SAN ELIJO
JOINT POWERS AUTHORITY

BUILDING IMPROVEMENT PROGRAM
PRELIMINARY DESIGN REPORT

December 12, 2016

Prepared by:

ROESLING NAKAMURA TERADA ARCHITECTS, INC.
363 Fifth Avenue, Suite 202
San Diego, CA 92101
(619) 233-1023

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY		3
2.0	INTRODUCTION		6
3.0	PROGRAMMING		7
	3.1	Programming – Site	7
	3.2	Programming – Building	7
	3.3	Adjacencies	11
	3.4	Adaptability	12
4.0	SITE REQUIREMENTS		12
	4.1	Existing Utilities	12
	4.2	Preliminary Site Plan	12
	4.3	Preliminary Utility Plan	12
	4.4	Storm Water Management	13
	4.5	Landscape Design	13
5.0	BUILDING REQUIREMENTS		13
	5.1	Building Data & Code Analysis	14
	5.2	Conceptual Building Floor Plans	14
	5.3	Conceptual Building Massing	14
	5.4	Architectural Requirements	14
	5.5	Structural Requirements	15
	5.6	Mechanical Requirements	16
	5.7	Electrical Requirements	17
	5.8	Communications & Low-Voltage Requirements	18
6.0	PERMITTING REQUIREMENTS (CITY OF ENCINITAS)		19
	6.1	Coastal Development Permit	19
	6.2	Site Development Permit	20
	6.3	Building Permit	20
7.0	PROJECT BUDGET SUMMARY		21

EXHIBITS

A	Conceptual Site Program	4
B	Preliminary Design - Administration & Operation Building	5
C	Project Timeline	6
D	Adjacency Diagrams	11

DRAWINGS

C-0.1	Existing Utilities Site Plan
C-1.0	Utility Site Plan
AS-1.0	Overall Site Plan
AS-2.0	Site Plan
A-1.0	Floor Plan Level 1
A-2.0	Floor Plan Level 2
A-3.0	Building Massing Study
ES-1.0	Electrical Site Plan

APPENDICES

A	Existing NPDES Permit - SWPPP Site Plan
B	Interior Room Matrices
C	Geotechnical Report
D	City of Encinitas Staff Advisory Committee Meeting Notes
E	SEJPA Staff Report dated September 12, 2016

1. EXECUTIVE SUMMARY

In 2015, the San Elijo Joint Powers Authority (SEJPA) contracted with Roesling Nakamura Terada Architects (RNT) to provide conceptual and preliminary design services to evaluate the need for new and/or remodeled buildings at the San Elijo Water Reclamation Facility located at 2695 Manchester Avenue, Cardiff by the Sea, CA.

Based on previous engineering evaluations, the Operations and Administration buildings were identified as requiring substantial improvements or replacement. RNT began its investigative process by reviewing existing facility engineering reports, construction drawings, and site conditions. RNT conducted site visits to confirm building deficiencies identified in the 2015 Facility Plan and review recommended improvements.

RNT conducted several design meetings with SEJPA staff to develop project goals and objectives, discuss and document site constraints, prepare programming elements for the buildings, and identify opportunities for creating efficiencies and cost savings. Through this planning process, the following project goals and objectives were identified:

- Meet current building code and ADA access requirements.
- Create clear delineation between public and restricted areas.
- Improve site security and access control.
- Utilize design and construction standards required for "Essential Service Buildings".*
- Improve operational efficiency and minimize project cost.
- Develop adaptable facilities to meet future needs including potable reuse.
- Seek opportunities to integrate with community (bike path, nature center parking, public education).

The project team developed multiple building alternatives that addressed the goals and objectives of the project to varying degrees. After consideration and review, three building options remained that best met the project goals and objectives. In order to select the preferred alternative, a final evaluation of the remaining options was conducted using the following selection criteria: Cost to Construct, Risk Reduction, Adaptability to Meet Future Needs, and Compatibility with Community and North Coast Corridor projects. See **Appendix E** for staff report, September 12, 2016 for additional details on this evaluation process.

The outcome of the final evaluation included the following recommendations:

- Demolish existing Administration and Operations structures.
- Combine administration and operation functions into one building, (estimated size of 11,600 sf to 13,400 sf).
- Construct new Administration & Operation building as two-story structure, minimizing building footprint and space requirements.
- Improve access and security by siting the new Administration & Operation building near the facility entrance.
- Construct new pre-engineered metal shop building with an estimated size of 1,500 sf to 1,800 sf.
- Create barriers to unauthorized entry to restricted areas.
- Improve operational efficiency by co-locating staff in one building.
- Increase connectivity with the public and nature center (overflow parking and educational opportunities).
- Integrate with proposed North Coast Corridor bike path and transportation improvements.
- Estimated cost: $7.4M for a 12,000 sf building (plus or minus 15%).

*In 1986, the California Legislature determined that buildings providing essential services should be capable of providing those services to the public after a disaster. Their intent in this regard was defined in legislation known as the Essential Services Buildings Seismic Safety Act of 1986 and includes requirements that such buildings shall be "designed and constructed to minimize fire hazards and to resist the forces of earthquakes, gravity and winds."

The preferred building program alternative is illustrated in Exhibit A – Conceptual Site Program. The preliminary budget estimate of $7.4M includes design, permitting, and construction and is further detailed in Section 7.0. The preliminary design building site plan is illustrated in Exhibit B and the anticipated project timeline and next steps are shown below in Exhibit C.

Exhibit A – Conceptual Site Program

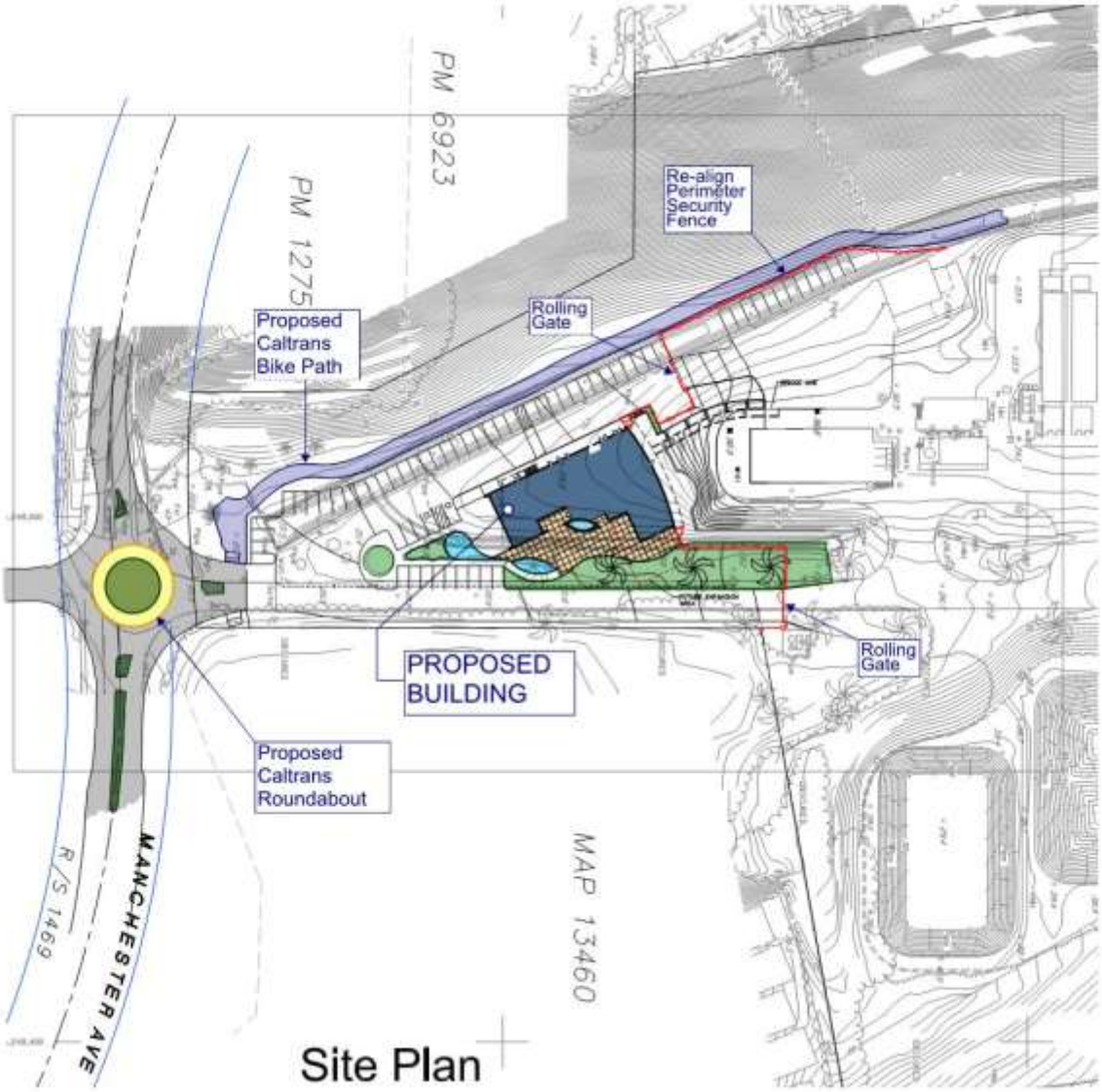


Exhibit B - Preliminary Design - Administration & Operation Building

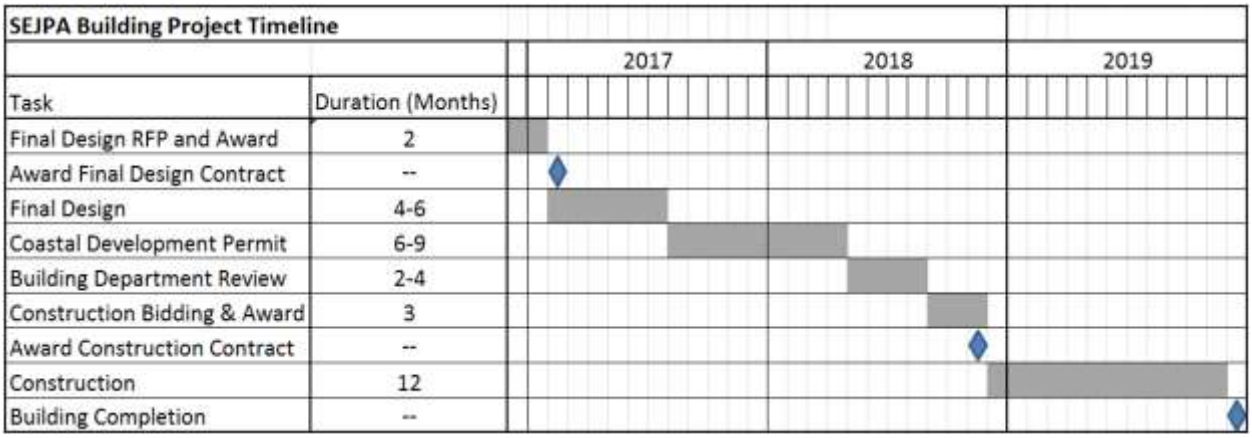


Exhibit C – Project Timeline

2. INTRODUCTION

The San Elijo Joint Powers Authority (SEJPA) owns and operates the San Elijo Water Reclamation Facility (SEWRF) in Cardiff-by-the-Sea, California which provides wastewater treatment and disposal services to the Cities of Encinitas, Solana Beach, Del Mar, and portions of Rancho Santa Fe. SEJPA also owns and operates a recycled water utility that includes 19 miles of distribution pipelines, three storage reservoirs, and that serves four water purveyors (San Dieguito Water District, Santa Fe Irrigation District, City of Del Mar, and Olivenhain Municipal Water District).

Support buildings at the SEWRF include an Operations Building (originally constructed in 1965) and an Administration Building, which is a temporary portable trailer, placed onsite in 2000. These buildings provide working space for the 22 employees who perform administration, engineering, analytical laboratory analyses, operations, and maintenance and capital projects required to safely and efficiently treat and recycle wastewater for beneficial reuse.

The Operations Building is 51 years old and has evolved from numerous piecemeal additions over the years. The building is outdated and inefficient with numerous Structural, Fire/Life safety and Accessibility deficiencies. Similar issues were noted with the modular trailer that was added for Administration staff in 2000.

Additionally, the location of the existing Operation and Administration buildings could be considered a safety and security liability to the SEJPA. This is due to the current facility configuration that requires the public, vendors, and contractors to enter the operating portions of the treatment facility in order to check in at the administration building. Industry standards for water and wastewater facilities are to restrict public access from the operational areas of the facility. Implementing such standards would require the new Administration and Operations building to be located at the entrance of the water reclamation facility. Locating the building at the front of the campus would greatly improve site access control and security. This would reduce risk and liability to the SEJPA, while improving the agency's visibility and accessibility to the public. Furthermore, placing the Operations and Administration building at the front could allow for public parking for the adjacent Nature Center and the proposed regional bike path, providing an added benefit to the community.

3.0 PROGRAMMING

Working with the SEJPA staff through a series of meetings and workshops, comprehensive programming was performed for the facility. Programming looked at holistically at site and facility operations to optimize working efficiency within departments, as well as throughout the overall site.

