm drain or water body except pursuant to an NPDES permit.

4.5 Schedules

The construction schedule and the BMP implementation schedule shall be included in Appendix 2 by the QSP prior to the beginning of construction, and shall be maintained up-to-date by the QSP as construction progresses.

Applicable BMPs identified in this SWPPP are to be installed concurrently with the initiation of work and as work progresses at each location and shall be routinely inspected and maintained by the QSP.

4.6 Potential Construction Site Pollutant Sources

4.6.1 Potential Sources of Sediment

The following is a list of activities and areas which may contribute to erosion and/or sedimentation.

- Installation and maintenance of sediment and erosion controls
- Vehicle tracking
- Earthwork operations
- Stockpiles
- Exposed soils and slopes
- Landscaping operations

4.6.2 Other Potential Pollutant Sources

Prior to construction, the QSP shall develop a Materials Management Plan for the project in accordance with section 9.0 of this SWPPP. The Plan will include an inventory and assessment of potential pollutants which are planned to be used or stored on the site. The Plan shall be stored in Appendix 7 of this SWPPP.

4.7 Site Maps and Diagrams

The exhibits included in Appendix 2 show:

Shown	QSP	N/A	
☒	☐	☐	The project's surrounding area (vicinity)
☒	☒	☐	Site layout
☒	☒	☐	Construction site boundaries (update if project area is changed)
☐	☐	☒	Locations of sensitive habitats, watercourses, or other features which are not to be disturbed
☒	☒	☐	Areas of soil disturbance (temporary or permanent)
☒	☒	☐	Active areas of soil disturbance (cut or fill)
☐	☒	☐	Drainage areas
☒	☒	☐	Discharge monitoring locations at site boundary (update as work progresses)
☒	☒	☐	Locations of all BMPs
☒	☒	☐	Access (entrance/exits) points to construction site
☐	☐	☒	ATS location(s)
☒	☒	☐	Locations of storage areas for waste, vehicles, service, loading/unloading of materials, fueling, and water storage, water transfer for dust control and compaction practices
☒	☒	☐	Sampling locations (Risk Level 2 and 3 projects only)
☒	☐	☐	Locations of all post-construction BMPs

It will be the responsibility of the QSP to identify or revise locations of those items marked 'QSP' above.

The QSP will also be responsible to document the day-to-day installation and maintenance of BMPs on these maps, and to make the necessary modifications to the maps as construction progresses.

5.0 Best Management Practices

Best Management Practices shall be implemented in conformance with the requirements and intent of the CGP. The intent of the CGP is that this would result in the following outcomes:

1. All pollutants and their sources, including sources of sediment associated with construction, construction site erosion and all other activities associated with construction activity, are controlled;
2. Where not otherwise required to be under a Regional Water Quality Control Board (RWQCB) permit, all non-stormwater discharges are identified and either eliminated, controlled, or treated;
3. Site BMPs are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges from construction activity to the Best Available Technology/Best Control Technology (BAT/BCT) standard;
4. Final site stabilization BMPs are installed to reduce or eliminate pollutants after construction are completed.

5.1 Construction Site BMPs

Appendix 3 outlines the Minimum Required Construction Site Best Management Practices that shall be utilized on this project. These practices include:

- Good Site Management "Housekeeping"
- Non-Storm Water Management
- Erosion Control
- Sediment Control
- Run-On and Run-Off Controls (required for Risk Level 2 and 3 projects only)
- Inspection, Maintenance and Repair

The QSP shall monitor BMP performance throughout construction, as outlined in the *Construction Site Monitoring Program and Sampling and Analysis Plan* included in Appendix 5 of this SWPPP. Based on the observations and testing results obtained, the QSP shall determine if additional BMPs are required in order to satisfy the objectives and requirements of the CGP, this SWPPP, and the Contract Documents.

BMP details are included in Appendix 2, in Attachment B, and in the Contract Documents.

The locations of construction site BMPs, and dates deployed and removed, shall be noted on the SWPPP Exhibit by the QSP.

5.2 Post-Construction BMPs

The completed project will incorporate the following post-construction BMPs in order to meet the requirements of the Construction General Permit:

- Final stabilization will be provided on all disturbed soil areas
- Bioretention areas are provided as described in the project's Storm Water Control Plan.

Post-construction BMP sizing calculations and design details are found in Appendix 4, if required.

6.0 Construction Site Monitoring Program and Sampling and Analysis Plan

6.1 Objectives

This CSMP and SAP was developed by the QSD, for implementation by the QSP, to address the following objectives:

- To demonstrate that the site is in compliance with the Discharge Prohibitions and applicable Numeric Action Levels (NALs) of this General Permit.
- To determine whether non-visible pollutants are present at the construction site and are causing or contributing to exceedances of water quality objectives.
- To determine whether immediate corrective actions, additional Best Management Practice (BMP) implementation, or SWPPP revisions are necessary to reduce pollutants in storm water discharges and authorized non-storm water discharges.
- To determine whether BMPs included in the SWPPP/Rain Event Action Plan (REAP) are effective in preventing or reducing pollutants in storm water discharges and authorized on storm water discharges.

6.2 Definitions

Qualifying Rain Event – An event that produces 0.5 inches or more precipitation with a 48 hour or greater period between rain events.
Stormwater Site Inspector – Qualified personnel performing site inspections, monitoring, sampling and analysis under the responsible charge of the QSP.

6.3 Rainfall Monitoring

The QSP or Stormwater Site Inspector shall monitor for precipitation forecasted to occur at the project site location. Precipitation forecast information shall be obtained from the National Weather service Forecast Office available on-line at: http://www.srh.noaa.gov/.

When the forecast precipitation is 0.25 inches (half the QRE rainfall depth) or greater for a rain event within the next 72 hours the QSP shall perform a pre-storm site inspection to ensure that the site is prepared for the possible QRE.

When there is precipitation, the QSP shall record precipitation readings from the project site rain gauge.

6.4 Visual Monitoring

Weekly:

- Visually observe BMPs to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended.

  Note: The State Water Resources Control Board has clarified that sites which are inactive (no activity for more than 14 days) are not required to perform weekly inspections. In this case the QSP may determine an alternate visual inspection frequency based on the temporary BMPs which are in place on the site. This alternate schedule shall be noted in a SWPPP amendment.

Within 2 business days (48 hours) prior to a qualifying rain event:

- Visually observe stormwater drainage areas to identify any spills, leaks, or uncontrolled pollutant sources. If needed, appropriate corrective actions shall be implemented.
- Visually observe all BMPs to identify if they have been properly implemented. If needed, appropriate corrective actions shall be implemented.
- Visually observe any stormwater storage and containment areas to detect leaks and ensure maintenance of adequate freeboard.
- For each observation, note the presence or absence of floating and suspended materials, a sheen on the surface, discolorations, turbidity, odors, and source(s) of any observed pollutants.

At maximum 24-hour intervals during extended storm events:

- Visually observe stormwater discharges at all discharge locations.
- Visually observe BMPs to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended.
- Begin implementing repairs or design changes to BMPs within 72 hours after identification, and complete the changes as soon as possible.
- Visually observe the discharge of stored or contained stormwater.
- For each observation, note the presence or absence of floating and suspended materials, a sheen on the surface, discolorations, turbidity, odors, and source(s) of any observed pollutants.

Within 48 hours after a qualifying rain event:

- Identify whether BMPs were adequately designed, implemented, and effective.
- As required, identify additional BMPs and revise the SWPPP.
- Observe (inspect) storm water discharges at all discharge locations.

If stored or contained storm water is discharged subsequent to a qualifying rain event:

- Visually observe (inspect) the discharge of stored or contained storm water that is derived from and discharged subsequent to a qualifying rain event producing precipitation of ½ inch or more at the time of discharge.
- For each observation, note the presence or absence of floating and suspended materials, a sheen on the surface, discolorations, turbidity, odors, and source(s) of any observed pollutants.
- Stored or contained storm water that will likely discharge after operating hours due to anticipated precipitation shall be observed prior to the discharge during operating hours.

Quarterly for non-stormwater discharges:

- Visually observe each drainage area for the presence of or indications of prior unauthorized and authorized non-stormwater discharges, pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.), and their sources.
- Visual monitoring (inspections) for non-stormwater discharges will be conducted at least once during each of the following periods: January-March, April-June, July-September, and October-December.

6.5 General Sampling Requirements

- All monitoring instruments and equipment (including a field instruments for measuring pH and turbidity) shall be calibrated and maintained in accordance with manufacturers' specifications to ensure accurate measurements. Copies of calibration records shall be kept in this CSMP.
- Field analysis of pH and turbidity shall be performed by qualified and trained employees using properly calibrated and maintained field instruments
- With the exception of field analysis conducted for turbidity and pH, all analyses shall be sent to and conducted at a laboratory certified for such analyses by the State Department of Health Services.
- Samples taken for laboratory analysis must follow water quality sampling procedures and analysis given in 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants."
- For laboratory samples, ensure that testing laboratories will receive samples within 48 hours of the physical sampling (unless otherwise required by the laboratory). Use only the sample containers provided by the laboratory to collect and store samples.
- The QSP shall designate and train personnel to collect, maintain, and ship samples in accordance with the Surface Water Ambient Monitoring Program's (SWAMP) 2008 Quality Assurance Program Plan (QAPrP).
- All monitoring, sampling and analysis shall be performed in accordance with the Health and Safety Plan

6.6 Sampling Locations (required for Risk Level 2 and 3 projects only)

Initial sampling locations are shown on the SWPPP Exhibit. The QSP shall update the sampling locations as needed as construction progresses. Sampling locations shall:

- Characterize discharges associated with construction activity from the entire disturbed area
- Be located at all discharge points at the site or construction area boundary
- Represent the effluent in each drainage area, based on visual observation of the water and upstream conditions
- Include site run-on, as this may contribute to an exceedance of NALs
- If ATS is used on the site, ATS effluent samples shall be taken from the discharge pipe or another location representative of the nature of the discharge

6.7 Water Quality Sampling During Qualifying Rain Events (required for Risk Level 2 and 3 projects only)

- Storm water runoff grab samples shall be analyzed for pH and turbidity, and any non-visible pollutants required by Sections 8.0 and 9.0 below. The storm water grab sample(s) obtained shall be representative of the flow and characteristics of the discharge
- A minimum of three (3) pH and three (3) turbidity samples shall be taken per day of each qualifying rain event
- Measurements shall be in accordance with the following table:

Water Quality Sampling Numeric Criteria

Parameter	Method	Applies to	Minimum Detection Limit	Reporting Unit	NAL	NEL	Receiving Water Monitoring Trigger
pH	Field test with calibrated portable instrument	RL 2 and RL 3	0.2	pH	lower: 6.5 upper: 8.5	-	lower: 6.0 upper: 9.0
Turbidity	EPA 0180.1 and/or field test with calibrated portable instrument	RL 2 and RL 3	1	NTU	250	-	500
Turbidity	EPA 0180.1 and/or field test with calibrated portable instrument	ATS	1	NTU	-	10 NTU for Daily Weighted Average & 20 NTU for Any Single Sample	10 NTU for Daily Weighted Average & 20 NTU for Any Single Sample
SSC	ASTM Method D 3977-97	RL 3 if RW Monitoring Trigger exceeded	5	mg/L	-	-	-
Bioassessment	(STE) Level I of (SAFIT),10 fixed-count of 600 org/sample	RL 3 if > 30 acres	-	-	-	-	-

6.8 Non-Visible Pollutant Sampling and Pollutant Source Assessment

Storm water discharges which are suspected to contain non-visible pollutants shall be sampled for those pollutants.