3.1 PROGRAMMING - SITE

A key component to the Building Improvement Program (BIP) was establishing staff and facility needs; identifying building code, permitting requirements, and site constraints; and creating opportunities for improving security, safety, and community interface. Key issues included:

- Site Security: Provide a secure perimeter to the treatment facility with controlled access.
- Employee Safety and Security: Provide a secure and safe working environment.
- Public Safety: Provide a safe and accessible public facility.
- Efficiencies: Develop site plan to create optimal work spaces and efficiencies.
- Flexibility: Develop adaptable building improvements to meet future needs and opportunities.
- Community Interface:
    - Evaluate opportunities for public parking at the front of the campus for community use.
    - Educational opportunities and uses.

From the BIP analysis of multiple options and operational scenarios, a preferred scheme with the Administration Building at the front of the campus emerged (Exhibit A – Conceptual Site Program).

3.2 PROGRAMMING - BUILDING

A detailed inventory of administration and operational spatial needs was developed as part of the BIP. The evaluations included projections for future program elements to build in long term flexibility. The inventory categories are as follows:

- **Administration**: Includes administrative staff offices and auxiliary spaces including Board facilities, reception, conference, staff work areas, storage, and appurtenances.
- **Operations**: Includes staff office space, control room, and auxiliary program areas including locker rooms, training, technical work areas, and appurtenances.
- **Laboratory:** Includes laboratory, office area, and auxiliary spaces.
- **Support:** Includes technology support, custodial, storage, and equipment rooms.

Room Designation	***Proposed Square Footage***
Administration	
Reception	120
Waiting/Lobby	350
General Manager	250
Director of Finance/Administration	200

Administrative Assistant	120
Accounting Technician	120
Flex/Future Office	120
Conference Room	250
Plan Room	180
Workroom/Files	300
Break Room	370
Board Room	1100
Board Conference Room	180
Storage Room	150
Men's Restroom	200
Women's Restroom	200
Showers	160
Subtotal	**4370**

Room Designation	***Proposed Square Footage***
Operations	
Director of Operations	200
Associate Engineer	150
Water Reclamation Specialist	150
Chief Plant Operator	150
Lead Operator 1	80
Lead Operator 2	80
Lead Operator 3	80
Operator 1	60
Operator 2	60
Operator 3	60
Operator 4	60
Intern	60

Control Room	250
Mechanical Systems Supervisor	150
Lead Mechanic	80
Mechanic 1	60
Mechanic 2	60
Intern	60
Tech Library	120
Men's Restroom	150
Women's Restroom	150
Men's Lockers	350
Women's Lockers	150
Subtotal	**2770**

Room Designation	***Proposed Square Footage***
Laboratory	
Senior Lab Analyst	150
Lab Analyst 1	80
Lab Analyst 2	80
Source Control Specialist	120
Laboratory	1500
Microbiology Room	150
Chemical Storage	150
Subtotal	2230

Room Designation	*Proposed Square Footage*
Support	
SCADA Manager	180
Systems Integrator	120
SCADA Closet	80
IT/Data	80
Mechanical	80
Electrical	80
Custodial	80
Subtotal	**700**

Overall Program Summary	
Administration	4370
Operations	2770
Laboratory	2230
Support	700
Subtotal	**10070**
Circulation Net/Gross (19%)	1920
Total	**11,990**
	(12,000)

3.3 ADJACENCIES

Working with the SEJPA staff through a series of programming meetings, location of staff and staff adjacencies have been identified. In general, the first floor of the building will include public spaces for reception and lobby, the Board Room, and restrooms. Access restricted areas on the first floor will include work areas for the operators and mechanics, operations control room, and locker and restroom facilities. The second floor will contain the administrative and technical staff, the laboratory, and the break room. Adjacency diagrams for the floors are shown below in Exhibit D.

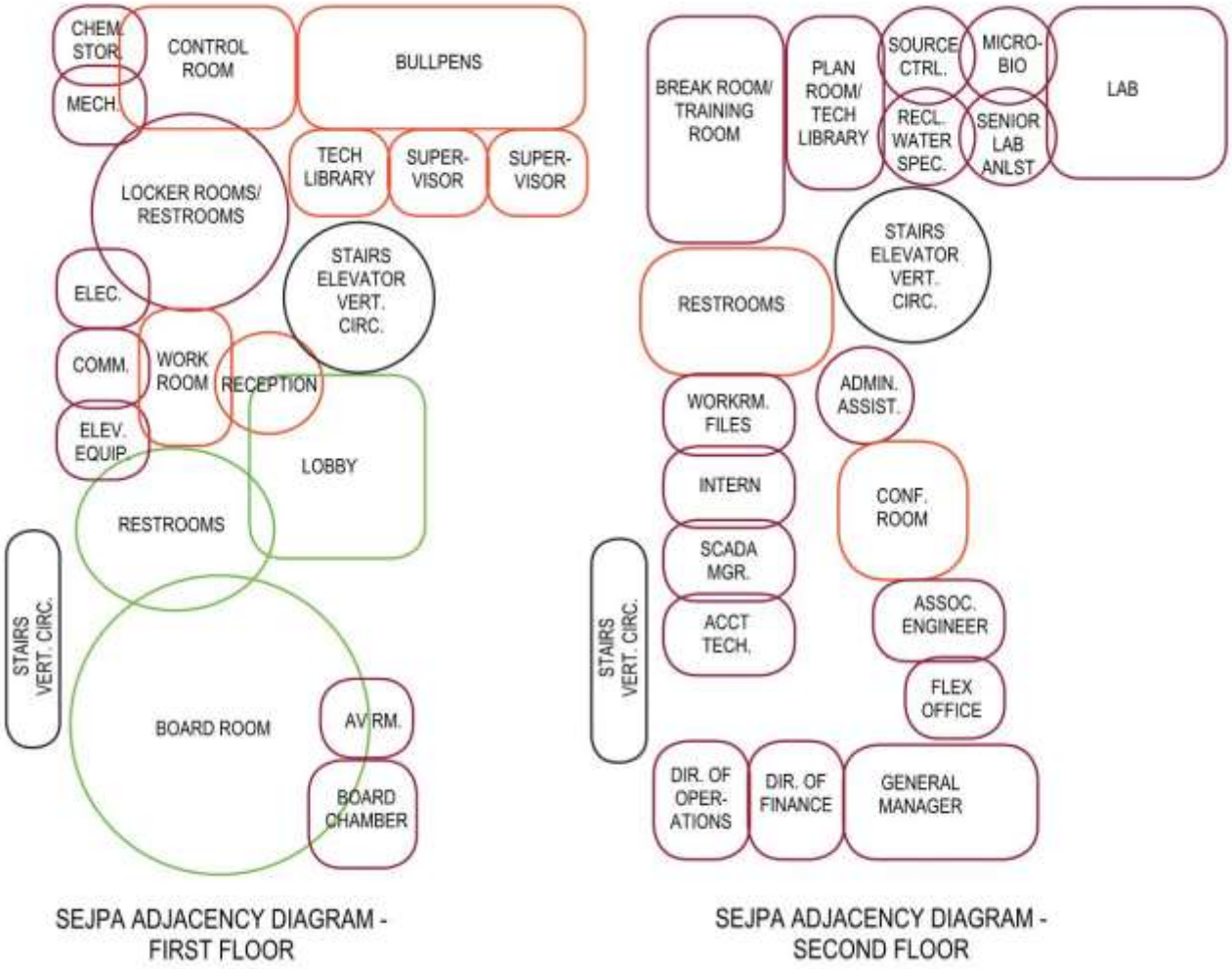


Exhibit D – Adjacency Diagrams

3.4 ADAPTABILITY

SEJPA recognizes that the water treatment and reclamation industry is in a dramatic period of change. Local water supply and reliability is a key focus for many local water purveyors and for the State, in general. These changes, coupled with advancements in water treatment technology and science, are pushing the boundaries for water purification and potable reuse. Implementing these programs will likely require the need for added staff and/or program spaces. The building footprint allows for a two-story addition of approximately 3,000 to 4,000 square feet of area at the northwest portion of the building. See Building Floor Plan Drawings **AS-1.0** and **AS-2.0**.

4.0 SITE REQUIREMENTS

The BIP identified the front of the campus as the ideal location for the Administration & Operations building. Preliminary design for the site establishes the building location, roadways and parking, and general locations for hardscape and landscaping. In addition to the programming goals, site design considerations include:

- Building orientation that optimizes public accessibility and site security.
- Building layout that minimizes space requirements.
- Located with minimal conflict with existing utilities.
- Entrance Enhancement: Caltrans is planning to install a Roundabout on Manchester Avenue at the SEJPA and Nature Center entrance. The site design takes into account the future alignment of this improvement for integration of the new driveway approach.
- Open Culvert Conversion to Underground Box Culvert: To maximize site area at the front of the campus, the open trapezoidal box culvert along the west side of the property is proposed be enclosed in an underground box culvert.
- Bridge Access from 2nd Floor to Site: Taking advantage of the grade change at the front of the facility, a bridge from the 2nd floor of the Administration & Operations building to the plant area is proposed.

4.1 EXISTING UTILITIES

Existing utilities at the front of the campus have been mapped and are shown on Drawing **C-0.1.**

With the exception of a 10" sewer force main, the proposed building area is free of active utilities. The one known active sewer force main utility is scheduled for relocation as part of the SEJPA Land Outfall Replacement project, which will occur ahead of the building project.

4.2 PRELIMINARY SITE PLAN

The proposed Overall Site Plan is shown on Drawing **AS-1.0**. The proposed Preliminary Site Plan, including the conceptual grading, for the front are of the campus is shown on Drawing **AS-2.0**.

4.3 PRELIMINARY UTILITY PLAN

The proposed Preliminary Utility Plan depicts the routing of water, sewer, gas, storm drain, electrical and communications is shown on Drawing **C-1.0**.

4.4 STORM WATER MANAGEMENT

As a publicly owned treatment plant, SEJPA has a National Pollutant Discharge Elimination System (NPDES) permit for Industrial General Permit compliance issued by the California State Water Resources Board, NPDES Permit No. CAS000001. A site plan of the facilities associated with this permit is shown in **Appendix A.** This permit will require modification to address the building improvements at the front of the campus and the inclusion of storm water attenuation and treatment systems associated with this project.

SEJPA will comply with local jurisdiction development requirements enforced by the City of Encinitas to reduce storm water pollution. The City requires land owners to implement a variety of Best Management Practices (BMP's) to capture and/or treat runoff prior to leaving the property. SEJPA may consider the use of bioswales, attenuation ponds, and other BMP's including flow diversion to the treatment plant as part of a comprehensive storm water management strategy.

4.5 LANDSCAPE DESIGN

Site landscaping will preserve the mature trees and build the landscaping palette around their presence. Plantings will focus on drought tolerant landscaping, including succulents and smaller palm varieties to complement the existing established larger palm trees. Groundcovers will include areas of decomposed granite with compositional plantings and ornamental boulders. Bioswales may be incorporated with grasses, plantings and drainage matrix that is suited for on-site water infiltration and retention.

Drought tolerant plantings, where approachable from site walkways will include name signage placards, as interpretive elements to teach the community about plant varieties suitable for Southern California's semi-arid climate.

5.0 BUILDING REQUIREMENTS

New building facilities will be designed to public institutional quality standards, with an expected life span of at least 50 years. Building design shall focus on providing a safe and productive working environment, with modern workplace designs.

All applicable Codes and regulations by the authorities having jurisdiction shall be applied to the building design. This includes the City of Encinitas Proposition A building height limitations of 30-feet above existing grade.

The building design, while not requiring a LEED certification, will incorporate sustainable features to the greatest extent practical. This includes recycled content for building materials, regionally sourced materials, cool roofing, low-VOC adhesives and paints, enhanced building envelope insulation, high performance glazing, low-flow plumbing fixtures, on-demand hot water heating, high-efficiency HVAC equipment, LED lighting, and automatic daylight harvesting controls. Non-combustible building components will be used to the greatest extent practical. Roof-top PV panels and electric vehicle charging stations will also be considered as optional project elements.

5.1 BUILDING DATA & CODE ANALYSIS

Area:	Approximately 12,000 square feet
Number of Stories:	2
Occupancy Type:	B/A (Business/Assembly)
Construction Type	VB (Structural elements, exterior walls and interior walls are of any materials permitted by the Code, Non-rated)
Fire Sprinklers:	Yes

5.2 CONCEPTUAL BUILDING FLOOR PLANS

The building will occupy an approximately 25,000 square foot building pad area at the front of the facility. See Drawing **A1.0** for the Preliminary First Floor Plan and **A2.0** for the Preliminary Second Floor Plan.

5.3 CONCEPTUAL BUILDING MASSING

Building massing will be composed of a two-story volume to maximize the available site area. Form will be articulated to respond to internal program. Roof lines will be low-slope, predominately screened behind low parapet walls in order to comply with the 30-foot Proposition A height limit. At this preliminary stage, building finishes and fenestration have not been articulated. The massing shown is intended to give a general idea of the size and form of the building. The final definition of the building finishes, fenestration, and roof lines will be developed in the subsequent design phases. See Drawing **A-3.0** for Conceptual Building Massing.

5.4 ARCHITECTURAL REQUIREMENTS

Architectural requirements for the various building components are as follows:

Floors at Grade: Reinforced concrete slab on grade at first floor. (*Note: See geotechnical report for additional requirements. First floor slab may be required to be a structural mat slab or post-tensioned due to soils conditions).* Slab design shall incorporate vapor reduction strategies, including a low water/cement mix design (less than 0.45), a capillary break (pea gravel) underlayment below a heavy-duty multi-layer 15 mil vapor barrier (I.E. Stegowrap).