The Stormwater Site Inspector shall perform a Pollutant Source Assessment as part of their regular monitoring activities. The Assessment shall include an inventory of the products and materials currently being used or stored at the site, and shall note if the products and materials are properly stored (e.g., in watertight containers with secondary containment, or under roof), and if any breach, malfunction, leakage, or spill is observed or suspected.

Non-visible pollutant monitoring and sampling is required if any breach, malfunction, leakage, or spill is observed or suspected which could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water.

Non-visible pollutant monitoring and sampling is also required if pollutants are known or suspected to already exist on the site. Potential pollutant sources which are suspected to currently exist on the site are discussed in Section 4.4 of the SWPPP.

A list of common construction products and materials and their pollutant indicators is included with this CSMP.

Non-visible pollutant sampling, if required, shall be performed as follows:

- Collect one or more samples during any breach, malfunction, leakage, or spill observed during a visual inspection which could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water
- Samples shall be large enough to characterize the site conditions.
- Samples shall be collected at discharge locations which can be safely accessed.
- Sample effluent at all discharge points where non-storm water and/or authorized non-storm water is discharged off-site
- Samples shall be collected during the first two hours of discharge from rain events that occur during business hours and which generate runoff.
- Analyze samples for non-visible pollutant parameters indicating the presence of pollutants identified in the pollutant source assessment, if the Stormwater Site Inspector has reason to believe that pollutants may have come in contact with storm water
- Collect a sample of storm water that has not come in contact with the disturbed soil or the materials stored or used on-site (uncontaminated sample) for comparison with the discharge sample.
- The uncontaminated sample shall be compared to the samples of discharge using field analysis or through laboratory analysis. For laboratory analysis, all sampling, sample preservation, and analyses must be conducted according to test procedures under 40 CFR Part 136. Field discharge samples shall be collected and analyzed according to the specifications of the manufacturer of the sampling devices employed.

6.9 Effluent Sampling for Non-Storm Water Discharges

If non-storm water discharges occur, such discharges shall be sampled as follows:

- All non-storm water samples shall be analyzed by a laboratory in accordance with Section 6.8.

- Monitor and report run-on from surrounding areas if there is reason to believe run-on may contribute to an exceedance of NALs.

6.10 Receiving Water Monitoring Requirements (required for Risk Level 3 projects only)

In the event that a Risk Level 3 discharger's effluent exceeds the daily average receiving water monitoring trigger of 500 NTU turbidity or the daily average pH range 6.0-9.0 contained in this General Permit and has a direct discharge into receiving waters, the Risk Level 3 discharger shall subsequently sample receiving waters (RWs) for turbidity, pH (if applicable), and SSC for the duration of coverage under this General Permit. If a Risk Level 3 discharger utilizing ATS with direct discharges into receiving waters discharges effluent that exceeds the NELs in this permit, the discharger shall subsequently sample RWs for turbidity, pH (if applicable), and SSC for the duration of coverage under this General Permit.

Risk Level 3 dischargers disturbing 30 acres or more of the landscape and with direct discharges into receiving waters shall conduct or participate in benthic macroinvertebrate bioassessment of RWs prior to commencement of construction activity (See CGP Appendix 3).

Risk Level 3 dischargers shall obtain RW samples in accordance with the Receiving Water sampling location requirements below:

- Upstream/up-gradient RW samples: Risk Level 3 dischargers shall obtain any required upstream/up-gradient receiving water samples from a representative and accessible location as close as possible and upstream from the effluent discharge point.
- Downstream/down-gradient RW samples: Risk Level 3 dischargers shall obtain any required downstream/down-gradient receiving water samples from a representative and accessible location as close as possible and downstream from the effluent discharge point.
- If two or more discharge locations discharge to the same receiving water, Risk Level 3 dischargers may sample the receiving water at a single upstream and downstream location.

6.11 Monitoring Exceptions

Visual observations (inspections) and sample collection are not required under the following conditions:

- During dangerous weather conditions such as flooding and electrical storms.
- Outside of scheduled site business hours.

If one of these conditions occurs, document why the sampling or observations did not occur and include the information in the Annual Report.

6.12 Recordkeeping

The Stormwater Site Inspector shall use the forms provided, or others approved by the Owner's Representative. At a minimum, the Stormwater Site Inspector shall provide:

- The date, place, and time of facility inspections, sampling, visual observation (inspections), and/or measurements, including precipitation.
- The individual(s) who performed the facility inspections, sampling, visual observation (inspections), and or measurements.
- The date and approximate time of analyses.
- The individual(s) who performed the analyses.

- For laboratory-tested samples, provide a summary of all analytical results, the method detection limits and reporting units, the analytical techniques or methods used, and the chain of custody forms.
- Rain gauge readings from site inspections;
- Quality assurance/quality control records and results.
- Visual observation and sample collection exception records
- The records of any corrective actions and follow-up activities that resulted from analytical results, visual observation, or inspections

A copy of all records shall be kept in the field copy of the SWPPP. Record retention shall conform to the requirements of the SWPPP.

6.13 Reporting

Reporting shall conform to Section 3.

7.0 Rain Event Action Plan (Risk Level 2 or 3 Projects Only)

If the project is Risk Level 2 or 3, the QSP shall develop a Rain Event Action Plan (REAP) to protect all exposed portions of the project sites and to ensure that there are adequate materials, staff, and time to implement erosion and sediment control measures prior to a rain event.

At a minimum the REAP must include the following site and phase-specific information:

1. Site Address;
2. Calculated Risk Level (2 or 3);
3. QSP contact information including the name, company, and 24-hour emergency telephone number;
4. Erosion and Sediment Control Provider(s) / Subcontractor(s) contact information including the name, company, and 24-hour emergency telephone number;
5. Stormwater Site Inspector(s) contact information including the name, company, and 24-hour emergency telephone number;
6. Storm Information;
7. Activities associated with the current construction phase;
8. Trades currently active on the construction site;
9. Trade subcontractor information;
10. WPC work applicable to the current project phase; and
11. Description of flood contingency measures.

The QSP must develop the REAP at least 48-hours in advance of any precipitation event forecast to have a 50% or greater chance of producing precipitation in the project area.

The REAP must be on site and be implemented 24 hours in advance of any the predicted precipitation event.

A REAP shall also be prepared by the QSP for Inactive Construction, if applicable, in accordance with the CGP.

The completed REAPs shall be included in Appendix 6 of this SWPPP.

A REAP template is provided in Appendix 1 for the convenience of the QSP.

8.0 Materials Management Plan and Spill Response Plan

The QSP shall conduct an assessment of materials and equipment expected to be used onsite that have the potential to contaminate stormwater runoff, and shall prepare a Materials Management Plan.

The QSP shall consider the following as part of the Materials Management Plan:

- the quantity, physical characteristics (e.g., liquid, powder, solid), and locations of each potential pollutant source handled, produced, stored, recycled, or disposed of at the site,
- the degree to which pollutants associated with those materials may be exposed to and mobilized by contact with stormwater,
- the direct and indirect pathways that pollutants may be exposed to stormwater or authorized non-stormwater discharges, and
- the effectiveness of BMPs to reduce or prevent pollutants in stormwater discharges and authorized non-stormwater discharges.

The Materials Management Plan shall outline a strategy for keeping potential pollutants from contacting stormwater during delivery, staging, usage, storage, and waste management. The Materials Management Plan must include all non-visible pollutants that are known or should be known to occur on the construction site including, but not limited to, materials that:

- are being used in construction activities,
- are stored on the construction site,
- were spilled during construction operations and not cleaned up,
- were stored (or used) in a manner that created the potential for a release of the materials during past land use activities,
- were spilled during previous land use activities and not cleaned up, or
- were applied to the soil as part of past land use activities.

8.1 Spill Response Plan

The Contractors' Illness and Injury Prevention Plan shall contain a Spill Response Plan component. The Spill Response Plan shall ensure that adequate containment is provided and that there are adequate spill cleanup materials and trained staff available in the event of a spill.

The Spill Response Plan shall include the following:

- Equipment and materials for cleanup of spills shall be available on site and that spills and leaks shall be cleaned up immediately and disposed of properly.
- Appropriate spill response personnel shall be assigned and trained.
- Concrete washout areas and other washout areas that may contain additional pollutants shall be contained so there is no discharge into the underlying soil and onto the surrounding areas.

At a minimum the Materials Management Plan and Spill Response Plan must include the following site- and phase-specific information:

- Site Address;
- Calculated Risk Level;
- QSP contact information including the name, company, and 24-hour emergency telephone number;

- On-site spill response personnel contact information including the name, company, and 24-hour emergency telephone number;
- Activities associated with current construction phase;
- Secondary containment and spill response kit inventory and their locations on the site
- An inventory of construction materials currently being used on the site (update frequently)
- Locations of all materials storage areas, and descriptions of secondary containment (show locations on SWPPP Exhibits in Appendix 2)
- Employee and subcontractor spill response training records
- Sampling shall be performed in accordance with the Construction Site Monitoring Plan and Sampling and Analysis Plan in the event of a spill

The completed Plan shall be included in Appendix 7 of this SWPPP.

Appendix 1

Risk Level 1, 2, 3 ***Visual Inspection Field Log Sheet***						
Date and Time of Inspection:				Report Date:		
Inspection Type:	☐ Weekly	☐ Before predicted rain	☐ During rain event	☐ Following qualifying rain event	☐ Contained stormwater release	☐ Quarterly non-stormwater

Site Information	
Construction Site Name:	
Construction stage and completed activities:	Approximate area of exposed site:

Weather and Observations			
Date Rain Predicted to Occur:		Predicted % chance of rain:	
Estimate storm beginning: _____ (date and time)	Estimate storm duration:_____ (hours)	Estimate time since last storm: _____ (days or hours)	Rain gauge reading: _____ (inches)

Observations: If yes identify location		
Odors	Yes ☐	No ☐
Floating material	Yes ☐	No ☐
Suspended Material	Yes ☐	No ☐
Sheen	Yes ☐	No ☐
Discolorations	Yes ☐	No ☐
Turbidity	Yes ☐	No ☐

Site Inspections	
Outfalls or BMPs Evaluated	**Deficiencies Noted**
(add additional sheets or attached detailed BMP Inspection Checklists)	

Photos Taken:	Yes ☐	No ☐	Photo Reference IDs:

Corrective Actions Identified (note if SWPPP/REAP change is needed)

Inspector Information	
Inspector Name:	Inspector Title:
Signature:	Date:

Risk Level 2 ***Effluent Sampling Field Log Sheets***			
Construction Site Name:	Date:	Time Start:	
Sampler:			
Sampling Event Type:	☐ Stormwater	☐ Non-stormwater	☐ Non-visible pollutant

Field Meter Calibration	
pH Meter ID No./Desc.: Calibration Date/Time:	Turbidity Meter ID No./Desc.: Calibration Date/Time:

Field pH and Turbidity Measurements

Discharge Location Description	pH	Turbidity	Time

Grab Samples Collected

Discharge Location Description	Sample Type	Time

Additional Sampling Notes:

Time End:

Risk Level 3
Effluent Sampling Field Log Sheets

Construction Site Name:	Date:	Time Start:
Sampler:		

Sampling Event Type:	☐ Stormwater	☐ Non-stormwater	☐ Non-visible pollutant	☐ Post NEL Exceedance

Field Meter Calibration

pH Meter ID No./Desc.: Calibration Date/Time:	Turbidity Meter ID No./Desc.: Calibration Date/Time:

Field pH and Turbidity Measurements

Discharge Location Description	pH	Turbidity	Time

Grab Samples Collected

Discharge Location Description	SSC	Other (specify)	Time

Additional Sampling Notes:

Time End:

Risk Level 3
Receiving Water Sampling Field Log Sheets

Construction Site Name:	Date:	Time Start:
Sampler:		

Receiving Water Description and Observations

Receiving Water Name/ID:		
Observations:		
Odors	Yes ☐	No ☐
Floating material	Yes ☐	No ☐
Suspended Material	Yes ☐	No ☐
Sheen	Yes ☐	No ☐
Discolorations	Yes ☐	No ☐
Turbidity	Yes ☐	No ☐

Field Meter Calibration

pH Meter ID No./Desc.:	Turbidity Meter ID No./Desc.:
Calibration Date/Time:	Calibration Date/Time:

Field pH and Turbidity Measurements and SSC Grab Sample

Upstream Location

Type	Result	Time	Notes
pH			
Turbidity			
SSC	Collected Yes ☐ No ☐		

Downstream Location

Type	Result	Time	Notes
pH			
Turbidity			
SSC	Collected Yes ☐ No ☐		

Additional Sampling Notes:
Time End:

Rain Event Action Plan (REAP)

Date:		**WDID Number:**	
Date Rain Predicted to Occur:		**Predicted % chance of rain:**	

Site Information:

_____
Site Name, City and Zip Code Project Risk Level: □ Risk Level 2 □ Risk Level 3

Site Stormwater Manager Information:

_____
Name, Company, Emergency Phone Number (24/7)

Erosion and Sediment Control Contractor – Labor Force contracted for the site:

_____
Name, Company, Emergency Phone Number (24/7)

Stormwater Sampling Agent:

_____
Name, Company, Emergency Phone Number (24/7)

Current Phase of Construction

Check ALL the boxes below that apply to your site.

❑ Grading and Land Development	❑ Vertical Construction	❑ Inactive Site
❑ Streets and Utilities	❑ Final Landscaping and Site Stabilization	❑ Other:

Activities Associated with Current Phase(s)

Check ALL the boxes below that apply to your site (some apply to all Phases).

Grading and Land Development:

❑ Demolition	❑ Vegetation Removal	❑ Vegetation Salvage-Harvest
❑ Rough Grade	❑ Finish Grade	❑ Blasting
❑ Soil Amendment(s):	❑ Excavation (_____ ft)	❑ Soils Testing
❑ Rock Crushing	❑ Erosion and Sediment Control	❑ Surveying
❑ Equip. Maintenance/Fueling	❑ Material Delivery and Storage	❑ Other:

Streets and Utilities:

❑ Finish Grade	❑ Utility Install: water-sewer-gas	❑ Paving Operations
❑ Equip. Maintenance/Fueling	❑ Storm Drain Installation	❑ Material Delivery & Storage
❑ Curb and Gutter/Concrete Pour	❑ Masonry	❑ Other:

Vertical Construction:

❑ Framing	❑ Carpentry	❑ Concrete/Forms/Foundation
❑ Masonry	❑ Electrical	❑ Painting
❑ Drywall/Interior Walls	❑ Plumbing	❑ Stucco
❑ Equip. Maintenance/Fueling	❑ HVAC	❑ Tile
❑ Exterior Siding	❑ Insulation	❑ Landscaping & Irrigation
❑ Flooring	❑ Roofing	❑ Other:

Final Landscaping & Site Stabilization:

❑ Stabilization	❑ Vegetation Establishment	❑ E&S Control BMP Removal
❑ Finish Grade	❑ Storage Yard/ Material Removal	❑ Landscape Installation
❑ Painting and Touch-Up	❑ Irrigation System Testing	❑ Other:
❑ Drainage Inlet Stencils	❑ Inlet Filtration	❑ Perm. Water Quality Ponds
❑ Other:	❑ Other:	❑ Other:

Inactive Construction Site:

❑ E & S Control Device Installation	❑ Routine Site Inspection	❑ Trash Removal
❑ E & S Control Device Maintenance	❑ Street Sweeping	❑ Other:

Rain Event Action Plan (REAP)

Date:		**WDID Number:**	

Trades Active on Site during Current Phase(s)

Check ALL the boxes below that apply to your site

❑ Storm Drain Improvement	❑ Grading Contractor	❑ Surveyor- Soil Technician
❑ Street Improvements	❑ Water Pipe Installation	❑ Sanitary Station Provider
❑ Material Delivery	❑ Sewer Pipe Installation	❑ Electrical
❑ Trenching	❑ Gas Pipe Installation	❑ Carpentry
❑ Concrete Pouring	❑ Electrical Installation	❑ Plumbing
❑ Foundation	❑ Communication Installation	❑ Masonry
❑ Demolition	❑ Erosion and Sediment Control	❑ Water, Sewer, Electric Utilities
❑ Material Delivery	❑ Equipment Fueling/Maintenance	❑ Rock Products
❑ Tile Work- Flooring	❑ Utilities, e.g., Sewer, Electric	❑ Painters
❑ Drywall	❑ Roofers	❑ Carpenters
❑ HVAC installers	❑ Stucco	❑ Pest Control: e.g., termite prevention
❑ Exterior Siding	❑ Masons	❑ Water Feature Installation
❑ Insulation	❑ Landscapers	❑ Utility Line Testers
❑ Fireproofing	❑ Riggers	❑ Irrigation System Installation
❑ Steel Systems	❑ Utility Line Testers	❑ Other:

Trade Contractor Information Provided

Check ALL the boxes below that apply to your site.

❑ Educational Material Handout	❑ Tailgate Meetings	❑ Training Workshop
❑ Contractual Language	❑ Fines and Penalties	❑ Signage
❑ Other:	❑ Other:	❑ Other:

Continued on next page.

Rain Event Action Plan (REAP)

Date of REAP		**WDID Number:**	
Date Rain Predicted to Occur:		**Predicted % chance of rain:**	

Predicted Rain Event Triggered Actions

Below is a list of suggested actions and items to review for this project. Each active Trade should check all material storage areas, stockpiles, waste management areas, vehicle and equipment storage and maintenance, areas of active soil disturbance, and areas of active work to ensure the proper implementation of BMPs. Project-wide BMPs should be checked and cross-referenced to the BMP progress map.

Trade or Activity	Suggested action(s) to perform / item(s) to review prior to rain event
❑ Information & Scheduling	❑ Inform trade supervisors of predicted rain ❑ Check scheduled activities and reschedule as needed ❑ Alert erosion/sediment control provider ❑ Alert sample collection contractor (if applicable) ❑ Schedule staff for extended rain inspections (including weekends & holidays) ❑ Check Erosion and Sediment Control (ESC) material stock ❑ Review BMP progress map ❑ Other:_____ ❑ _____ ❑ _____
❑ Material storage areas	❑ Material under cover or in sheds (ex: treated woods and metals) ❑ Perimeter control around stockpiles ❑ Other:_____ ❑ _____ ❑ _____
❑ Waste management areas	❑ Dumpsters closed ❑ Drain holes plugged ❑ Recycling bins covered ❑ Sanitary stations bermed and protected from tipping ❑ Other:_____ ❑ _____ ❑ _____
❑ Trade operations	❑ Exterior operations shut down for event (e.g., no concrete pours or paving) ❑ Soil treatments (e.g.,: fertilizer) ceased within 24 hours of event ❑ Materials and equipment (ex: tools) properly stored and covered ❑ Waste and debris disposed in covered dumpsters or removed from site ❑ Trenches and excavations protected ❑ Perimeter controls around disturbed areas ❑ Fueling and repair areas covered and bermed ❑ Other:_____ ❑ _____ ❑ _____
❑ Site ESC BMPs	❑ Adequate capacity in sediment basins and traps ❑ Site perimeter controls in place ❑ Catch basin and drop inlet protection in place and cleaned ❑ Temporary erosion controls deployed ❑ Temporary perimeter controls deployed around disturbed areas and stockpiles ❑ Roads swept; site ingress and egress points stabilized ❑ Other:_____ ❑ _____ ❑ _____
❑ Concrete rinse out area	❑ Adequate capacity for rain ❑ Wash-out bins covered ❑ Other:_____ ❑ _____ ❑ _____
❑ Spill and drips	❑ All incident spills and drips, including paint, stucco, fuel, and oil cleaned ❑ Drip pans emptied ❑ Other:_____ ❑ _____ ❑ _____

Continued on next page.

❑ Other / Discussion / Diagrams	❑ _____ ❑ _____ ❑ _____ ❑ _____ ❑ _____ ❑ _____ ❑ _____ ❑ _____ ❑ _____ ❑ _____ ❑ _____ ❑ _____ ❑ _____

Attach a printout of the weather forecast from the NOAA website to the REAP.

I certify under penalty of law that this Rain Event Action Plan (REAP) will be performed in accordance with the General Permit by me or under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____Date: _____
Qualified SWPPP Practitioner (Use ink please)

SWPPP Amendment Form

(Store Completed Form in Appendix 9)

Project Name: _____

Project Location: _____

_____

_____

Amendment Number: _____

Amendment Summary:

Legally Responsible Person / Approved Signatory's Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete.