Elevated Floors: Composite deck consisting of reinforced lightweight concrete fill placed on spannable metal decking. Concrete mix design shall incorporate vapor reduction strategies, including water reducing admixtures.

Exterior Walls: Perimeter walls may include a combination of the following:

- Concrete masonry units.
- Cast-in-place concrete.
- Metal siding over non-bearing metal studs.
- Exterior plaster over non-bearing metal studs.

Exterior walls shall include enhanced envelope insulation. This includes:

- Concrete masonry and concrete: R-10 rigid insulation at metal stud furred interior side of walls.

- Metal Siding & Exterior Plaster: R-19 batt insulation at metal stud gravity, with thermal break R-5 rigid insulation over exterior weather barrier and wall sheathing.

Roofs: Roof coverings may be a combination of the following:

- Low Slope (1/2:12 to 1:12): Modified bitumen roofing (MBR) with "cool roof" coating. Minimum slope in the drainage direction shall be ½:12, with drainage crickets installed to provide a minimum slope at cricket valleys of at least 1/4:12. MBR roof areas shall terminate at parapets which extend at least 12 inches above the roof deck.
- Medium to High Slope (greater than 1:12): Standing seam metal roofing with "cool roof" fluoropolymer finish.

Windows & Glazing: Dark-bronze anodized aluminum storefront system with energy efficient tinted solar-ban insulated dual glazing. Glazing will be tempered throughout.

Interiors:

Partitions: Light gage metal stud framing (20 gage min.) with gypsum wallboard each side, insulated for sound isolation.

Acoustics:

- Interior partitions between offices and other acoustically-sensitive areas shall have an STC rating of at least 50.
- Ductwork terminations at registers shall be acoustically lined. Ductwork at Board Room will be oversized to reduce air velocity and noise.
- Board Room will have acoustical treatment at walls and ceilings to mitigate reverberation time.

For information regarding interior finishes, see **Appendix B** - Interior Room Matrices.

5.5 STRUCTURAL REQUIREMENTS

Structural requirements for the various building components are as follows:

Foundations: A geotechnical report for the site area has been prepared by Stoney-Miller Consultants, Inc. and is included in this report. See **Appendix C**. The Geotechnical Report has identified the existing soils at the building area are potentially liquefiable and have a high water table. Ground improvements will be required in conjunction with the foundation design. Foundation recommendations will be developed in the subsequent design phase. Preliminary indications are that the building will utilize a mat slab foundation.

Walls: Walls and vertical supporting elements include:

- Concrete masonry unit walls.
- Cast-In-Place concrete walls.
- Structural steel frames with non-bearing metal stud framing.

Elevated Floor Structure: Floors will consist of composite deck comprised of metal decking with reinforced lightweight concrete fill, supported by steel bar joist trusses at 4 feet on-center.

Roof Structure: Roof structure will consist of metal decking supported by steel bar joist trusses at 8 feet on-center.

Seismic Design: Lateral resisting elements will consist of concrete masonry and/or concrete shear walls, metal stud shear panel walls, structural steel braced-frames in combination with horizontal composite deck floor diaphragm and metal deck roof diaphragm.

5.6 MECHANICAL REQUIREMENTS

HVAC system shall be designed to meet or exceed the following:

- Title 24 energy regulations.
- Latest adopted edition of the California Mechanical Code.
- ASHRAE recommendations for this type of facility.

Exterior Design Conditions

California Climate Zone	7
Location:	Encinitas, California
Latitude	33.02
Elevation	25 ft

Design Conditions based on ASHRAE Climate Data for the SEJPA region, with 0.4% data for summer and 99.6% data for winter.

Summer	**Design Temperature**	**Winter**	**Design Temperature**
Dry Bulb	84 degrees F	Dry Bulb	45 degrees F
Wet Bulb	68 degrees F		
Daily Range			

Interior Space Temperature

Space	**Temp (F)**	**RH (%)**
Administration Areas, Private Offices, and Open Office Areas	72+/- 2	35-65% (not controlled)
Board Room	72+/- 2	35-65% (not controlled)
Computer & Network Equipment Rooms	72+/- 2	No requirements

HVAC: After reviewing the various HVAC systems available for this building type, SEJPA has decided on using a Variable Refrigerant Flow (VRF) system. The decision is based on weighing several factors, including:

- Comfort: Controllability of multiple zones.
- Energy efficiency.

- Reduced building height by reducing ductwork and eliminating rooftop equipment.

The Locker Room areas for the facility will require special design consideration to provide temperature control while sufficient air changes to minimize odor and moisture issues. Heat exchange units should be considered in the exhaust/intake air set up.

The Laboratory space will also require special design considerations to accommodate the separate exhaust system for the fume hood.

Acoustically sensitive areas, including the Board Room will require special considerations including acoustically lined ductwork and acoustically lined diffusers.

Controls: Digital, web-based energy management system, capable of remotely adjusting set points.

Plumbing:

Fixture requirements include:

- Institutional grade fixtures throughout.
- Low-flow faucets and flush valves throughout.
- Porcelain fixtures for water closets, urinals and sinks at restrooms.
- Flush valves at all water closets and urinals.
- Stainless steel sinks at Break Room and Kitchenettes.
- Epoxy sinks integral to countertops at Laboratory.
- Self-closing faucets at restroom sinks.

Water System:

- All domestic water piping shall be Type L copper with lead-free solder.
- All hot water piping shall be insulated.
- Hot water shall be provided by a commercial grade hot water heater, feeding a looped system with a recirculating pump.

Sewer System:

- All below grade piping shall be schedule 40 PVC with solvent-welded joints.
- All above grade piping shall be no hub cast iron (for sound isolation).

5.7 ELECTRICAL REQUIREMENTS

The electrical service to support the new Administration and Operations building will be coupled electrical infrastructure upgrade for the facility. Currently, the SEJPA campus has a 1600 Amp, 480 Volt main service, “MS-2” which feeds various substations throughout the facility. The nearest substation to the Administration and Operations building is “MCC-L”, which is an 800 Amp, 480 Volt panel. These components of the facility’s electrical backbone will be replaced as part of an Electrical Infrastructure project. The new facilities will remain in the same location, but will be upgraded to current Code and technology standards. See Drawing **ES-1.0** for Electrical Site Plan.

The Administration and Operations building will be fed from the upgraded MCC-L panel. It is anticipated that a 600 Amp/480 volt service will be provided to the Administration and Operations building. This service will meet current needs as well as have room for future expansion. This panel will provide power as follows:

- Direct connection for elevator and the HVAC equipment.
- Sub-feed to a 480/277 volt panel for lighting.

- Sub-feed to transformer to stepped down 120/208-3ph power panel (225-400Amp).
- Sub-feed from 120/208-3ph power panel to smaller panels (100-125A).

Actual anticipated loads and panel sizes will be determined as the project moves forward in more detailed design phases.

The Administration and Operations building will be connected to the emergency generator that provides backup power the SEJPA facility.

Equipment:

To take advantage of power efficiency, equipment such HVAC and the elevator will be 480 volt to the greatest extent possible.

Lighting:

- Similar to the equipment, lighting fixtures will be 277 volt to the greater power efficiency.
- Lighting will conform to the CEC Building Energy Efficiency Standards, Title 24 (California Green Building Standards Code).
- Interior light fixture will be LED type, with integral driver and provisions for dimming.
- Interior LED lighting will be 4000K, with 85 CRI.
- Lighting controls will include daylight sensing automatic dimming controls.
- Exterior lighting will be LED fixtures with 100% cut-off lighting distribution.
- Exterior lighting will provide a minimum one (1) footcandle of illumination at sidewalks, pathways and parking areas during hours of darkness. A site photometric plan will be generated to verify minimum footcandles are met over the entire site.

Receptacles:

- Convenience outlets will be NEMA 5-20R, nylon face for 120 volt outlets. GFCI outlets will be provided at kitchens, locker rooms, restrooms and custodial spaces.
- A maximum of four outlets will be connected to a 20 amp circuit.
- Dedicated outlets will be provided at refrigerators, microwaves, coffee machines, vending machines, garbage disposals, copy machines, and similar appliances.

5.8 COMMUNICATIONS & LOW-VOLTAGE

Data: This system will include the following:

- Main Distribution Frame, with T-1 fiber connectivity to the service provider, in air-conditioned space.
- Structured Cat 6a cabling throughout, with network connectivity to all spaces.
- Wireless access points at group spaces such as the Board Room, Break Room and the Lobby.
- Cat 6A will provide hard-wired connectivity throughout the building.

Phone: The phone system will be voice over IP run through the data system.

Audiovisual: The SEJPA Board room will include a modern audiovisual system. Functionality and the associated components will be determined at a subsequent design phase. Components and functionality will include:

- Motorized, drop down screens at front and back of room.
- Dual, motorized dropdown projectors, with synchronized projection to screens at front and back of the room.
- Speakers for surround sound throughout Board Room.

- Audio-visual system with remote control for all screen, projection, and functions.
- Built-in microphones at Board dais and lectern.

Conference rooms and the Break Room/Training Room will have projection capacity using short throw projectors onto integral interactive projection screens.

SCADA: SEJPA is planning for a facility-wide SCADA upgrade project. Head-end and monitoring will be accessed from the Administration & Operations building. Head-end equipment will be located in a secure office space adjoining the facility's SCADA Manager's office. Monitoring of the Plant equipment will occur within the Control Room.

Security: Access to the private portions of the building will be controlled via a Card-key security system. Additionally, the facility will include intrusion monitoring via door contacts and motion sensors, with remote monitoring from an outside security vendor.

Fire Alarm: The facility will have a fully-automatic fire alarm system, with smoke and heat detectors, audio-visual devices, and monitoring for the fire sprinkler system. The system will include battery back-up and comply with the latest adopted edition of NFPA 101, Life Safety Code.

6.0 PERMITTING REQUIREMENTS (CITY OF ENCINITAS)

The SEJPA facility is located within the City of Encinitas jurisdiction, and local approval will go through their Planning and Building department. The Agency attended a Staff Advisory Committee (SAC) meeting with the City. The notes from that meeting are attached in **Appendix D**. Although the scope has been adjusted slightly from that which was documented in the meeting, the process will require a **Coastal Development Permit**, and will be followed by submittals and approvals for a **Site Development Permit (Grading & Utilities)** and a **Building Permit**.

6.1 COASTAL DEVELOPMENT PERMIT

The Coastal Development Permit (CDP) through the City of Encinitas Planning Department is required in order to submit a building project to the Development Services for a Building Permit. The application will require the following schematic plans:

- Site Plan/Preliminary Grading Plan.
- Floor Plans.
- Roof Plans.
- Elevations, including Colored Elevations of all elevations.
- Landscape Plans.
- Slope analysis.
- Lighting Plan.
- Color photos of entire site, structures and adjoining properties.

The following technical studies will also be required:

- Drainage Study.
- Priority Development Project Stormwater Quality Management Plan.

It is anticipated that this process will take between 4 to 6 months.

6.2 SITE DEVELOPMENT PERMIT

Upon approval of the CDP, a Site Development Permit will need to be obtained from the City of Encinitas for grading and site utility work. This will include:

- Grading & Drainage Plan.
- Paving Plan.
- Horizontal Control Plan.
- Utility Site Plan.

It is estimated that this process will take between 3 to 4 months.

6.3 BUILDING PERMIT

Upon approval of the CDP and in conjunction with the Site Development, Construction Plans for a Building Permit issuance will need to be obtained from the City of Encinitas. This will include all plans, elevations, sections and detailing to verify Code compliance and provide adequate instructions for constructing the building and site.

It is estimated that this process will take between 3 to 4 months.

7.0 PROJECT BUDGET SUMMARY

Conceptual Project Budget				
	Area	Unit	Unit Cost	Total
Construct 2-Story Admin Bldg	12,000	SF	$350	4,200,000
Demolish Operations Building & Admin Trailer	8,000	SF	$10	80,000
Construct Pre-engineered Shop Bldg (+ Toilet Rm. & Office)	1,600	SF	$150	240,000
Minor Sitework at Shop Building	1	LS	$50,000	50,000
Sitework at Front Entry	1	LS	$500,000	500,000
				5,070,000
Contingency (20%)				1,014,000
Total				6,084,000
Soft Costs - Design				
A/E Design (7%)				425,880
Discretionary Permitting/Environmental				75,000
Plan Review & Building Permit				100,000
CM - Predesign (Constructability + Cost Est) (2.5%)				152,100
				752,980
Soft Costs - Construction				
A/E Construction Administration (2%)				121,680
CM (4%)				243,360
Testing & Inspection (3%)				182,520
				590,760
Grand Total				**7,427,740**

Approximate Building Pad Location

Existing Utility Site Plan
Drawing C-0.1
1"=40'
11/29/16

NORTH

RNT ARCHITECTS

BOX CULVERT
EXTENSION

UNDERGROUND
EXISTING TELEPHONE
TO NEXT POLE

Utility Site Plan
Drawing C-1.0

1"=40'
11/29/16

NORTH

RNT ARCHITECTS

PM 6923

PM 12757

MAP 13460

MANCHESTER AVE

R/S 1469

6,247,600

6,248,000

6,248,400

FUTURE BIKE PATH BY CALTRANS

GATE

BRIDGE LINE

FUTURE EXPANSION AREA

PROPOSED BUILDING

FUTURE ROUNDABOUT BY CALTRANS

PROPOSED 30x60 SHOP

Overall Site Plan

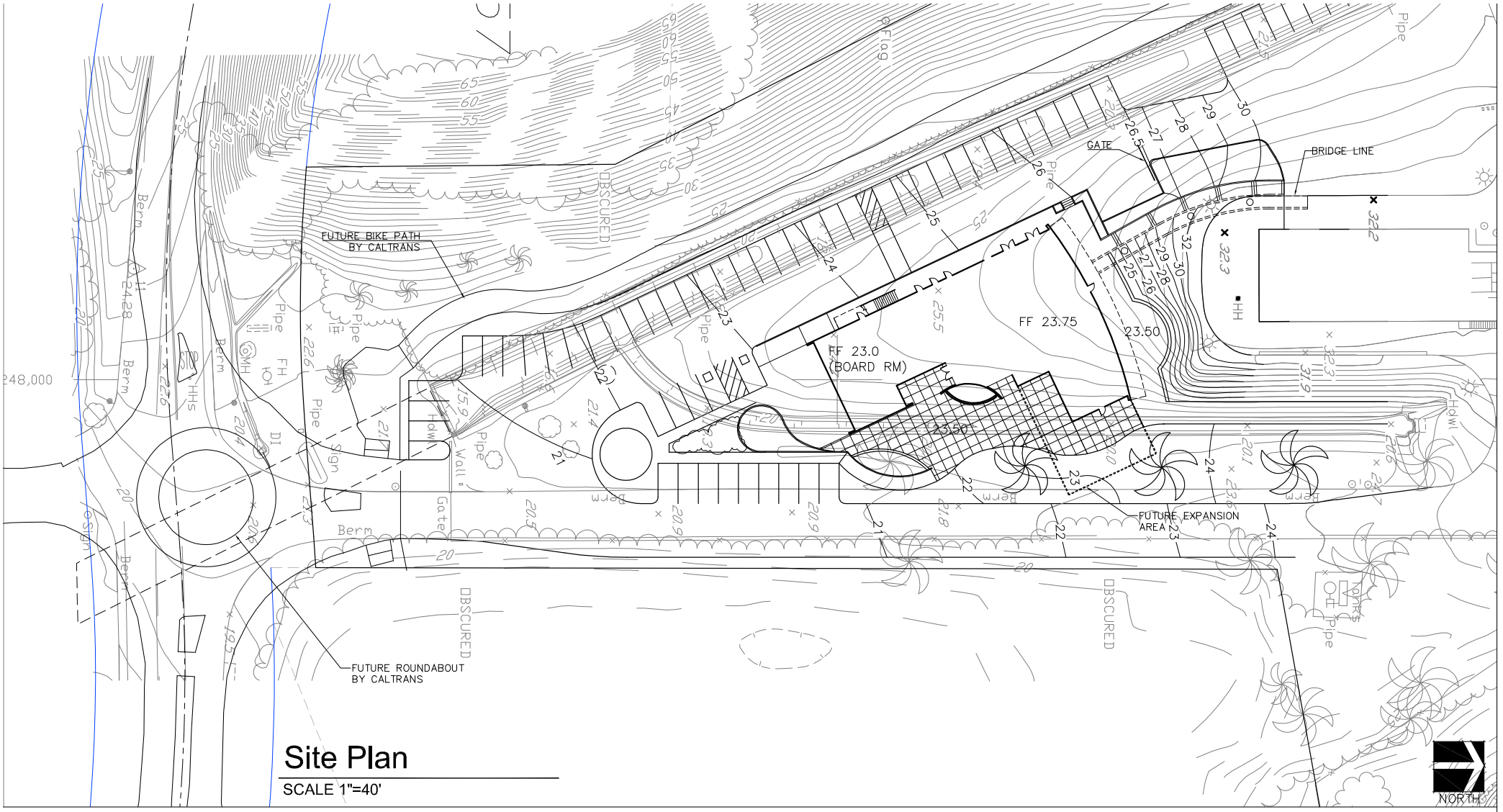
SCALE 1"=100'

NORTH

OVERALL SITE PLAN
DRAWING AS-1.0

11/29/16

RNT ARCHITECTS



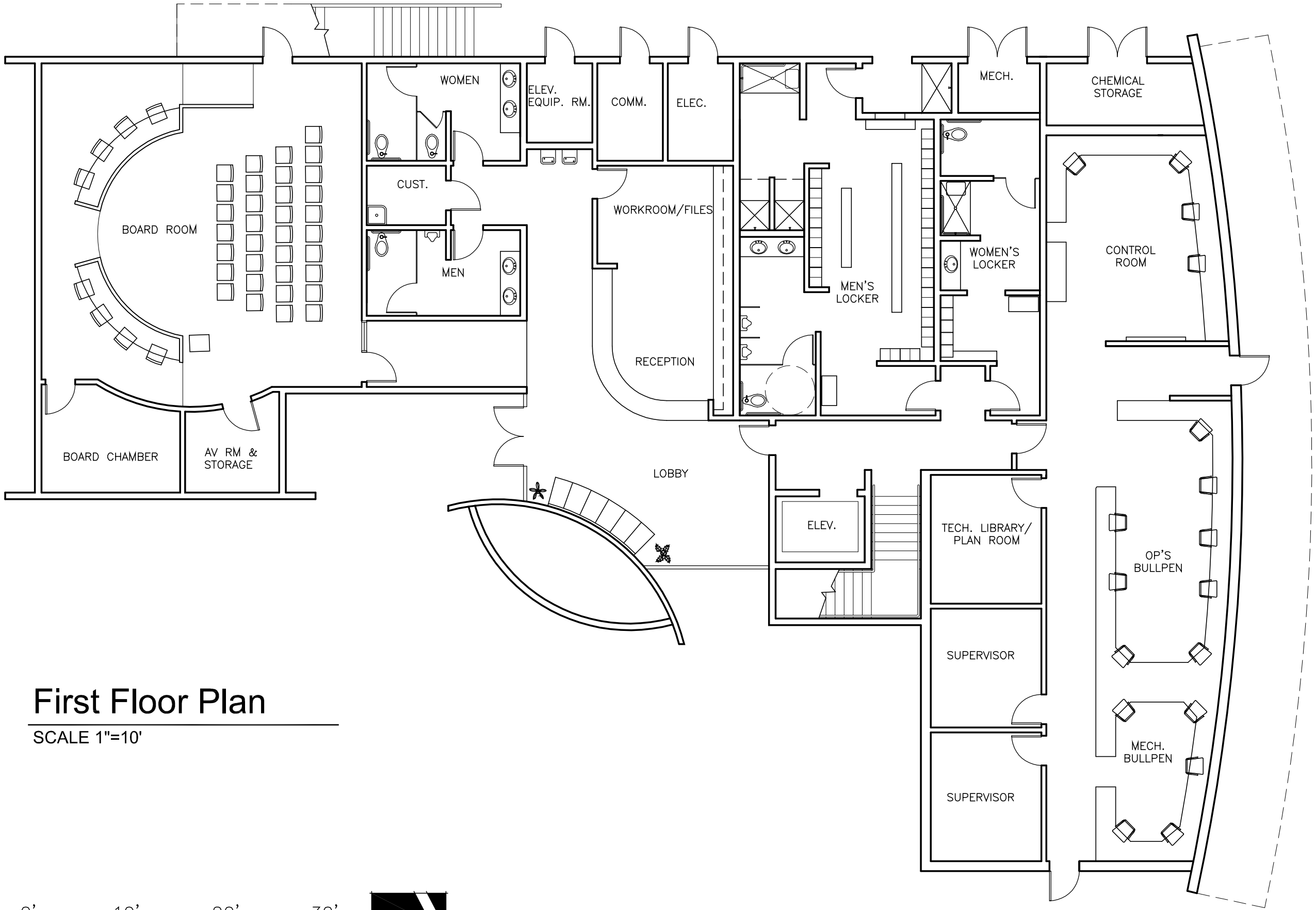
Site Plan

SCALE 1"=40'

SITE PLAN
DRAWING AS-2.0

11/28/16

ROESLING NAKAMURA TERADA ARCHITECTS INC.



First Floor Plan

SCALE 1"=10'

0' 10' 20' 30'

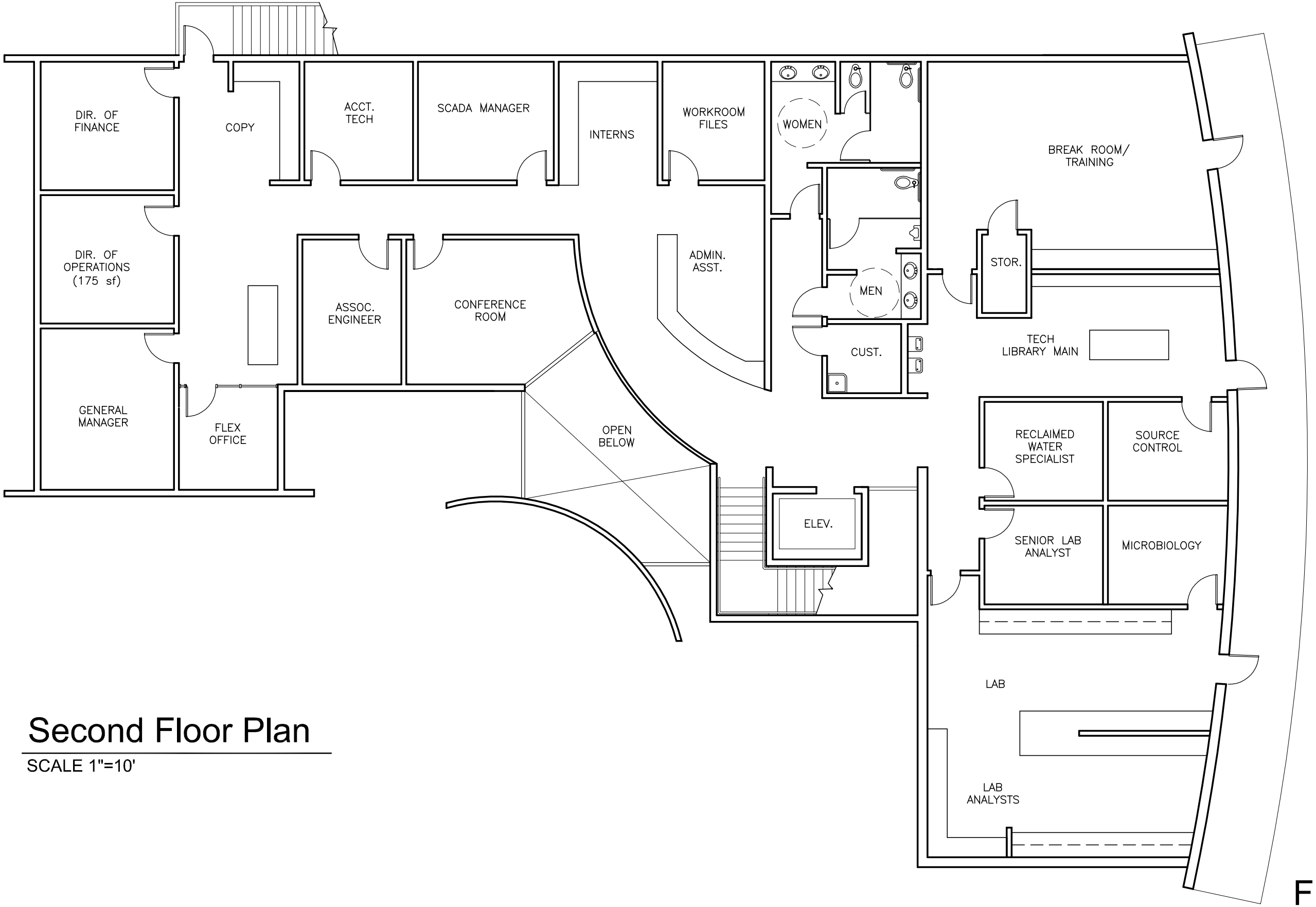
GRAPHIC SCALE: 1"=10'

NORTH

FLOOR PLAN LEVEL 1

A-1.0

11/29/16



Second Floor Plan

SCALE 1"=10'

0' 10' 20' 30'

GRAPHIC SCALE: 1"=10'

NORTH

ROESLING NAKAMURA TERADA ARCHITECTS INC.