I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____

LRP or AS Signature Date

Qualified SWPPP Developer's Certification:

I certify (as this term is defined by California Business and Professions Code Section 6735.5) that the information and any design within this Storm Water Pollution Prevention Plan (SWPPP) Amendment meets the requirements of the various agencies having jurisdiction over the project and the California Construction General Permit (CGP).

_____

QSD's Signature Date

STATE OF CALIFORNIA • DEPARTMENT OF TRANSPORTATION

STORMWATER TRAINING RECORD

CEM-2023 (REV 11/2013)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER
CONTRACTOR NAME AND ADDRESS	PROJECT SITE RISK LEVEL ☐ Risk Level 1 ☐ N/A. WPCP ☐ Risk Level 2 ☐ N/A. Project Resides in the Lake Tahoe Hydrologic Unit and is regulated under Order No. R6T-2011-0019, NPDES No. CAG616002. ☐ Risk Level 3
SUBMITTED BY CONTRACTOR (PRINT AND SIGN NAME)	DATE

Stormwater Training Record

Training Course Title or Specific Training Objective	Location	Date of Training
Stormwater Topics ☐ Temporary soil stabilization ☐ Tracking controls ☐ Non-stormwater management ☐ Waste management and materials pollution control ☐ Spill prevention and control ☐ BMPs required for work activities current week ☐ Stormwater pollution prevention plan ☐ Water pollution control program ☐ Temporary sediment control ☐ Wind erosion control ☐ Stormwater discharge sampling ☐ Pre-storm activities ☐ Permanent soil stabilization ☐ Initial project training	Instructor Name Instructor Title Instructor Phone Number Course Length (hours)	Training Audience ☐ General ☐ BMPs ☐ SWPPP

Attendee Roster

Name	Phone Number	Initials	Company Name

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STORMWATER TRAINING RECORD

CEM-2023 (REV 11/2013)

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

Attendee Roster (Continued)

Name	Phone Number	Initials	Company Name

Review and Record Keeping

Has training information been entered into the optional Stormwater Training Log (CEM-2024)? ☐ Yes ☐ No

I have reviewed this document and, based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief the information submitted is true, accurate, and complete.

Water Pollution Control Manager (name)	Date
Water Pollution Control Manager (signature)	

Instructions

General Information

- Projects with either a Stormwater Pollution Prevention Plan (SWPPP) or Water Pollution Control Program (WPCP) require the information on this form to document stormwater training for contractor and subcontractor managers, supervisors, and employees. Include the form and required training documentation in the stormwater annual report for SWPPP projects.
- Use this form to document training for employees responsible for activities associated with Construction General Permit compliance and contract specifications. Use this form to document required weekly stormwater training.
- Provide this training record and an updated copy of CEM-2024 (CEM-2024 is an optional form used at the WPCM's discretion) "Stormwater Training Log," to the resident engineer (RE) within five days of the date of training.
- Attach additional copies of page 2 of this form if necessary to record all individuals attending this training.
- Stormwater training needs to be completed at the frequency stipulated in the project specifications and/or the SWPPP, whichever is more frequent.
- Names may be written or typed. Initials must be original. Originals are filed with RE as stipulated above.
- Attach copy of training material/topic with submittal to RE.

Form

- **Contract Number/Co/Rte/PM**
  For local agency encroachment permit projects write the encroachment permit number in the Contract Number field.
- **Project Identifier Number**
  Caltrans projects starting July 1, 2010, will have a Project Identifier Number (PIN). For projects without a PIN, write N/A in the field.
- **WDID Number**
  For projects with Water Pollution Control Program, enter "WPCP."
- **Attendee Roster**
  Enter employee name, contractor or subcontractor company name and employee phone number.
- **Training Audience**
  Enter one of the following responses:

  General—Training for individuals responsible for activities associated with compliance with the Construction General Permit.

  BMPs—Training for individuals responsible for BMP installation, inspection, maintenance, and repair.

  SWPPP—Training for individuals responsible for overseeing, revising, and amending the SWPPP.

PROJECT STORMWATER ANNUAL REPORT

GENERAL INFORMATION

A. SITE OWNER INFORMATION

OWNER NAME	OWNER CONTACT		
OWNER ADDRESS	EMAIL		PHONE
CITY		STATE	ZIP CODE

B. SITE INFORMATION

SITE BUSINESS NAME	SITE CONTACT		
SITE WDID NUMBER	EMAIL		PHONE
PHYSICAL ADDRESS	CITY	STATE	ZIP CODE

FORM 1

C. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

C.1. Has a SWPPP been prepared by a Qualified SWPPP Developer (QSD) for the construction project? ☐ YES ☐ NO
If NO, explain: _____

C.2. Does the SWPPP include a Construction Site Monitoring Program (CSMP) section/element? ☐ YES ☐ NO
If NO, explain: _____

C.3. Are these documents kept on-site? ☐ YES ☐ NO
If NO, explain: _____

D. GOOD SITE MANAGEMENT (i.e. HOUSEKEEPING)

D.1. Were good site management (i.e. housekeeping) measures for construction materials implemented on-site in accordance with Construction General Permit (CGP) and SWPPP? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

D.1.a. Was an inventory of the products used and/or expected to be used conducted? ☐ YES ☐ NO
If NO, explain: _____

D.2. Were required good site management (i.e. housekeeping) measures for waste management implemented on-site in accordance with CGP and SWPPP? ☐ YES ☐ NO
If NO, explain: _____

D.2.a. Is there a spill response and implementation element for the SWPPP? ☐ YES ☐ NO
If NO, explain: _____

D.3. Were required good site management (i.e. housekeeping) measures for vehicle storage and maintenance implemented on-site in accordance with CGP and SWPPP? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

D.4. Were required good site management (i.e. housekeeping) measures for landscape materials implemented on-site in accordance with CGP and SWPPP? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

D.5. Was a list of potential pollutant sources developed? ☐ YES ☐ NO
If NO, explain: _____

D.6. Were required good site management (i.e. housekeeping) measures to control air deposition of site materials and from site operations implemented on-site? ☐ YES ☐ NO
If NO, explain: _____

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E. NON-STORM WATER MANAGEMENT

E.1. Were measures to control all non-storm water discharges during construction implemented? ☐ YES ☐ NO
If NO, explain: _____

E.2. Were vehicles washed in such a manner as to prevent non-storm water discharges to surface waters or to MS4 drainage systems? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

E.3. Were streets cleaned in such a manner as to prevent unauthorized non-storm water discharges from reaching surface waters or MS4 drainage systems? ☐ YES ☐ NO
If NO, explain: _____

F. EROSION CONTROLS

F.1. Were required erosion controls implemented on-site in accordance with CGP and SWPPP? ☐ YES ☐ NO
If NO, explain: _____

G. SEDIMENT CONTROLS

G.1. Were required sediment controls implemented on-site in accordance with CGP and SWPPP? ☐ YES ☐ NO
If NO, explain: _____

G.2. Were immediate access roads inspected on a daily basis? ☐ YES ☐ NO
If NO, explain: _____

G.3. Was an Active Treatment System implemented on site? ☐ YES ☐ NO

H. RUN-ON AND RUN-OFF CONTROLS

H.1. Was all site run-on and run-off effectively managed? ☐ YES ☐ NO
If NO, explain: _____

H.2. Did Risk level 2 dischargers monitor and report run-on from surrounding areas if there was reason to believe run-on may have contributed to a Numeric Action Level (NAL) exceedance? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

I. RAIN EVENT ACTION PLAN (REAP)

I.1. Were REAPs developed 48 hours prior to all likely precipitation events (50% or greater probability of producing precipitation)? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

I.2. Did the REAPs developed meet the minimum criteria listed in the CGP? ☐ YES ☐ NO
If NO, explain: _____

I.3. Was a REAP developed for each qualifying event in accordance with the permit requirements (i.e. Grading and Land Development, Streets and Utilities, Vertical Construction, Final Landscaping and Site Stabilization)? ☐ YES ☐ NO
If NO, explain: _____

J. INSPECTION, MAINTENANCE AND REPAIR

J.1. Were all site inspections, maintenance, and repairs performed or supervised by a Qualified SWPPP Practitioner (QSP)? ☐ YES ☐ NO
If NO, explain: _____

J.2. Were site inspections conducted weekly and at least once each 24-hour period during extended storm events? ☐ YES ☐ NO
If NO, explain: _____

J.3. Were post rain event inspections conducted? ☐ YES ☐ NO
If NO, explain: _____

J.4. Do your inspection forms/checklists meet the minimum criteria listed in the CGP? ☐ YES ☐ NO
If NO, explain: _____

J.5. During any site inspection was Best Management Practice (BMP) maintenance or repairs required? ☐ YES ☐ NO
If NO, explain: _____

J.6. If BMP maintenance/repair or design change was needed, did implementation begin within 72 hours? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

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K. VISUAL MONITORING

K.1. Within 2 business days (48 hours) after each qualified rain event, were visual inspections conducted in compliance with the CGP? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

K.2. Were all storm water discharges that occurred from storage or containment systems visually observed prior to discharge? ☐ YES ☐ NO
If NO, explain: _____

K.3. Were the time, date, and rain gauge reading recorded for each qualifying rain event? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

K.4. Within 2 business days (48 hours) prior to each predicted rain event, were visual inspections conducted in compliance with the CGP? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

K.5. Are all visual inspection records retained on-site? ☐ YES ☐ NO
If NO, explain: _____

L. WATER QUALITY SAMPLING AND ANALYSIS

L.1. How many qualifying storm events (producing precipitation of 0.5 inch or more at the time of discharge) occurred this past reporting year? _____

L.2. How many qualifying storm events (producing precipitation of 0.5 inch or more at the time of discharge) were sampled? _____
Explain un-sampled events: _____

L.3. For the sampled events, did you collect three samples, at minimum (representative of the flow and characteristics) each day of discharge per qualified event? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

L.4. Were grab samples analyzed for pH and/or turbidity? (Analytical data must be entered in the RAW DATA tab in SMARTS)? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

L.5. Were Active Treatment System (ATS) effluent samples taken? (Applies to projects that deployed ATS) ☐ YES ☐ NO ☐ NA
If NO, explain: _____

M. NON-STORM WATER DISCHARGE MONITORING

M.1. Were all drainage areas monitored for authorized/unauthorized non-storm water discharges quarterly? ☐ YES ☐ NO
If NO, explain: _____

M.2. Did visual observations indicate any authorized/unauthorized non-storm water discharges? ☐ YES ☐ NO
If NO, explain: _____

M.3. Were effluent samples taken of the authorized/unauthorized non-storm water discharge? (Analytical data must be entered into the RAW DATA tab in SMARTS) ☐ YES ☐ NO ☐ NA
If NO, explain: _____