FLOOR PLAN LEVEL 2

A-2.0

11/29/16

SEJPA Building Massing Study
Drawing A3.0
11/29/16

L-1 225A
480/277 3PH

P-1 400A
120/208 3PH

MDP-1
600A/480V

ADMINISTRATION & OPERATIONS
BUILDING ELECTRICAL ROOM

MDP-1
600A/480V

MCC-L

MS-2

PROPOSED
BUILDING

FUTURE BIKE PATH
BY CALTRANS

FUTURE ROUNDABOUT
BY CALTRANS

FUTURE EXPANSION
AREA

GATE

BRIDGE LINE

PM 6923

PM 12757

MAP 13460

R/S 1469

MANCHESTER AVE

6,247,600

6,248,000

6,248,400

NORTH

ELECTRICAL SITE PLAN
DRAWING ES-1.0

SCALE 1"=100'

11/29/16

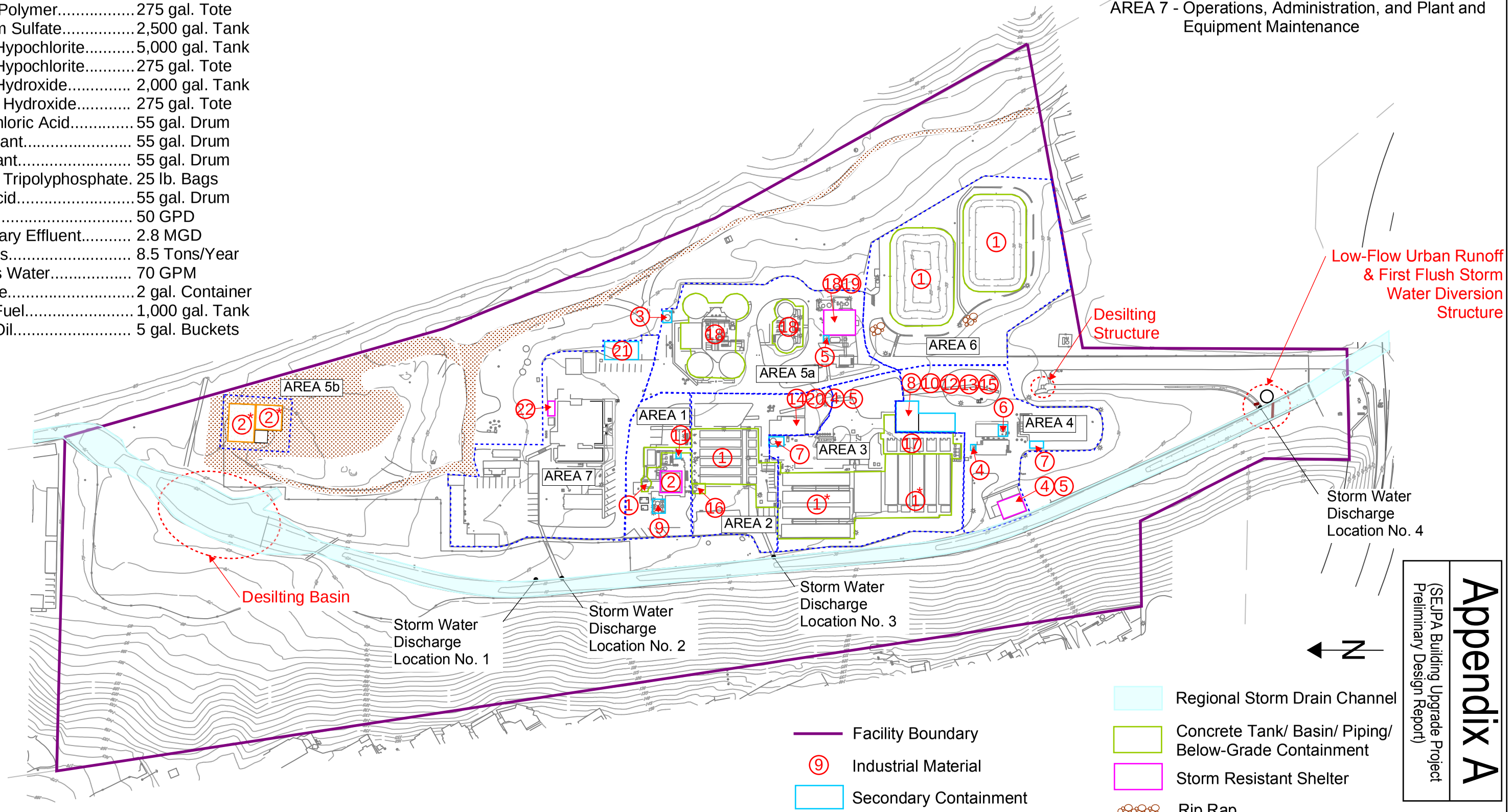
RNT ARCHITECTS

SEWRF SWPPP Site Map
Industrial Materials & BMPs

INDUSTRIAL MATERIALS

1. Wastewater..... 2.8 MGD
2. Screenings & Grit..... 80 Tons/Year
3. Ferric Chloride..... 5,000 gal. Tank
4. C-378 Polymer..... 55 gal. Drum
5. WE-007 Polymer..... 275 gal. Tote
6. Aluminum Sulfate..... 2,500 gal. Tank
7. Sodium Hypochlorite..... 5,000 gal. Tank
8. Sodium Hypochlorite..... 275 gal. Tote
9. Sodium Hydroxide..... 2,000 gal. Tank
10. Sodium Hydroxide..... 275 gal. Tote
11. Hydrochloric Acid..... 55 gal. Drum
12. Antiscalant..... 55 gal. Drum
13. Coagulant..... 55 gal. Drum
14. Sodium Tripolyphosphate. 25 lb. Bags
15. Citric Acid..... 55 gal. Drum
16. FOG..... 50 GPD
17. Secondary Effluent..... 2.8 MGD
18. Biosolids..... 8.5 Tons/Year
19. Process Water..... 70 GPM
20. Gasoline..... 2 gal. Container
21. Diesel Fuel..... 1,000 gal. Tank
22. Diesel Oil..... 5 gal. Buckets

AREA 1 - Preliminary Treatment
AREA 2 - Primary Treatment
AREA 3 - Secondary Treatment
AREA 4 - Tertiary Treatment
AREA 5 - Solids Handling
AREA 6 - Flow Equalization
AREA 7 - Operations, Administration, and Plant and Equipment Maintenance



NOTE: No significant leaks or spills have occurred at the SEWRF

Appendix A
(SEJPA Building Upgrade Project Preliminary Design Report)

FIGURE 2a

Appendix B - Room Matrices

Room:	**Board Room**	Area:	**1100**
Space Characteristics		Item Type	Description
Adjacencies:	Lobby, Restrooms, Storage, AV closet	Floor Finish	Carpet
Dimensions:	34.75'x34.5'	Base Finish	Topset
Occ. Type:	Assembly	Wall Finish	gyp. bd., acoustical panel
Occ. Load:	35	Ceiling Finish	Acoustical clouds, gyp. bd.
Acoustics:	Yes, Sound baffling	Ceiling Height	10'-0" Minimum
		Casework	Dias seating area, solid surface counter w/ plastic lam cabinet body
Other		Window Requirements	Yes
Raised dais 6"-8"		Window Treatment	Motorized blinds
		HVAC	VRF, individual zone, acoustcial considerations
		Plumbing	none
		Power	Typical convenience outlets, power to each dias station, power to motorized projectors, screens and blinds
		Lighting	Recessed, Dimmable LED
		Data	Data to projector, dias stations, podium
		Comm	
		AV	Motorized retractable ceiling projector, motorized projection screen (consider at front & back of room), sound system & speakers
		FF&E	30 audience chairs, podium, dias chairs, artwork

Room:	**Board Chamber**	Area:	**1100**
Space Characteristics		Item Type	Description
Adjacencies:	Board Room, Storage, AV closet	Floor Finish	Carpet
Dimensions:	14'x9.75'	Base Finish	Topset
Occ. Type:	B	Wall Finish	gyp. bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	Yes	Ceiling Height	9'-0"
		Casework	
Other		Window Requirements	Yes
		Window Treatment	Horizontal Blinds
		HVAC	Yes
		Plumbing	none
		Power	Typical convenience outlets
		Lighting	Recessed LED
		Data	Data outlet on one wall
		Comm	
		AV	
		FF&E	8 seat table and chairs. White board.

Room:	**AV RM & Stor.**	Area:	**1100**
Space Characteristics		Item Type	Description
Adjacencies:	Board Room, Board Chamber	Floor Finish	Carpet
Dimensions:	10.75'x9.5'	Base Finish	Topset
Occ. Type:	B	Wall Finish	gyp. Bd.
Occ. Load:		Ceiling Finish	gyp. bd.
Acoustics:	No	Ceiling Height	9'-0"
		Casework	
Other		Window Requirements	none
		Window Treatment	
		HVAC	VRF Individual Zone
		Plumbing	none
		Power	Dedicated outlet(s) for AV eqmt.
		Lighting	Recessed LED
		Data	Network connection
		Comm	
		AV	AV Head-end equipment
		FF&E	

Room:	**Lobby**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Workroom files, Mech, Board Room, RR, Elev.	Floor Finish	Epoxy Terrazzo
Dimensions:	≈ 12.5'x34'	Base Finish	Epoxy Terrazzo
Occ. Type:	Assembly	Wall Finish	Gyp. Bd., Acoustical treatment
Occ. Load:	15	Ceiling Finish	Gyp. Bd., Acoustical treatment
Acoustics:	Yes	Ceiling Height	Varies, partial 2-story volume
		Casework	Reception counter, solid surface w/ plastic lam. Cabinets
Other		Window Requirements	Yes
		Window Treatment	Fritted or Translucent Glazing
		HVAC	VRF Individual Zone
		Plumbing	drinking fountain
		Power	Typical convenience outlets
		Lighting	Recessed LED,and/or pendant LED, indirect LED
		Data	Wi Fi
		Comm	
		AV	NA
		FF&E	Lobby seating

Room:	**Men 1**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Elev. Equip. Rm, Lobby, Board Room, Cust.	Floor Finish	Epoxy Terrazzo
Dimensions:	≈ 15'-6"x 9'-0"	Base Finish	Epoxy Terrazzo
Occ. Type:	B	Wall Finish	Moisture resistant gyp. bd. & Tile
Occ. Load:		Ceiling Finish	Moisture resistant gyp. bd.
Acoustics:	Yes	Ceiling Height	9'-0"
		Casework	Solid surface sink counter
Other		Window Requirements	No
		Window Treatment	
		HVAC	Exhaust Fan
		Plumbing	Toilet, urinal, in-counter sinks
		Power	Typical convenience outlets
		Lighting	Recessed and/or pendant mounted, indirect
		Data	Wi Fi
		Comm	
		AV	NA
		FF&E	Toilet Partitions, Mirror full length of counter, Electric Hand Drier, Soap, Paper Towel & Toilet Seat Cover Dispensers

Room:	**Women 1**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Elev. Equip. Rm, Lobby, Board Room, Cust.	Floor Finish	Epoxy Terrazzo
Dimensions:	≈ 15'-6"x 9'-0"	Base Finish	Epoxy Terrazzo
Occ. Type:	B	Wall Finish	Moisture resistant gyp. bd. & Tile
Occ. Load:		Ceiling Finish	Moisture resistant gyp. bd.
Acoustics:	Yes	Ceiling Height	9'-0"
		Casework	Solid surface sink counter
Other		Window Requirements	No
		Window Treatment	
		HVAC	Exhaust Fan
		Plumbing	Toilets, in-counter sinks
		Power	Typical convenience outlets
		Lighting	Recessed and/or pendant mounted, indirect
		Data	Wi Fi
		Comm	
		AV	NA
		FF&E	Toilet Partitions, Mirror full length of counter, Electric Hand Drier, Soap, Paper Towel & Toilet Seat Cover Dispensers

Room:	**Custodial Rm 1**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Restrooms, Mech Rm. Board Rm, Lobby	Floor Finish	Sealed Concrete
Dimensions:	6'x8'	Base Finish	Sealed Concrete
Occ. Type:	B	Wall Finish	Moisture resistant Gyp. Bd., FRP
Occ. Load:		Ceiling Finish	Moisture resistant Gyp. Bd.
Acoustics:	no	Ceiling Height	9'
		Casework	None
Other		Window Requirements	no
		Window Treatment	
		HVAC	Exhaust Fan
		Plumbing	Floor Sink
		Power	Typical convenience outlets
		Lighting	Recessed LED
		Data	NA
		Comm	
		AV	NA
		FF&E	Storage Shelving, Mop Rack

Room:	**Mechanical Rm**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Chem. Storage, Locker Rooms	Floor Finish	Sealed Concrete
Dimensions:	5'x8.3'	Base Finish	Sealed Concrete
Occ. Type:	S1	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Gyp. Bd.
Acoustics:	Yes	Ceiling Height	9'-0"
		Casework	
Other		Window Requirements	No
		Window Treatment	
		HVAC	Combustion air ventilation
		Plumbing	Hot Water Heater, floor sink
		Power	Typical convenience outlets
		Lighting	Surface-mounted LED
		Data	
		Comm	
		AV	NA
		FF&E	

Room:	**Electrical**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Mech. Rm. Workroom files	Floor Finish	Sealed Concrete
Dimensions:	6.6'x8'	Base Finish	Sealed Concrete
Occ. Type:		Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Gyp. Bd.
Acoustics:	no	Ceiling Height	9'-0"
		Casework	
Other		Window Requirements	No
		Window Treatment	
		HVAC	Exhaust Fan
		Plumbing	Sump with sewer connection
		Power	
		Lighting	Surface-mounted LED
		Data	
		Comm	Phone connection
		AV	NA
		FF&E	

Room:	**Communication**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Restrooms, Cust. Mech. Rm. Board Rm, Lobby	Floor Finish	Sealed Concrete
Dimensions:	6.6'x9.8'	Base Finish	Sealed Concrete
Occ. Type:		Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Gyp. Bd.
Acoustics:		Ceiling Height	9'-0"
		Casework	
Other		Window Requirements	No
		Window Treatment	
		HVAC	VRF Individual Zone
		Plumbing	No
		Power	Dedicated outlets for server equipment, Fire Alarm & EMS panels, Typical convenience outlets
		Lighting	Surface-mounted LED
		Data	Server rack & cabinet
		Comm	Fire Alarm Control Panel, Energy Management System
		AV	NA
		FF&E	UPS

Room:	**Electrical**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Mech. Rm. Workroom files	Floor Finish	Sealed Concrete
Dimensions:	6.6'x9.8'	Base Finish	Sealed Concrete
Occ. Type:		Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Gyp. Bd.
Acoustics:	no	Ceiling Height	9'-0"
		Casework	
Other		Window Requirements	No
		Window Treatment	
		HVAC	Individual
		Plumbing	
		Power	Electrical Panels
		Lighting	Recessed and/or pendant mounted, indirect
		Data	
		Comm	
		AV	NA
		FF&E	