M.4. Were the effluent samples sent to a laboratory certified for such analyses by the California Department of Public Health? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

M.5. Were unauthorized non-storm water discharges eliminated? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

N. NON-VISIBLE POLLUTANT MONITORING

N.1. Were any breaches, malfunctions, leakages, or spills observed during a visual inspection? ☐ YES ☐ NO

N.2. How many potential discharges of non-visible pollutants were identified? _____

N.3. For each discharge event (of non-visible pollutants), were samples collected in compliance with the CGP? (Analytical data must be entered into the RAW DATA tab in SMARTS) ☐ YES ☐ NO ☐ NA
If NO, explain: _____

N.4. For each discharge event, was a comparison sample collected (uncontaminated sample that did not come into contact with the pollutant)? (Analytical data must be entered into the RAW DATA tab in SMARTS) ☐ YES ☐ NO ☐ NA
If NO, explain: _____

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O. WATERSHED MONITORING

O.1. Are you part of a qualified regional watershed-based monitoring program approved by the Regional Water Board? ☐ YES ☐ NO

P. RECORDS

P.1. Are all records of all storm water monitoring information retained on-site? ☐ YES ☐ NO

Q. NAL EXCEEDANCES

Q.1. Were any NALs exceeded? ☐ YES ☐ NO ☐ NA
If NO or NA, skip to next section

Q.2. Were corrective actions taken to address the NAL exceedances? ☐ YES ☐ NO ☐ NA
If YES, please provide information about the corrective actions taken on Form 3.
If NO, explain: _____

Q.3. Were analytical results from any/all NAL exceedances submitted electronically to the State Water Board, no later than 10 days after the conclusion of the storm event? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

Q.4. Were any NAL Exceedance Reports submitted to the Regional Water Board? ☐ YES ☐ NO ☐ NA

R. NEL EXCEEDANCES

R.1. Were any Numeric Effluent Limitations (NELs) exceeded? ☐ YES ☐ NO ☐ NA

R.2. Were any NEL exceedances due to a storm event equal to or larger than the Compliance Storm Event described in CGP? (On-site rain gauge and governmental rain gauge verification required) ☐ YES ☐ NO ☐ NA
If YES, describe: _____

R.3. Were corrective actions taken to address the NEL exceedances? ☐ YES ☐ NO ☐ NA
If YES, please provide information about the corrective actions taken on Form 3.
If NO, explain: _____

R.4. Were NEL Violation Reports submitted to the State Water Board within 24 hours after the NEL exceedance were identified? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

R.5. Were analytical/sampling results from any/all NEL exceedances submitted electronically to the State Water Board, no later than 5 days after the conclusion of the storm event? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

R.6. Were Suspended Sediment Concentration (SSC) analyses conducted? (Analytical data must be entered in the RAW DATA tab in SMARTS) ☐ YES ☐ NO ☐ NA
If NO, explain: _____

R.7. Were Receiving Water samples taken and analyzed? (Analytical data must be entered in the RAW DATA tab in SMARTS) ☐ YES ☐ NO ☐ NA
If NO, explain: _____

S. BIOASSESSMENT

S.1. Is the project over 30 acres? ☐ YES ☐ NO ☐ NA

S.2. Does the project have a direct connection to a freshwater wadeable (generally less than 0.5-1.0 meters deep, that can be sampled by field crews wearing chest waders) receiving water? ☐ YES ☐ NO ☐ NA

S.3. Have you already submitted bioassessment information in a previous annual report? ☐ YES ☐ NO ☐ NA
Note: If you have not already submitted your bioassessment information, please provide the information (electronically) from the group that did the assessment or a summary of the information. Please include what party conducted the assessment for the site.

S.4. Was the benthic macroinvertebrate bioassessment commenced in accordance to the instructions in Appendix 3 of the permit? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

S.5. Was your site exempted by the Regional Water Board? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

S.6. Were you required to pay into a comparable monitoring program (i.e. SWAMP)? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

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T. TRAINING

T.1. Was a Qualified SWPPP Practitioner (QSP) in reasonable charge of SWPPP implementation? ☐ YES ☐ NO ☐ NA
If YES, provide name: _____
and certificate number: _____
If NO, explain: _____

T.2. Were all individuals conducting BMP installation, inspection, maintenance, and repairs trained appropriately? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

T.3. Are complete training records kept on-site and available upon request? ☐ YES ☐ NO ☐ NA
If NO, explain: _____

U. AUTHORIZED NON-STORMWATER DISCHARGE (NSWD) DISCHARGED

U.1. Were any authorized NSWDs discharged/observed from July-September? ☐ YES ☐ NO
If YES, complete Form 2.

U.2. Were any authorized NSWDs discharged/observed from October-December? ☐ YES ☐ NO
If YES, complete Form 2.

U.3. Were any authorized NSWDs discharged/observed from January-March? ☐ YES ☐ NO
If YES, complete Form 2.

U.4. Were any authorized NSWDs discharged/observed from April-June? ☐ YES ☐ NO
If YES, complete Form 2.

V. UNAUTHORIZED NON-STORMWATER DISCHARGE (NSWD) DISCHARGED

V.1. Were any unauthorized NSWDs discharged/observed from July-September? ☐ YES ☐ NO
If YES, complete Form 2.

V.2. Were any unauthorized NSWDs discharged/observed from October-December? ☐ YES ☐ NO
If YES, complete Form 2.

V.3. Were any unauthorized NSWDs discharged/observed from January-March? ☐ YES ☐ NO
If YES, complete Form 2.

V.4. Were any unauthorized NSWDs discharged/observed from April-June? ☐ YES ☐ NO
If YES, complete Form 2.

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FORM 2

DATE/TIME OF OBSERVATION	AUTHORIZED OR UNAUTHORIZED (CHECK ONE)	SOURCE AND LOCATION OF NSWD	NAME OF NSWD	DESCRIBE NSWD CHARACTERISTICS. Indicate whether NSWD is clear, cloudy, or discolored, causing staining, contains floating objects or oil sheen, has odors, etc.		DESCRIBE ANY REVISED OR NEW BMPs AND PROVIDE THEIR IMPLEMENTATION DATE
				At the NSWD Source	At the NSWD Drainage Area and Discharge Location	
_____ _____ ☐AM ☐PM	☐ Authorized ☐ Unauthorized					
_____ _____ ☐AM ☐PM	☐ Authorized ☐ Unauthorized					
_____ _____ ☐AM ☐PM	☐ Authorized ☐ Unauthorized					
_____ _____ ☐AM ☐PM	☐ Authorized ☐ Unauthorized					
_____ _____ ☐AM ☐PM	☐ Authorized ☐ Unauthorized					
_____ _____ ☐AM ☐PM	☐ Authorized ☐ Unauthorized					
_____ _____ ☐AM ☐PM	☐ Authorized ☐ Unauthorized					

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FORM 3

Enter a general summary of any BMP deficiencies identified for each quarter and the corrective actions taken. Maximum up to 1000 characters.

July-Sept Quarter	
Oct-Dec Quarter	
Jan-March Quarter	
April-June Quarter	

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Project Stormwater Annual Report

I certify under penalty of law that this document was prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those person directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Water pollution control manager name	Date
Water pollution control manager signature	
Resident engineer name	Date
Resident engineer signature	

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Instructions

GENERAL INFORMATION

The Contractor must prepare a Stormwater Annual Report each year. The resident engineer must ensure that an Annual Report is electronically submitted by September 1st of each year to the State Water Resources Control Board (SWRCB) for all projects enrolled for more than one continuous three month period.

A Stormwater Annual Report shall be prepared to document the stormwater monitoring information and training information.

The stormwater monitoring information listed below shall be included in the Stormwater Annual Report.

- A summary and evaluation of all sampling and analysis results, including copies of laboratory reports.
- The analytical method(s), method reporting unit(s), and method detection limit(s) of each analytical parameter.
- A summary of all corrective actions taken during the compliance year.
- Identification of any compliance activities or corrective actions that were not implemented.
- A summary of all violations of the CGP.
- The names of individual(s) who performed site inspections, sampling, site visual monitoring inspections and/or measurements.
- The date, place, and time of site inspections, sampling, site visual monitoring inspections, and/or measurements, including precipitation (rain gauge).
- Any site visual monitoring inspection and sample collection exception records.
- The stormwater training information listed below shall be included in the Stormwater Annual Report.
- Documentation of all training for individuals responsible for all activities associated with compliance with the CGP.
- Documentation of all training for individuals responsible for BMP installation, inspection, maintenance, and repair.
- File this form in SWPPP File Category 20.80.

FORM

- Owner Name: Enter legally responsible person's name.
- Owner Address: Use the district office address.
- Owner Contact: Enter Authorized Signatory's name.
- E-mail for Site Owner Information: Enter authorized signatory's e-mail address.
- Site Business Name: Use Caltrans District XX to ensure consistency. For construction projects in a region, use the parent district number (either 03 or 06)
- Site Contact: Enter resident engineer's name.
- E-mail for Site Information: Enter resident engineer's e-mail address.

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Appendix 2

WATER POLLUTION CONTROL NOTES

1. ESTIMATED TOTAL DISTURBED AREA: 20 AC. THIS PLAN SHALL BE USED IN CONJUNCTION WITH THE PROJECT SWPPP.
2. BEST MANAGEMENT PRACTICES (BMPs) (MATERIALS AND THEIR INSTALLATION) SHALL CONFORM TO THE DETAILS INCLUDED IN THE SWPPP.
3. THE BMPs SHOWN ON THIS WATER POLLUTION CONTROL PLAN SHALL BE ADJUSTED OR SUPPLEMENTED AS REQUIRED TO PROTECT WATER QUALITY AND/OR AS DIRECTED BY THE ENGINEER OR JURISDICTION HAVING AUTHORITY.
4. CONTRACTOR IS RESPONSIBLE FOR MONITORING BMPs PRIOR TO, DURING, AND AFTER STORM EVENTS, AND SHALL PROMPTLY CORRECT ANY DEFICIENCIES NOTED.
5. ALL CONNECTIONS TO OFF-SITE PAVED AREAS SHALL BE KEPT CLEAN OF SOIL AND DEBRIS. REGULAR STREET SWEEPING IS REQUIRED. ADDITIONAL STREET SWEEPING MAY BE REQUIRED BY THE ARCHITECT/ENGINEER OR JURISDICTION HAVING AUTHORITY.
6. REASONABLE CARE SHALL BE TAKEN WHEN HAULING ANY EARTH, SAND, GRAVEL, STONE, DEBRIS, PAPER OR ANY OTHER SUBSTANCE OVER ANY PUBLIC STREET, ALLEY OR OTHER PUBLIC PLACE. ANY MATERIAL THAT IS TO BE HAULED OFF-SITE SHALL BE COVERED. SHOULD ANY BLOW, SPILL, OR TRACK OVER AND UPON SAID PUBLIC OR ADJACENT PRIVATE PROPERTY, IMMEDIATE REMEDY SHALL OCCUR.
7. KEEP ADDITIONAL EROSION AND SEDIMENT CONTROL SUPPLIES ON SITE IN CASE IMMEDIATE REPAIRS OR MODIFICATIONS ARE REQUIRED. THESE SUPPLIES MAY INCLUDE ADDITIONAL SILT FENCE, FILTER FABRIC, INLET PROTECTION DEVICES, JUTE NETTING, GRAVEL BAGS AND TARPS.
8. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION WILL BE MINIMIZED. STATE AND LOCAL LAWS CONCERNING POLLUTION ABATEMENT SHALL BE COMPLIED WITH.
9. CONTRACTOR SHALL PROVIDE DUST CONTROL AS REQUIRED BY FEDERAL, STATE, AND LOCAL AGENCY REQUIREMENTS.
10. PROVIDE TEMPORARY "EFFECTIVE SOIL COVER" ON ALL INACTIVE DISTURBED AREAS (AREAS WHICH HAVE NOT BEEN DISTURBED FOR AT LEAST 14 DAYS) PRIOR TO INSTALLATION OF FINAL LANDSCAPING, IF REQUIRED DUE TO PROJECT SCHEDULING.
11. PROVIDE WIND EROSION CONTROL AT ALL TIMES IN ACCORDANCE WITH BEST MANAGEMENT PRACTICE WE-1.
12. LIMIT THE USE OF PLASTIC MATERIALS WHEN MORE SUSTAINABLE, ENVIRONMENTALLY FRIENDLY ALTERNATIVES EXIST. WHERE PLASTIC MATERIALS ARE DEEMED NECESSARY, CONSIDER THE USE OF PLASTIC MATERIALS RESISTANT TO SOLAR DEGRADATION AND WHICH MAY BE RE-USED.
13. ALL SURFACES EXPOSED OR EXPECTED TO BE EXPOSED DURING GRADING ACTIVITIES SHALL BE PREPARED AND MAINTAINED THROUGH THE LENGTH OF THE ENTIRE PROJECT TO PROTECT AGAINST EROSION.
14. ESTABLISH AND MAINTAIN EFFECTIVE PERIMETER CONTROLS AND STABILIZE ALL CONSTRUCTION ENTRANCES AND EXITS TO SUFFICIENTLY CONTROL EROSION AND SEDIMENT DISCHARGES FROM THE SITE.
    - PROVIDE SILT FENCE AT CONSTRUCTION SITE PERIMETER WHERE RUNOFF LEAVES THE CONSTRUCTION SITE.
    - PROVIDE INLET PROTECTION AT ALL DRAIN INLETS.
    - PROVIDE CONSTRUCTION ENTRANCES AT ALL LOCATIONS WHERE VEHICLES LEAVE THE CONSTRUCTION SITE.
16. AT ALL TIMES DURING CONSTRUCTION AND UNTIL FINAL COMPLETION, THE CONTRACTOR, WHEN HE OR HIS SUBCONTRACTORS ARE OPERATING EQUIPMENT ON THE SITE, SHALL PREVENT THE FORMATION OF AN AIRBORNE DUST NUISANCE BY WATERING AND/OR TREATING THE SITE OF THE WORK IN SUCH A MANNER THAT WILL CONFINE DUST PARTICLES TO THE IMMEDIATE SURFACE OF THE WORK. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGE DONE BY DUST FROM HIS OR HER SUBCONTRACTOR.

BIORETENTION PONDS

17. SEE SHEET C17 FOR REQUIREMENTS FOR CONSTRUCTION SEQUENCING, PROTECTION AND MAINTENANCE OF BIORETENTION PONDS.

MONTEREY COUNTY REQUIREMENTS

18. ALL GRADING SHALL CONFORM TO THE MONTEREY COUNTY GRADING ORDINANCE #2535, EROSION CONTROL ORDINANCE #2806, AND CALIFORNIA BUILDING CODE.
19. PRIOR TO COMMENCEMENT OF ANY LAND DISTURBANCE, THE OWNER/APPLICANT SHALL SCHEDULE AN INSPECTION WITH RMA-ENVIRONMENTAL SERVICES TO ENSURE ALL NECESSARY SEDIMENT CONTROLS ARE IN PLACE AND THE PROJECT IS COMPLIANT WITH MONTEREY COUNTY GRADING AND EROSION CONTROL REGULATIONS.
20. DURING CONSTRUCTION THE OWNER/APPLICANT SHALL SCHEDULE AN INSPECTION WITH RMA-ENVIRONMENTAL SERVICES TO UPDATE COMPACTION TEST RECORDS, INSPECT DRAINAGE DEVICE INSTALLATION, REVIEW THE MAINTENANCE AND EFFECTIVENESS OF BMPS INSTALLED, AS WELL AS, TO VERIFY THAT POLLUTANTS OF CONCERN ARE NOT DISCHARGED FROM THE SITE.
21. PRIOR TO FINAL INSPECTION, THE OWNER/APPLICANT SHALL SCHEDULE AN INSPECTION WITH RMA-ENVIRONMENTAL SERVICES TO CONDUCT A FINAL GRADING INSPECTION, COLLECT FINAL GEOTECHNICAL LETTER OF CONFORMANCE, ENSURE THAT ALL DISTURBED AREAS HAVE BEEN STABILIZED AND THAT ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES THAT ARE NO LONGER NEEDED HAVE BEEN REMOVED.
22. ALL OR PART OF THE CONSTRUCTION OF THIS PROJECT IS EXPECTED TO OCCUR DURING THE WINTER SEASON (OCTOBER 15TH THROUGH APRIL 15TH).
23. IT SHALL BE THE RESPONSIBILITY OF THE OWNER AND THE PERMITTEE TO ENSURE THAT EROSION DOES NOT OCCUR FROM AN ACTIVITY DURING OR AFTER PROJECT CONSTRUCTION. ADDITIONAL MEASURES, BEYOND THOSE SPECIFIED, MAY BE REQUIRED AS DEEMED NECESSARY TO CONTROL ACCELERATED EROSION. (MCC 16.12.100)
24. ACTUAL GRADING SHALL BEGIN WITHIN 30 DAYS OF VEGETATION REMOVAL OR THE AREA SHALL BE PLANTED TO CONTROL EROSION. VEGETATION REMOVAL BETWEEN OCTOBER 15TH AND APRIL 15TH SHALL NOT PRECEDE SUBSEQUENT GRADING OR CONSTRUCTION ACTIVITIES BY MORE THAN 15 DAYS.
25. THE FOLLOWING PROVISIONS SHALL APPLY BETWEEN OCTOBER 1 AND APRIL 30.
    A. DISTURBED SURFACES NOT INVOLVED IN THE IMMEDIATE OPERATIONS MUST BE PROTECTED BY APPLYING STRAW MULCH AT 2000 LBS. PER ACRE AND ANCHORED BY TRACK-WALKING TO PREVENT MOVEMENT DURING WATER FLOW.
    B. RUNOFF FROM THE SITE SHALL BE DETAINED OR FILTERED BY BERMS, VEGETATED FILTER STRIPS AND/OR CATCH BASINS TO PREVENT THE ESCAPE OF SEDIMENT FROM THE SITE. THESE DRAINAGE CONTROLS MUST BE MAINTAINED BY THE CONTRACTOR AS NECESSARY TO ACHIEVE THEIR PURPOSE THROUGHOUT THE LIFE OF THE PROJECT. SEE THIS SHEET FOR EROSION CONTROL PLAN AND EROSION CONTROL DETAILS.
    C. EROSION CONTROL MEASURES SHALL BE IN PLACE AT THE END OF EACH DAY'S WORK.
    D. THE BUILDING INSPECTOR MAY STOP OPERATIONS DURING PERIODS OF INCLEMENT WEATHER IF HE DETERMINES THAT EROSION PROBLEMS ARE NOT BEING CONTROLLED ADEQUATELY.
    E. CUT AND FILL SLOPES SHALL BE PLANTED WITH A SEED MIX APPROVED BY THE LANDSCAPE ARCHITECT. AMOUNT OF SEED AND FERTILIZER SHALL BE APPROVED BY THE LANDSCAPE ARCHITECT.

LEGEND

SYMBOL	BMP #	DESCRIPTION
	EC-9	EARTH DIKE
	EC-10	ROCK RIP RAP OUTLET PROTECTION
	SE-1	SILT FENCE
	SE-4	GRAVEL BAG CHECK DAM
	SE-5	FIBER ROLL
~~SE-7~~	SE-7	STREET SWEEPING
	SE-10	STORM DRAIN INLET PROTECTION
	TC-1	STABILIZED CONSTRUCTION ENTRANCE/EXIT
NS-9	NS-9	VEHICLE AND EQUIPMENT FUELING AREA
NS-10	NS-10	VEHICLE AND EQUIPMENT MAINTENANCE AREA
WM-3	WM-3	STOCKPILE
WM-8	WM-8	CONCRETE WASHOUT
SS	WM-9	SANITARY FACILITIES
MSWM		MATERIAL STORAGE & WASTE MANAGEMENT AREA
★		STORMWATER SAMPLING LOCATION

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CALIFORNIA AMERICAN WATER

REVISIONS		REVISIONS	
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NO. C55219

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Whitson ENGINEERS

DRAWN BY N. MILAM
PROJECT ENG'R N. MILAM

DATE MARCH 2019

PROJECT 154001-0191

MPWSP DESALINATION INFRASTRUCTURE PROJECT
CIVIL
TEMPORARY WATER POLLUTION CONTROL
NOTES & DETAILS SHEET 1 OF 2

CALIFORNIA AMERICAN WATER CO.	COASTAL DIVISION	USE DIMENSIONS ONLY SCALE 1" = 50'
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	90% SUBMITTAL	154001-0191-G11

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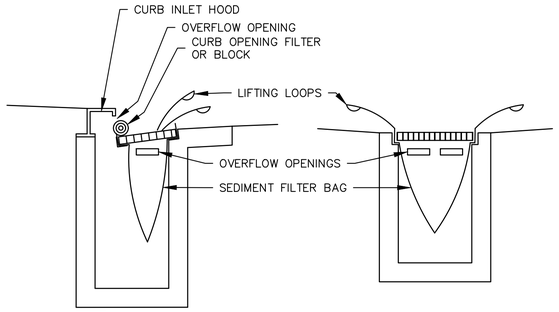
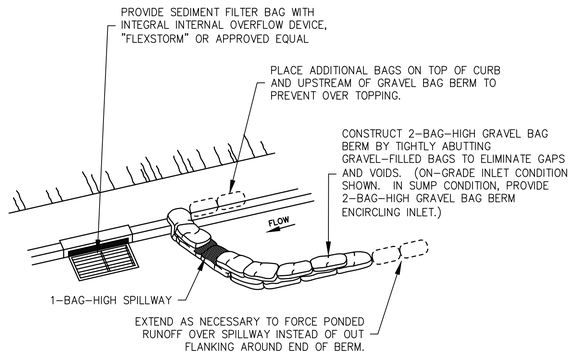
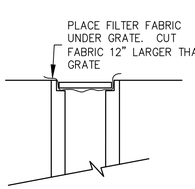