Room:	**Workroom Files**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Locker Rm, Elec, Comm, Reception, Lobby, RR	Floor Finish	Carpet
Dimensions:	17'x13.5'	Base Finish	Topset Vinyl
Occ. Type:	B	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Gyp. Bd. / Suspended acoustical panel ceiling
Acoustics:		Ceiling Height	9'-0"
		Casework	Counters and cabinets
Other		Window Requirements	no
		Window Treatment	
		HVAC	VRF Individual Zone
		Plumbing	none
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	Outlets on two walls
		Comm	
		AV	NA
		FF&E	Table, Chairs, Cabinets, Shelving

Room:	**M- Locker Room**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Elec, Workroom files, Lobby, W-Locker Rm, Elev.	Floor Finish	Epoxy Terrazzo
Dimensions:	19.75'x35.5'	Base Finish	Epoxy Terrazzo
Occ. Type:	B	Wall Finish	Moisture resistant gyp. bd./Terrazzo
Occ. Load:	50	Ceiling Finish	Moisture resistant gyp. bd.
Acoustics:	Yes	Ceiling Height	9'-0"
		Casework	Solid surface counter
Other		Window Requirements	No
		Window Treatment	
		HVAC	Exhaust, plus VRF Individual Zone
		Plumbing	Toilets, Sinks, Showers, Urinals
		Power	Typical convenience outlets
		Lighting	Recessed LED
		Data	no
		Comm	
		AV	NA
		FF&E	Lockers, Benches, Toilet Partitions

Room:	**M- Locker Room**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	M-Locker Rm, Control Room, Supervisor, Bullpens, Mech. Rm.	Floor Finish	Epoxy Terrazzo
Dimensions:	10'x24'-4"	Base Finish	Epoxy Terrazzo
Occ. Type:	B	Wall Finish	Moisture resistant gyp. bd./Teraazzo
Occ. Load:	25	Ceiling Finish	Moisture resistant gyp. bd.
Acoustics:	Yes	Ceiling Height	9'-0"
		Casework	Solid surface counter
Other		Window Requirements	No
		Window Treatment	
		HVAC	Exhaust, plus VRF Individual Zone
		Plumbing	Toilets, Sinks, Showers
		Power	Typical convenience outlets
		Lighting	Recessed LED
		Data	Wi Fi
		Comm	
		AV	NA
		FF&E	Lockers, Benches, Toilet Partitions

Room:	**Control Room**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	W-Locker Room, Bullpens	Floor Finish	Carpet
Dimensions:	17'-7"x20'-9"	Base Finish	Concrete
Occ. Type:	B	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	Yes	Ceiling Height	9'-0"
		Casework	
Other		Window Requirements	Yes
		Window Treatment	Shades
		HVAC	VRF Individual Zone
		Plumbing	none
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	Multiple outlets on all walls
		Comm	
		AV	NA
		FF&E	Computers, Desks, Chairs, Tables, Printers, Flat Screen Monitors, Cabinets

Room:	**Bullpen**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Control Room, Supervisors, Tech Library	Floor Finish	Carpet
Dimensions:	46'-6"x18'-3"	Base Finish	Topset
Occ. Type:	B	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	Yes	Ceiling Height	9'-0"
		Casework	Solid surface work counters w/ plastic laminate cabinets
Other		Window Requirements	Yes
		Window Treatment	Horizontal blinds
		HVAC	VRF Individual Zone
		Plumbing	none
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	Multiple data drops for workstations, Wi Fi
		Comm	
		AV	NA
		FF&E	Desk counters, Chairs, Computers, White Board, Flat screen monitor

Room:	**Supervisor 1**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Bullpens, Control Room, Tech Library	Floor Finish	Carpet
Dimensions:	13'x11-2'	Base Finish	Topset
Occ. Type:	B	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	Yes	Ceiling Height	9'-0"
		Casework	none
Other		Window Requirements	Yes
		Window Treatment	Horizontal blinds
		HVAC	VRF Individual Zone
		Plumbing	none
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	Outlets on 2 opposing walls
		Comm	
		AV	NA
		FF&E	Desk , Chairs, Computers, Filing Cabinet/Credenza

Room:	**Supervisor 2**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Bullpens, Control Room, Tech Library	Floor Finish	Carpet
Dimensions:	13'x11-2'	Base Finish	Topset
Occ. Type:		Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:		Ceiling Height	9'-0"
		Casework	none
Other		Window Requirements	Yes
		Window Treatment	Horizontal blinds
		HVAC	VRF Individual Zone
		Plumbing	none
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	2 drops on opposing walls
		Comm	
		AV	NA
		FF&E	Desk , Chairs, Computers, Filing Cabinet/Credenza

Room:	**Tech Library-Plan**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:			
	Supervisors, Bullpen	Floor Finish	Carpet
Dimensions:	12'x11'-2"	Base Finish	Concrete
Occ. Type:		Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:		Ceiling Height	9'-0"
		Casework	Plastic laminate book shelves
Other		Window Requirements	none
		Window Treatment	
		HVAC	VRF Individual Zone
		Plumbing	none
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	2 drops on opposing walls
		Comm	
		AV	NA
		FF&E	Book Shelves, Table, Printer

Room:	**Chemical Storage**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Tech Library, Water Reclaim, Lab Analyst	Floor Finish	Sealed Concrete
Dimensions:	13'-11"x 6'-11"	Base Finish	Sealed Concrete
Occ. Type:	H	Wall Finish	Painted concrete masonry
Occ. Load:		Ceiling Finish	Exterior Plaster
Acoustics:	Yes	Ceiling Height	10'-0"
		Casework	none
Other		Window Requirements	none
		Window Treatment	
		HVAC	None
		Plumbing	none
		Power	Exterior Outlets w/ Housing
		Lighting	Surface-mounted LED
		Data	none
		Comm	
		AV	NA
		FF&E	

Room:	**Microbiology**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Lab, Senior Lab Analyst, Water Specialist, Source Control	Floor Finish	Polished Conc.
Dimensions:	10'x12'	Base Finish	Vinyl
Occ. Type:	B	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	Yes	Ceiling Height	9'-0"
		Casework	Counter
Other		Window Requirements	Yes
		Window Treatment	Horizontal Blinds
		HVAC	VRF Individual Zone
		Plumbing	Sink
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	2 drops on opposing walls
		Comm	
		AV	NA
		FF&E	Cabinets, Chairs, Tables, Chemical Lab Equip

Room:	**Lab**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Microbiology, Senior Lab Analyst	Floor Finish	Vinyl
Dimensions:	8'x10'-6"	Base Finish	Topset
Occ. Type:	B	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	Yes	Ceiling Height	9'-0"
		Casework	Counter
Other		Window Requirements	Yes
		Window Treatment	Horizontal Blinds
		HVAC	VRF Individual Zone
		Plumbing	none
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	Multiple outlets on all walls
		Comm	
		AV	NA
		FF&E	Counters, Computer, Chair, Desk

Room:	**Senior Lab Analyst**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Lab Analyst, Lab, Microbiology, Water Specialist	Floor Finish	Carpet
Dimensions:	12'x10'	Base Finish	Top Set
Occ. Type:	**B**	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	Yes	Ceiling Height	9'-0"
		Casework	none
Other		Window Requirements	none
		Window Treatment	
		HVAC	VRF Individual Zone
		Plumbing	none
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	2 drops on opposing walls
		Comm	
		AV	NA
		FF&E	Desk, Computer, Chair, Filing Cabinet

Room:	**Source Control**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Tech Library, Water Specialist, Micobiology	Floor Finish	Carpet
Dimensions:	12'x10'	Base Finish	Top Set
Occ. Type:	**B**	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	Yes	Ceiling Height	9'-0"
		Casework	none
Other		Window Requirements	Yes
		Window Treatment	Horizontal Blinds
		HVAC	VRF Individual Zone
		Plumbing	none
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	2 drops on opposing walls
		Comm	
		AV	NA
		FF&E	Desk, Computer, Chair, Filing Cabinet

Room:	**Reclaimed Water S**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Chemical Stor, Tech Library	Floor Finish	Carpet
Dimensions:	12'x10'	Base Finish	Topset
Occ. Type:	B	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended Acoustical Panel Ceiling
Acoustics:	Yes	Ceiling Height	9'-0"
		Casework	none
Other		Window Requirements	Interior
		Window Treatment	Blinds
		HVAC	VRF Individual Zone
		Plumbing	none
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	2 Drops on opposing walls
		Comm	
		AV	NA
		FF&E	Desk, Computer, Chair, Filing Cabinet

Room:	**Tech Library-Main**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:		Floor Finish	Carpet
	Supervisors, Bullpen	Base Finish	Topset
Dimensions:	12'-5"x27'-11"	Wall Finish	Gyp. Bd.
Occ. Type:	B	Ceiling Finish	Suspended acoustical panel ceiling
Occ. Load:		Ceiling Height	9'-0"
Acoustics:	Yes	Casework	Book Shelves, Counters
Other		Window Requirements	Yes
		Window Treatment	Horizontal Blinds
		HVAC	VRF Individual Zone
		Plumbing	none
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	2 Drops
		Comm	
		AV	NA
		FF&E	Book Shelves, Table, Printer, chairs

Room:	**Break Room**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Tech Library, RR	Floor Finish	Polished Concrete
Dimensions:	21'x32'-4"	Base Finish	Topset
Occ. Type:	B	Wall Finish	Gyp. Bd., Acoustical Panel
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	Yes	Ceiling Height	9'-0"
		Casework	Solid surface countertop w/ plastic laminate cabinets
Other		Window Requirements	Yes
		Window Treatment	Horizontal Blinds
		HVAC	VRF Individual Zone
		Plumbing	2 compartment sink, water for ref. icemaker
		Power	Typical convenience outlets, GFI at sink
		Lighting	Recessed lay-in LED or LED pendants
		Data	Outlets on 2 walls
		Comm	
		AV	NA
		FF&E	Lunch Tables, Chairs, Small Couch, TV, Microwave, Vending Machine, Toaster Oven, Coffee Maker, Refrigerator

Room:	**Men 2nd flr.**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	BrreakRoom, Womens Bathroom, Elev.	Floor Finish	Epoxy Terrazzo
Dimensions:	15'-3x9'-6"	Base Finish	Epoxy Terrazzo
Occ. Type:		Wall Finish	Moisture resistant gyp. bd./tile
Occ. Load:		Ceiling Finish	Moisture resistant gyp. bd.
Acoustics:		Ceiling Height	9'
		Casework	Solid surface sink counter
Other		Window Requirements	None
		Window Treatment	NA
		HVAC	Exhaust Fan
		Plumbing	Toilets, in-counter sinks, urinal
		Power	Convenience Outlet at sink, GFI
		Lighting	Recessed LED
		Data	Wi Fi
		Comm	
		AV	NA
		FF&E	Electric Hand Drier, Soap, Paper Towel & Toilet Seat Cover Dispensers

Room:	**Women 2nd flr.**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	BrreakRoom, Mens Bathroom, Elev.	Floor Finish	Epoxy Terrazzo
Dimensions:	15'-2x11'	Base Finish	Epoxy Terrazzo
Occ. Type:		Wall Finish	Moisture resistant gyp. bd./tile
Occ. Load:		Ceiling Finish	Moisture resistant gyp. bd.
Acoustics:		Ceiling Height	9'
		Casework	Solid surface sink counter
Other		Window Requirements	None
		Window Treatment	NA
		HVAC	Exhaust Fan
		Plumbing	Toilets, in-counter sinks
		Power	Convenience Outlet at sink, GFI
		Lighting	Recessed LED
		Data	Wi Fi
		Comm	
		AV	NA
		FF&E	Electric Hand Drier, Soap, Paper Towel & Toilet Seat Cover Dispensers

Room:	**Custodial 2**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	RR, Elevator, Tech. Library, Admin. Asst.	Floor Finish	Sealed Concrete
Dimensions:	9'-6"x7'	Base Finish	Sealed Concrete
Occ. Type:	B	Wall Finish	Gyp. Bd., FRP
Occ. Load:		Ceiling Finish	Gyp. Bd.
Acoustics:	Yes	Ceiling Height	9'
		Casework	None
Other		Window Requirements	no
		Window Treatment	
		HVAC	Exhaust Fan
		Plumbing	Floor Sink
		Power	Typical convenience outlets
		Lighting	Recessed LED
		Data	NA
		Comm	
		AV	NA
		FF&E	Storage Shelving, Mop Rack

Room:	**Admin Assist.**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	RR, Workfiles, Interns	Floor Finish	Carpet
Dimensions:	10'-10"x17'	Base Finish	Topset
Occ. Type:	B	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:		Ceiling Height	10'
		Casework	Solid surface countertop w/ plastic laminate abinets
Other		Window Requirements	no
		Window Treatment	
		HVAC	VRF Individual Zone
		Plumbing	none
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	Outlets on 2 opposing walls
		Comm	
		AV	NA
		FF&E	Chair, Computer, Filing Cabinet, Counter