TYPE 5 (COMBINATION INLET)

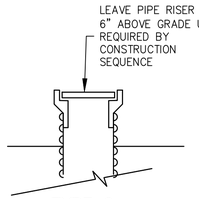
TYPE 5 (FLAT GRATE INLET)



TYPE 3



TYPE 1



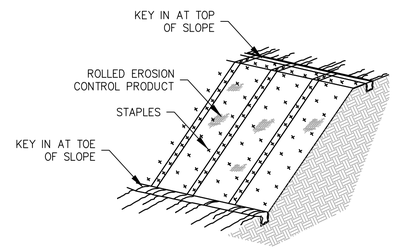
TYPE 2

NOTES:
1. PROVIDE TYPE 1 INLET PROTECTION AT ALL INLETS IF OTHER TYPE NOT PROVIDED.
2. TYPE 2 INLET PROTECTION MAY BE PROVIDED IN LIEU OF TYPE 1 AT CONTRACTOR'S OPTION.
3. TYPE 3 INLET PROTECTION SHALL BE PROVIDED FOR ALL EXISTING AND PROPOSED PUBLIC STORM DRAIN INLETS, AND ANY PRIVATE INLETS WHICH ARE TO REMAIN IN SERVICE DURING CONSTRUCTION.

STORM DRAIN INLET PROTECTION

DETAIL SE-10

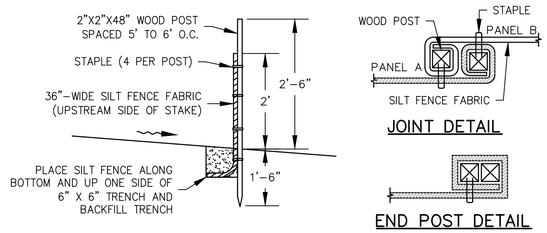
NO SCALE



ROLLED EROSION CONTROL PRODUCT

DETAIL EC-7

NO SCALE



JOINT DETAIL

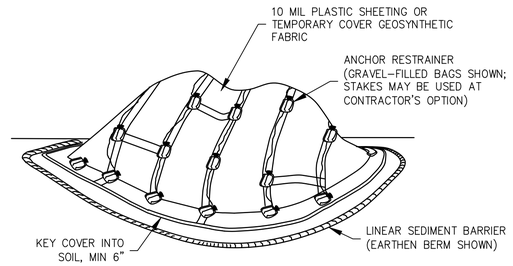
END POST DETAIL

NOTES:
1. THE DOWNSTREAM END OF THE SILT FENCE SHALL HAVE THE LAST 8' ANGLED UP SLOPE TO PREVENT WATER FROM RUNNING AROUND THE END OF THE SILT FENCE
2. JOINT SECTIONS SHALL NOT BE PLACED AT SUMP LOCATIONS

TEMPORARY SILT FENCE

DETAIL SE-1

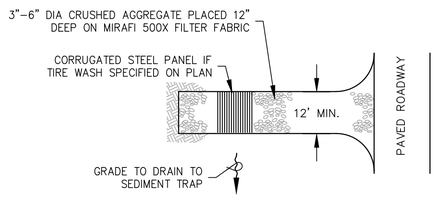
NO SCALE



TEMPORARY STOCKPILE COVER

DETAIL WM-3

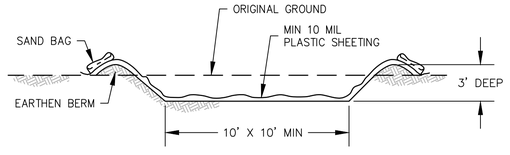
NO SCALE



STABILIZED CONSTRUCTION ENTRANCE

DETAIL TC-1

NO SCALE



NOTES:
1. AT CONTRACTOR'S OPTION, AN EQUIVALENT 10' X 10' X 2'-DEEP ABOVE-GRADE WASHOUT MAY BE CONSTRUCTED USING LUMBER OR HAY BALES.

TEMPORARY CONCRETE WASHOUT FACILITY

DETAIL WM-8

NO SCALE

CALIFORNIA AMERICAN WATER

REVISIONS		REVISIONS	
1		1	
2		2	
3		3	
4		4	
5		5	

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Whitson ENGINEERS

DRAWN BY N. MILAM
PROJECT ENG'R N. MILAM

DATE MARCH 2019

PROJECT 154001-0191

MPWSP DESALINATION INFRASTRUCTURE PROJECT
CIVIL
TEMPORARY WATER POLLUTION CONTROL NOTES & DETAILS SHEET 2 OF 2

CALIFORNIA AMERICAN WATER CO.	COASTAL DIVISION	USE DIMENSIONS ONLY SCALE 1" = 50'
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	90% SUBMITTAL	154001-0191-G12

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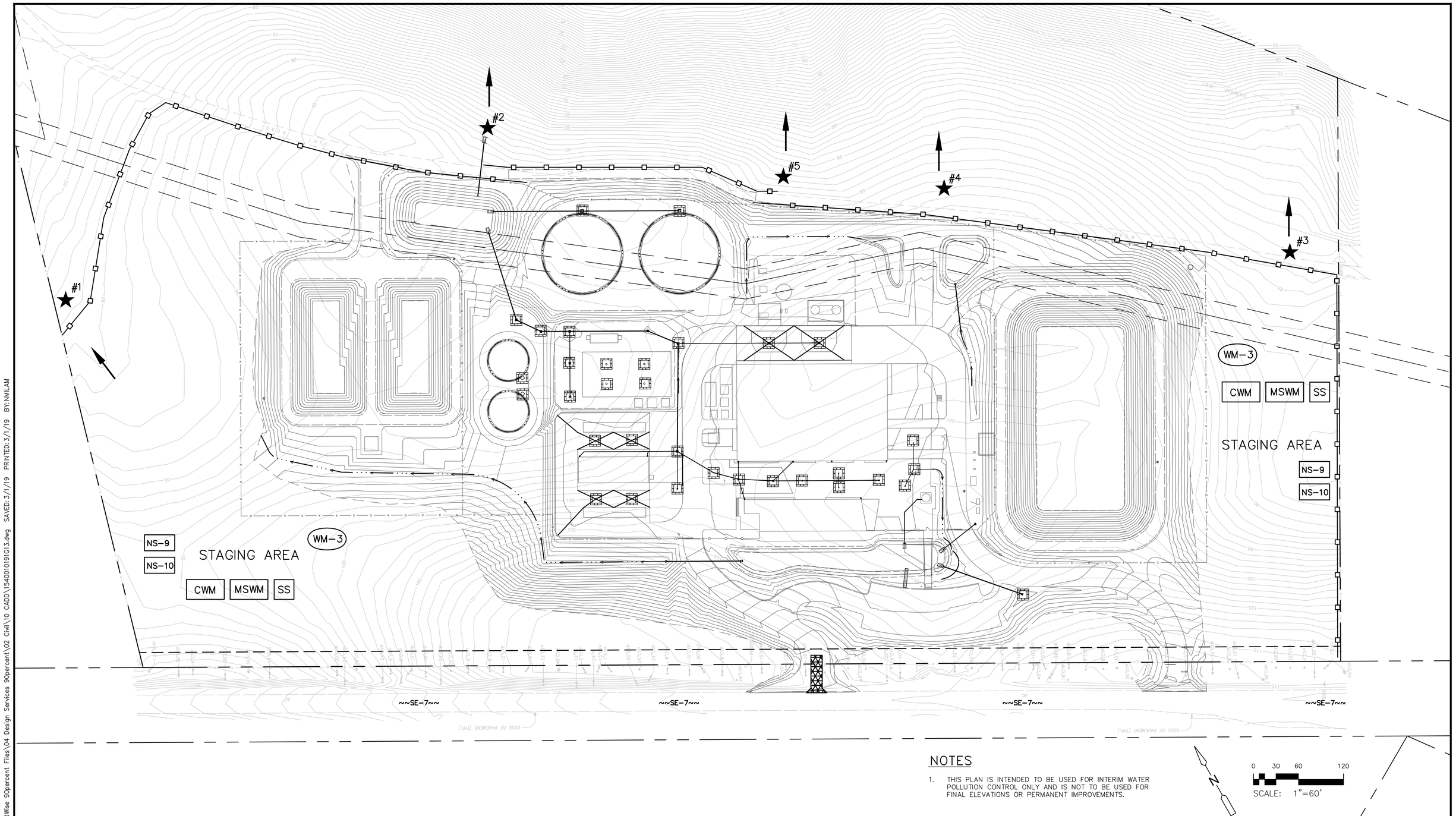

NOTES

1. THIS PLAN IS INTENDED TO BE USED FOR INTERIM WATER POLLUTION CONTROL ONLY AND IS NOT TO BE USED FOR FINAL ELEVATIONS OR PERMANENT IMPROVEMENTS.

0 30 60 120

SCALE: 1"=60'

CALIFORNIA AMERICAN WATER

REVISIONS		REVISIONS	
1		1	
2		2	
3		3	
4		4	
5		5	

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Whitson ENGINEERS

DRAWN BY N. MILAM
PROJECT ENG'R N. MILAM

DATE MARCH 2019

PROJECT 154001-0191

MPWSP DESALINATION INFRASTRUCTURE PROJECT
CIVIL
TEMPORARY WATER POLLUTION CONTROL PLAN

CALIFORNIA AMERICAN WATER CO.	COASTAL DIVISION	USE DIMENSIONS ONLY SCALE 1" = 60'
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	90% SUBMITTAL	154001-0191-G13

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Appendix 3

BMP Implementation Checklist

The following BMPs are proposed by the QSD for use on the project. The QSP shall note if any of the proposed BMPs were not used, or if additional BMPs were used which were not originally proposed.