Room:	**Workroom Files 3**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	RR, Admin. Assist. Interns	Floor Finish	Carpet
Dimensions:	12'x10'-4"	Base Finish	Topset
Occ. Type:		Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	Yes	Ceiling Height	9'
		Casework	None
Other		Window Requirements	Yes
		Window Treatment	Horizontal Blinds
		HVAC	VRF Individual Zone
		Plumbing	none
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	Outlets on 3 walls
		Comm	
		AV	NA
		FF&E	Tables, Counter, Chairs, Shelving

Room:	**Interns**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Admin Assist. Workrm Files, Scada MGR.	Floor Finish	Carpet
Dimensions:	13'x12'-6"	Base Finish	Topset
Occ. Type:	B	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	yes	Ceiling Height	9'
		Casework	None
Other		Window Requirements	Yes
		Window Treatment	
		HVAC	VRF Individual Zone
		Plumbing	None
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	Outlets on 2 opposing walls
		Comm	
		AV	N/A
		FF&E	Desk, Chair, Floor Cabinet, Computer

Room:	**Scada Manager**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Interns, Conf. Rm, Assoc. Eng., Acct. Tech.	Floor Finish	Carpet
Dimensions:	13'-9"x12'	Base Finish	Topset
Occ. Type:	B	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	Yes	Ceiling Height	9'
		Casework	None
Other		Window Requirements	Yes
		Window Treatment	Horizontal Blinds
		HVAC	VRF Individual Zone
		Plumbing	None
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	Outlets on every wall
		Comm	
		AV	N/A
		FF&E	Desk, Chair, Floor Cabinet, Computer

Room:	**Conference Rm**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Admin. Assist., Interns, Scada Mgr, Assoc. Eng, Acct Tech.	Floor Finish	Carpet
Dimensions:	14'-8"x17'	Base Finish	Concrete
Occ. Type:	B	Wall Finish	Gyp. Bd./Acoustical Panel
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	yes	Ceiling Height	9'
		Casework	None
Other		Window Requirements	Yes
		Window Treatment	Horizontal Blinds
		HVAC	VRF Individual Zone
		Plumbing	None
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	Outlets on 3 walls
		Comm	
		AV	Yes
		FF&E	Conference Table, Chair, Floor Cabinet, Projector or Screen, Dryerase board

Room:	**Copy**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Dir. Of Ops., Dir. Of Finance, Acct. Tech.	Floor Finish	Carpet
Dimensions:	12'x5'-8"	Base Finish	Topset
Occ. Type:	B	Wall Finish	Gyp. Bd
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:		Ceiling Height	9'
		Casework	Solid surface countertop with plastic laminate cabinets
Other		Window Requirements	None
		Window Treatment	
		HVAC	VRF Individual Zone
		Plumbing	None
		Power	Typical convenience outlets, dedicated outlet for copier
		Lighting	Recessed lay-in LED
		Data	two out
		Comm	
		AV	N/A
		FF&E	Printers

Room:	**Associate Eng.**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Scada MGR, Acct. Tech. Flex Office	Floor Finish	Carpet
Dimensions:	14'-8"'x10'	Base Finish	Topset
Occ. Type:	B	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	yes	Ceiling Height	9'
		Casework	None
Other		Window Requirements	Yes
		Window Treatment	Horizontal Blinds
		HVAC	VRF Individual Zone
		Plumbing	None
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	Outlets on 2 opposing walls
		Comm	
		AV	N/A
		FF&E	Desk, Chair, Floor Cabinet, Computer

Room:	**Flex Room**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:		Floor Finish	Carpet
Dimensions:	10'X11'	Base Finish	Topset
Occ. Type:	B	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	yes	Ceiling Height	9'
		Casework	None
Other		Window Requirements	Yes
		Window Treatment	Horizontal Blinds
		HVAC	VRF Individual Zone
		Plumbing	None
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	Outlets on 2 opposing walls
		Comm	
		AV	N/A
		FF&E	Desk, Chair

Room:	**Dir. Of Finance**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Copy, Dir. Of Ops	Floor Finish	Carpet
Dimensions:	13'-6"X12'-6"	Base Finish	Topset
Occ. Type:	B	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	Yes	Ceiling Height	9'
		Casework	None
Other		Window Requirements	Yes
		Window Treatment	Horizontal blinds
		HVAC	VRF Individual Zone
		Plumbing	None
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	Outlets on 2 opposing walls
		Comm	
		AV	N/A
		FF&E	Desk, Chair, Floor Cabinet, Credenza, Computer, Small Table

Room:	**General Manager**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:			
	Dir. Of Operations, Flex Office	Floor Finish	Carpet
Dimensions:	17'X12'-6"	Base Finish	topset
Occ. Type:	B	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	Yes	Ceiling Height	9'
		Casework	None
Other		Window Requirements	Yes
		Window Treatment	Horizontal blinds
		HVAC	VRF Individual Zone
		Plumbing	None
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	Outlets on 2 opposing walls
		Comm	
		AV	N/A
		FF&E	Desk, Chair, Floor Cabinet, Credenza, Computer, Small Table

Room:	**Dir. Of Operations**	Area:	
Space Characteristics		Item Type	Description
Adjacencies:	Gen. Manager, Dir. Of Finance	Floor Finish	Carpet
Dimensions:	13'-6"X12'-6"	Base Finish	Topset
Occ. Type:	B	Wall Finish	Gyp. Bd.
Occ. Load:		Ceiling Finish	Suspended acoustical panel ceiling
Acoustics:	yes	Ceiling Height	9'
		Casework	None
Other		Window Requirements	Yes
		Window Treatment	Horizontal Blinds
		HVAC	VRF Individual Zone
		Plumbing	None
		Power	Typical convenience outlets
		Lighting	Recessed lay-in LED
		Data	Outlets on 2 opposing walls
		Comm	
		AV	N/A
		FF&E	Desk, Chair, Floor Cabinet, Credenza, Computer, Small Table

Appendix C
Geotechnical Report

STONEY-MILLER CONSULTANTS, INC

GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

November 28, 2016

San Elijo Joint Powers Authority
2695 Manchester Avenue
Cardiff by the Sea, California 92007-7077

Project No: 50093-00
Report No: 16-C0582

Attention: Mr. Mike Konicke, Associate Engineer

Subject: **Preliminary Geotechnical Investigation**
Proposed Two-Story Operations Building
San Elijo Joint Powers Authority
2695 Manchester Avenue
Cardiff by the Sea, California

Dear Mr. Konicke:

This report presents the findings and conclusions of a geotechnical investigation undertaken to evaluate onsite and certain regional geotechnical conditions pertinent to the planned two-story operations building to be constructed at the subject property. Analyses for this investigation are based upon a review of conceptual plans for the building, and discussions with the project team.

The conclusions and recommendations of this report are considered preliminary due to the absence of site plans, foundation plans and grading plans, the formulation of which may partially be dependent upon the recommendations presented herein.

Scope of Investigation

The scope of our investigation included the following:

1. Analysis of pertinent reports, maps, and published literature pertaining to the site and nearby areas, as well as available plans for the site in order to relate geotechnical conditions to the anticipated construction;

2. Review of previously prepared geotechnical reports for other structures that have been constructed on the property;

3. Site reconnaissance and utility markout for cone penetration tests (CPT);

4. The excavation and geologic logging of three test excavations to expose the shallow subsurface conditions, obtain representative samples for laboratory testing, and determine the character and geometrical distribution of shallow earth materials underlying the site;

5. Performance of three cone penetration tests (CPT) to evaluate the subsurface conditions, and to provide data for liquefaction and settlement analyses;

6. Laboratory testing of representative soil samples to evaluate moisture content, Atterberg limits, expansion index, grain size distribution, maximum density/optimum moisture content and soil corrosivity properties;

7. Geotechnical analyses of the data, including liquefaction and settlement analyses, preparation of two geotechnical cross-sections, and preparation of this geotechnical report presenting our preliminary geotechnical conclusions and recommendations for the proposed construction, and for use by your design professionals, contractors, and agency submittal.

Accompanying Illustrations and Appendices

Figure 1	-	Site Location Map
Figure 2	-	Geotechnical Plot Plan
Figure 3	-	Cross Section A-A'
Figure 4	-	Cross Section B-B'
Figure 5	-	Slab Subdrain Detail
Figure 6	-	Typical Retaining Wall Subdrain Detail
Appendix A	-	References
Appendix B	-	Test Excavation Logs and Cone Penetration Test Results
Appendix C	-	Field Exploration and Laboratory Test Results
Appendix D	-	Liquefaction Analyses
Appendix E	-	Standard Grading Specifications
Appendix F	-	Utility Trench Backfill Guidelines

Site Description

The proposed building site is located within an existing water reclamation facility situated north of Manchester Avenue and the San Elijo Lagoon. The site consists of several existing structures and water treatment plant facilities and improvements. An existing, fairly large offsite concrete channel and ascending slope are located to the west of the proposed building site, a landscaped area with palm trees and a smaller onsite concrete drainage ditch are located east of the lawn area, an asphalt driveway and parking area are located east of the landscaping area, and an open space area is located east of the site. The building site currently consists mainly of a lawn and landscaped area that gently slopes to the south towards the lagoon. The site has elevations ranging from approximately 20 feet at the southern corner to 32 feet to the north, where there is an existing pad supporting a water treatment plant improvement.

Proposed Development

Based on the conceptual site plan provided to us, we understand that a new two-story operations building and associated improvements are proposed. The building is planned to have a finish

floor elevation of 23.0 to 23.75 feet, with an exterior patio area located east of the building at an elevation of 23.5 feet. A new parking area is proposed along the west side of the building with a walking bridge and ascending slope along the north side of the building. Other anticipated improvements include concrete walkways and underground utilities.

Foundations supporting the new building and exterior improvements are anticipated to utilize conventional foundations constructed in recompacted engineered fill as recommended herein.

GEOTECHNICAL CONDITIONS

Geologic Setting

The area of investigation lies within the western portion of the Peninsular Range geomorphic province, an extensive uplifted fault block that occupies the southwestern portion of California and extends southward into Baja California. Based on the Reference 6 geology map, local stratigraphy consists of Eocene Age Delmar Formation and Torrey Sandstone overlain by patches of Quaternary marine and non-marine terrace formations at higher elevations. The site is located in a narrow valley between steep bluffs to the west and a large fill section of the Interstate 5 corridor. In the site valley area, the bedrock is overlain by Quaternary-age alluvium and fill. The fill is generally associated with the construction of the roads, buildings and pipelines of the Treatment Facility. The alluvium is a result of erosion and deposition in the natural drainage course that runs north to south on the property. Deeper alluvial deposits occur closer to the drainage course and become shallower to the east and west of the drainage.

Earth Materials

Based upon review of regional geologic mapping, and our recent onsite geologic exploration, the site is underlain at depth by soft to hard or compact sedimentary bedrock composed of sandstone and claystone. This rock is expected to be easily excavated in the event it is encountered during development.

Alluvium (Qal) overlies the bedrock within the subject property, to depths ranging from 10- to 30-feet below the existing surface. The alluvium consists primarily of medium to dark brown silty to clayey sand. The alluvium is damp to moist to a depth of 5 feet below the surface where the water table is present.

Artificial fill overlies the alluvium throughout the site. The fill is clean and compacted composed of brown fine to medium silty sand with scattered gravel.

The existing fill and alluvium are considered adequate to support structural loads provided that the upper materials are overexcavated, moisture conditioned, and recompacted as recommended herein. Actual depth of remedial grading and overexcavation will be dependent upon several factors including the proposed grade, depth to ground water, anticipated foundation loads, and

further field review of the overexcavation bottom prior to processing the bottom and replacing the fill.

Laboratory testing indicates that onsite materials have a very low expansion potential and negligible soluble sulfate concentrations. Electrical resistivity testing indicates a very severe potential for corrosivity to buried metal.

Slope Stability

The majority of the site is generally flat to gently sloping, following the natural topography of an alluvial valley. Slopes associated with the existing pad to the north are less than 10-feet in height, thus slope stability is not a design consideration.

Groundwater

Groundwater was evaluated by the CPT testing to be at a depth of approximately 5 feet below existing grade. Groundwater likely will be encountered during construction depending on the depth of improvements. The groundwater level is anticipated to experience some fluctuation depending on rainfall, tidal cycles, and seasonal variations. At this time, the design groundwater level is recommended to be 5 feet below the existing grade. Building slab subdrains or waterproofing is recommended, as described in the recommendations section of this report, in order to reduce the effects of the shallow groundwater.

Groundwater monitoring wells located in the building footprint are recommended to further evaluate actual groundwater depths, potential construction impacts, and whether dewatering will be necessary. The design groundwater depth may be revised depending on the results of groundwater monitoring.

Surficial Runoff

No evidence of uncontrolled, concentrated, and erosive runoff within the property was observed during our onsite investigation. The proposed development may modify surficial discharge, which should be controlled and conducted offsite by appropriate civil or landscape engineering design to preclude potentially damaging erosion or soil saturation.

Seismic Considerations

Published Studies

One of the principles of seismic analyses and prediction is the premise that earthquakes are more likely to occur on geologically younger faults, and less likely to occur on older faults. For many years, studies have described faults with Holocene movement (within the last 11,000 years) as "active", and faults with documented Pleistocene movement (within the last 1.6 million years) and with undetermined Holocene movement as "potentially active". Informally, many studies have described faults documented to have no Holocene movement as "inactive". Recent geologic and seismic publications are attempting to clarify the nomenclature describing faults to more accurately represent the potential affects from earthquakes.
Reports by the California Division of Mines and Geology indicate faults with documented Holocene or Historic (within the last 200 years) movement should be considered "active". However, "potentially Active" faults are more appropriately characterized in terms of the last period of documented movement. The Fault Activity Map of California (Jennings, C.W.; 1994) defines four categories for onshore "potentially active" faults. The categories are associated with the time of the last displacement evidenced on a given fault and are summarized in Table 1.