EROSION CONTROL BMPs					
BMP No.	**BMP**	**CONSIDERED FOR PROJECT**	**CHECK IF USED**	**CHECK IF NOT USED**	**NOTES**
SE-1	Scheduling	x	x		
SE-2	Preservation of Existing Vegetation	x	x		
SE-3	Hydraulic Mulch	x	( )		Provide temporary soil cover using SE-3, SE-4, SE-6 and/or SE-8 for inactive graded areas prior to predicted rain, until permanent soil cover is provided.
SE-4	Hydroseeding	x	( )		
SE-5	Soil Binders	x		x	
SE-6	Straw Mulch	x	( )		
SE-7	Geotextiles & Blankets/Mats	x		x	
SE-8	Wood Mulching	x	( )		
SE-9	Earth Dikes, Drainage Swales and Lined Ditches	x	x		
SE-10	Outlet Protection / Velocity Dissipation Devices	x		x	
SE-11	Slope Drains	x		x	
SE-12	Streambank Stabilization	x		x	Not applicable

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

NON-STORM WATER MANAGEMENT BMPs					
BMP No.	**BMP**	**CONSIDERED FOR PROJECT**	**CHECK IF USED**	**CHECK IF NOT USED**	**NOTES**
NS-1	Water Conservation Practices	x	x		
NS-2	Dewatering Operations	x		x	
NS-3	Paving and Grinding Operations	x	x		
NS-4	Temporary Stream Crossing	x		x	
NS-5	Clear Water Diversion	x		X	
NS-6	Illicit Connection/ Discharge	x	x		
NS-7	Potable Water/Irrigation	x	x		
NS-8	Vehicle and Equipment Cleaning	x	x		
NS-9	Vehicle and Equipment Fueling	x	x		
NS-10	Vehicle and Equipment Maintenance	x	x		
NS-11	Pile Driving Operations	x		x	
NS-12	Concrete Curing	x	x		
NS-13	Material and Equipment Use Over Water	x		x	
NS-14	Concrete Finishing	x	x		
NS-15	Demolition Over/Adjacent to Water	x		x	

WASTE MANAGEMENT AND MATERIALS POLLUTION CONTROL BMPs					
BMP No.	**BMP**	**CONSIDERED FOR PROJECT**	**CHECK IF USED**	**CHECK IF NOT USED**	**NOTES**
WM-1	Material Delivery and Storage	**x**	**x**		
WM-2	Material Use	**x**	**x**		
WM-3	Stockpile Management	**x**	**x**		
WM-4	Spill Prevention and Control	**x**	**x**		
WM-5	Solid Waste Management	**x**	**x**		
WM-6	Hazardous Waste Management	**x**	**x**		
WM-7	Contaminated Soil Management	**x**		**x**	
WM-8	Concrete Waste Management	**x**	**x**		
WM-9	Sanitary/Septic Waste Management	**x**	**x**		
WM-10	Liquid Waste Management	**x**		**x**	

Note: See Attachment C (if Risk Level 1), Attachment D (if Risk Level 2), or Attachment E (if Risk Level 3) of the *Construction General Permit* for general permit requirements for Good Site Management ("Housekeeping"). **All Good Site Management ("Housekeeping") practices required by the Permit shall be implemented.**

Appendix 4

Facility Information

- Start Date: 07/01/2019
- End Date: 10/31/2021
- Latitude: 36.7154
- Longitude: -121.7728

Erosivity Index Calculator Results

An erosivity index value Of **91.75** has been determined for the construction period of **07/01/2019 - 10/31/2021**.

A rainfall erosivity factor of 5.0 or greater has been calculated for your site and period of construction. **You do NOT qualify for a waiver from NPDES permitting requirements**.

Start Over

Appendix 5

Appendix 6

Appendix 7

Materials Management Plan and Pollutant Source Assessment

Date: _____

General:

1 Potential pollutants shall not be stored within 50 feet of stormwater conveyance features or concentrated flow paths. In addition, non-stormwater discharges shall not be made within 50 feet of potential pollutants.

2 Waste materials will be cleaned up at the end of each day and disposed of properly.

3 Hazardous wastes shall be properly handled, contained, and disposed of.

4 Some materials and equipment are designed to be outdoors and exposed to environmental conditions (e.g., poles, equipment pads, cabinets, conductors, piping, bricks). In these cases, no special containment or protection is required.

5 Some materials, such as soil amendments, are designed to be used in a manner that will result in exposure to stormwater. In these cases, the materials shall be applied according to the manufacturer's instructions and at a time when they are unlikely to be washed away (at least 48 hours prior to predicted rain).

6 Construction waste dumpsters shall be covered daily and prior to likely precipitation events.

Materials Management Plan and Pollutant Source Assessment

Date: _____

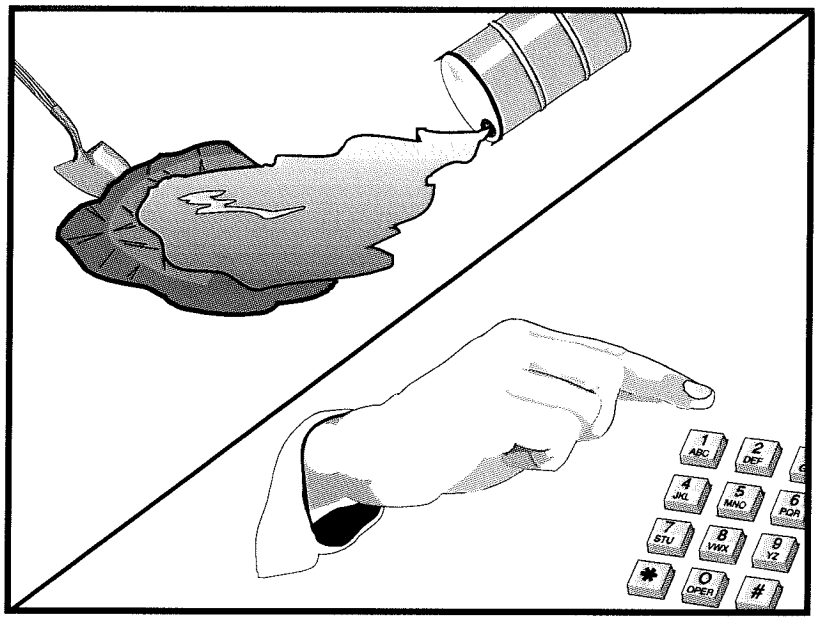
Materials In Use, and Waste Materials (check box if material is in use or will be used)	Outdoor Storage	Stockpiled per BMP WM-3	On Pallet and Covered	In Covered Dumpster	In Enclosed Container	Secondary Containment	No Storage On Site	Other
General								
☐ Soil (uncontaminated)		X						
☐ Contaminated Soil				X				
☐ Stripped Materials (Soil, vegetation)	X	X						
☐ Dust Palliative (drums)			X					
☐ Aggregate Base		X						
☐ Asphalt Concrete Rubble		X						
☐ Concrete Rubble		X						
☐ Clean Wood (Untreated)	X							
☐ Used Concrete Forms			X					
☐ Treated Wood			X					
☐ Metal Scrap	X							
☐ Plastic Scrap	X							
☐ Outdoor Electrical Equipment (Cabinets, Conduits, Etc)	X							
☐ _____								
☐ _____								
☐ _____								
Vehicle Fueling and Maintenance								
☐ Vehicle Wash Area								Per NS-8
☐ Vehicle Fuels / Fueling						X		Per NS-9
☐ Vehicle Maintenance								Per NS-10
☐ Vehicle Batteries, Fluids					X			
☐ _____								
☐ _____								
☐ _____								
Flammable Containment Cabinet								
☐ Acetone					X			
☐ Methyl Ethyl Ketone					X			
☐ _____					X			
☐ _____					X			
☐ _____					X			

Materials Management Plan and Pollutant Source Assessment

Date: _____

Materials In Use, and Waste Materials (check box if material is in use or will be used)	Outdoor Storage	Stockpiled per BMP WM-3	On Pallet and Covered	In Covered Dumpster	In Enclosed Container	Secondary Containment	No Storage On Site	Other
Concrete and Masonry								
☐ Concrete Waste/Rinse								Per WM-8
☐ Portland Cement (bags)			X	or	X			
☐ QuickCrete Mix (bags)					X			
☐ Masonry	X							
☐ Sealants, Additives, Curing Compounds, Etc					X			
☐ _____								
☐ _____								
☐ _____								
Asphalt Paving								
☐ Hot Mix Asphalt Waste							X	
☐ Asphalt Emulsion (drums)			X					
☐ Liquid Asphalt (drums)			X					
☐ Cold Mix AC (bags)					X			
☐ _____								
☐ _____								
☐ _____								
Cleaning Products								
☐ Acids					X			
☐ Bleaches					X			
☐ Solvents					X			
☐ Detergents					X			
☐ TSP					X			
☐ _____								
☐ _____								
☐ _____								
Landscaping								
☐ Natural Earth (Sand, Gravel, Topsoil)		X						
☐ Soil Amendments and Fertilizers					X			
☐ Herbicides, Pesticides					X			
☐ _____								
☐ _____								
☐ _____								
☐ **Painting Products**					X			
☐ **Portable Toilets**						X		Per WM-9

Spill Prevention and Control WM-4



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

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals

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- Fuels
- Lubricants
- Other petroleum distillates

Limitations

- In some cases it may be necessary to use a private spill cleanup company.
- This BMP applies to spills caused by the contractor and subcontractors.
- Procedures and practices presented in this BMP are general. Contractor should identify appropriate practices for the specific materials used or stored onsite

Implementation

The following steps will help reduce the stormwater impacts of leaks and spills:

Education

- Be aware that different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills.
- Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.
- Have contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from stormwater runon during rainfall to the extent that it doesn't compromise clean up activities.
- Do not bury or wash spills with water.

- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with WM-10, Liquid Waste Management.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Place proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Absorbent materials should be promptly removed and disposed of properly.
- Follow the practice below for a minor spill:
  - Contain the spread of the spill.
  - Recover spilled materials.
  - Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

- Spills should be cleaned up immediately:
  - Contain spread of the spill.
  - Notify the project foreman immediately.
  - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
  - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
  - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:
  - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper county officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
  - Notify the Governor's Office of Emergency Services Warning Center, (916) 845-8911.
  - For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
  - Notification should first be made by telephone and followed up with a written report.
  - The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
  - Other agencies which may need to be consulted include, but are not limited to, the Fire Department, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, etc.

Reporting

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

Use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Regularly inspect onsite vehicles and equipment for leaks and repair immediately
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- If fueling must occur onsite, use designate areas, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Discourage "topping off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

Costs

Prevention of leaks and spills is inexpensive. Treatment and/ or disposal of contaminated soil or water can be quite expensive.

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.

- Keep ample supplies of spill control and cleanup materials onsite, near storage, unloading, and maintenance areas.
- Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals onsite.

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 Practice, EPA 832-R-92005; USEPA, April 1992.

Appendix 8

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP DEVELOPER (QSD)
AND
QUALIFIED SWPPP PRACTITIONER (QSP)

Richard Weber

Sep 01, 2017 - Sep 01, 2019

Certificate # 20534

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California Stormwater Quality Association and
California Construction General Permit Training Team

Appendix 9

Appendix 10