Table 1, Definitions of Fault Activity in California

Activity	Category	Recency of Movement
Active	Historic	Within the last 200 years
	Holocene	Within the last 11,000 years
Potentially Active	Late Quaternary	Within the last 700,000 years
	Quaternary	Within the last 1.6 million years
	Late Cenozoic	Possibly within the last 1.6 million years
	Pre-Quaternary	Before the last 1.6 million years

It is important to note these categories embrace all Pre-Holocene faults as "potentially active", and provide no methodology to designate a given fault as "inactive". Although the likelihood of an earthquake or movement to occur on a given fault significantly decreases with inactivity over geologic time, the potential for such events to occur on any fault cannot be eliminated within the current level of understanding.

Local and Regional Faults

The closest published active fault to the site is the offshore extension of the Rose Canyon Fault Zone, approximately 3.4 miles west-southwest (Blake, T.F., 2000, CGS/2004). Other active faults in the vicinity of the site include the Offshore Newport-Inglewood, approximately 13 miles to the northwest; the Coronado Bank, approximately 17 miles to the west; the Elsinore Fault, approximately 29 miles to the northeast; the San Jacinto Fault, approximately 52 miles to the northeast; and the San Andreas Fault, approximately 73 miles to the northeast.

The Rose Canyon fault is published to transect coastal San Diego, extending from the downtown area to offshore of Oceanside, where it joins the Newport-Inglewood zone. Several small to moderate local seismic events in the mid-1980's have been directly assigned to this structure. It is also postulated as the source of the M6.5 11/22/1800 earthquake that damaged numerous areas of San Diego. In this case a M7.2 event on the Rose Canyon fault at approximately 3.4 miles away is calculated as the most significant seismic event to potentially affect this site. Given the potential and the present level of understanding of this structure it is, in our opinion, appropriate to include this fault as a causative seismic feature.

Historic Ground Motion Analyses

Utilizing attenuation relationships (Bozorgnia, et al., 1999; unconstrained/Pleistocene-soil), one can estimate the ground motion history of the site. This study indicates the maximum site acceleration from 1800 to 2004 was approximately 0.543g and occurred during a magnitude 6.5 San Diego earthquake 1.9 miles from the site on November 22, 1800; however, the location of this event is highly speculative and this result may not be reliable. The closest modern event to the site was the M5.3 Coronado Bank earthquake 35 miles to the west on July 13, 1986. This event is calculated to have generated accelerations at the site on the order of 0.02g

It is noted that the estimation of historic peak ground acceleration presented above is provided for the interest of the client and is required by local (City or County) review agencies. The value derived is not directly utilized in structural design of residential structures. Seismic parameters for use by the structural engineer in accordance with 2013 California Building Code in design of the proposed structure(s) are presented in the recommendations portion of this report.

Site Classification for Seismic Design

For the purposes of determining seismic design parameters provided in the Recommendations portion of this report for use by the structural engineer, the upper 100 feet of soil underlying the subject site has been classified in accordance with Section 1613.3.2 of the 2013 California Building Code and Section 20.1 of ASCE 7-10. Given the results of our onsite field investigations, which indicate the site is predominantly underlain by fill, alluvium and bedrock with average N-values between 15 and 50, the site classifies as D. It is postulated that the underlying bedrock is soft to firm rock, and the site may classify as B or C; however, further evaluations of the bedrock would be necessary.

Secondary Seismic Hazards

Other secondary seismic hazards can include deep rupture and shallow ground cracking. With the absence of active faulting onsite, the potential for deep fault rupture is not present. The potential for shallow ground cracking to occur during an earthquake is a possibility at any site, but does not pose a significant hazard to site development.

Appraisal of Liquefaction Potential

Liquefaction is a process by which water-saturated sand sediments lose strength and fail during strong earthquake shaking. Loss of bearing strength from liquefaction can result in deformations, which allow buildings to settle and tilt. Factors known to influence liquefaction include soil type, grain size, relative density, depth to groundwater, and intensity and duration of seismic ground shaking. Lateral spreading is the lateral movement due to liquefaction.

Based on the results of our analysis presented in Appendix D, liquefaction is likely to occur. The total settlement due to liquefaction was calculated to be approximately 1.4- to 2.3-inches. The calculated lateral spreading is approximately 44- to 60-inches. The estimated lateral spreading exceeds the maximum allowed movement of 18-inches according to the State of California for new construction. Recommendations are provided to reduce the potential lateral spreading to approximately 18-inches or less, which will also reduce the calculated liquefaction settlement to approximately 1/2-inch.

Tsunami Appraisal

No specific tsunami analysis has been undertaken in this investigation. However, the "Evaluation of Tsunami Risk to Southern California Coastal Cities" (EERI, 2003) provides a framework for understanding the impact of locally seismic and/or landslide generated tsunamis. Based on the results of this work, typical maximum run-up heights were estimated to vary from 1 to 2 meters in the San Diego area. Because of unknown bathymetry on wavefield interactions and irregular coastal configurations, actual maximum run-up heights could range from 2 to 4 meters, or more.

CONCLUSIONS

1. The proposed development of the subject site is considered geotechnically feasible provided the preliminary recommendations presented herein and any additional recommendations provided in future geotechnical reports are integrated into design, construction, and long-term maintenance of the property. Proposed construction should not affect or be affected by adjacent properties provided appropriate methods and care is utilized during construction.

2. The property is underlain by fill, alluvium and bedrock. The fill is estimated to be approximately 5-10 feet thick, and the alluvium is approximately 30-feet thick. The fill and alluvium are underlain by 25+ feet of weathered bedrock of the Delmar Formation. Based on the high tip resistance and refusal in the CPT soundings, the underlying unweathered bedrock was estimated to be encountered at a depth of approximately 70-feet below grade.

3. Grading of the site is anticipated to include overexcavation of loose fill and alluvium under the proposed building pad and other improvement areas. The removal and

recompaction is recommended to provide at least 1-foot of compacted fill beneath the bottom of the recommended mat slab. The depth of removals will vary depending on the final design grades and proposed construction. Further evaluation of the proposed grading plan and foundation loads will be necessary once more detailed site development plans are available. Remedial grading removal depths are anticipated to range from approximately 3 to 5 feet below existing grade.

4. Based upon our laboratory test results, CPT results, and visual classification, onsite earth materials are expected to consist mainly of sandy soils with an overall very low to low expansion potential, a negligible soil soluble sulfate level, and a severe potential for corrosion of buried metal.

5. No active faults are known to transect the site and, therefore, the site is not expected to be adversely affected by surface rupturing. It will, however, be affected by ground motions from earthquakes during the design life of the structures.

6. Liquefaction analysis performed indicates an estimated seismic settlement of approximately 1.4- to 2.3-inches, and approximately 44- to 60-inches of lateral spreading. Recommendations are provided to reduce the calculated lateral spreading to approximately 18-inches or less, which will also reduce the calculated liquefaction settlement to approximately 1/2-inch.

7. Groundwater was recorded at a depth of approximately 5 feet below ground surface. Groundwater will fluctuate based on rainfall, irrigation, seasonal changes, tidal conditions and other factors, and likely will be a design and construction constraint depending on the depth of improvements and excavations. Groundwater monitoring wells located in the building footprint are recommended prior to construction in order to further evaluate actual groundwater depths, potential construction impacts, and whether dewatering will be necessary based on the planned construction.

8. Building slab subdrains or waterproofing are recommended in order to reduce the effects of the shallow groundwater.

9. Proposed development of the site will modify surface runoff, which should be appropriately controlled with proper civil engineering design and site grading.

10. Based on the depth to groundwater and the potential for liquefaction settlement and lateral spreading, the proposed building is preliminarily recommended to utilize a mat slab foundation embedded in new engineered fill.

11. Preliminary pavement sections are provided herein based on an assumed R-value and traffic index. R-value tests should be performed after grading to confirm the preliminary values used for design. The traffic index used should be confirmed by the project Civil Engineer.

12. This report is a preliminary geotechnical evaluation based on the current site conditions, and conceptual site plan provided. Once more detailed site development plans and grading plans are prepared, additional geotechnical plan reviews should be performed, and revised and/or additional recommendations should be provided, as necessary.

PRELIMINARY RECOMMENDATIONS

Site Preparation and Grading

1. General

Grading should be performed in accordance with the recommendations herein and the Standard Grading Specifications in Appendix E. In general, grading is anticipated to include overexcavation of existing soils to create the building pads, parking lot areas, and other areas for proposed improvements. Processing, overexcavation and recompaction should be observed, tested, and approved in writing by a representative of this firm.

2. Remedial Grading

Grading of the site is anticipated to include overexcavation of loose fill and alluvium under the proposed building pad and other improvement areas. The removal and recompaction is recommended to provide at least 1 foot of compacted fill beneath the bottom of the recommended mat slab. An overexcavation of 2 feet below the planned subgrade is recommended for the parking lot area and other improvements around the proposed building including flatwork and site walls. The depth of removals will vary depending on the final design grades and proposed construction. Remedial grading removal depths are anticipated to range from approximately 3 to 5 feet below existing grade. The material should excavate with conventional equipment.

Saturated conditions may be encountered during overexcavation grading or installation of deeper improvements, and subgrade stabilization may be required. Subgrade stabilization may consist of geotextile filter fabric, crushed rock, and another layer of filter fabric. Typically, a rock layer of at least 1 to 2 feet is required.

3. Removal of Existing Improvements

Existing vegetation, concrete, structures, utilities and/or construction and demolition debris should be removed and disposed of offsite prior to grading.

4. Compaction Standard

Onsite soil materials are anticipated to be suitable for re-use as compacted fill providing they are free of rubble and debris. Fill materials should be in accordance with the recommendations provided in the Standard Grading Specifications, Appendix E.

Removal of oversize cobbles from the excavated material prior to placement as compacted fill may be required, if present. Materials should be placed at approximately 120 percent of optimum moisture content and compacted under the observation and testing of the soil engineer to at least 90 percent of the maximum dry density as evaluated by ASTM D 1557-07. The upper 12-inches of the subgrade for driveway areas, and aggregate base should be compacted to at least 95 percent of their respective maximum dry density.

5. Temporary Construction Slopes

A. Protection of Property

In order to reduce the potential risk to adjoining properties, temporary construction slopes may be constructed no steeper than 1:1 (horizontal:vertical) pending field review by the geologist during grading.

Shoring should be anticipated where space limitations preclude temporary slope layback, or in any location where onsite personnel may be in close proximity to open excavations.

B. Worker Safety

As the safety of onsite personnel affected by the performance of temporary construction slopes is the responsibility of the general contractor, the contractor is recommended to implement the safety practices as defined in Section 1541, Subchapter 4, of Cal/OSHA T8 Regulations (2006).

Per the guidelines, earth materials are anticipated to be classified as Type B or C, and temporary cuts of 1:1 or 1.5:1 may be appropriate. The materials exposed in temporary excavations should be evaluated by the contractor during construction.

Ground Improvement for Lateral Spreading

As discussed above, lateral spreading is calculated to be up to 60-inches; therefore, we recommend ground improvement beneath the proposed building pad. The ground improvement should extend down to an elevation of 8 feet, corresponding to a depth of approximately 16 to 20 feet below existing grades and approximately 15 feet below the proposed finished floor. We recommend that the ground improvement extend 15 feet or more beyond the footprint of the building. Ground improvement in other improvement areas may be considered by the owner to reduce the potential for liquefaction settlement and lateral spreading, if desired.

Types of ground improvement that may be utilized include stone columns, EQ Drains, rammed aggregate piers or pressure grouting. A specialty contractor should be contacted to evaluate and design an appropriate system, based on the anticipated geotechnical conditions. The type of

improvement selected should be reviewed and approved by Stoney-Miller Consultants, Inc. prior to selection, and the design, plans and specifications should be reviewed and approved by Stoney-Miller Consultants, Inc. prior to construction.

Foundations and Slab for New Building

1. General

This evaluation assumes the fundamental period of vibration of proposed structures does not exceed 0.5 second. The structural consultant should review the seismic parameters and the California Building Code to evaluate the seismic design. The proposed structures may be founded entirely in re-compacted and engineered fill materials. This can be accomplished with mat foundation underlain by engineered fill over alluvium.

2. Mat Foundation

Mat foundations which are a minimum of 18-inches thick and founded in recompacted alluvium may be designed for an allowable bearing value of 2,000 pounds per square foot for a minimum embedment of 12-inches below lowest adjacent grade. Design values may be increased one-third for short-term wind or seismic loading. A subgrade modulus of 200 pci may be used in slab design.

Lateral loads may be resisted by passive pressure forces and friction acting at the base of footings. Passive pressure forces may be computed using an equivalent fluid density of 200 pounds per cubic foot for compacted fill. Maximum passive pressures should not exceed 2,000 pounds per square foot. A coefficient of friction for compacted fill of 0.25 may be used in computing the frictional resistance; these values may be combined without reduction.

Settlement of footings in fill due to dead and live loading may be ¾-inch total and 1/2-inch differential, over a distance of 20 feet. Differential settlements during the maximum considered design seismic event are estimated to be 1/2-inch over a distance of 20 feet.

3. Footing Reinforcement

Foundations should be reinforced in accordance with the requirements of the structural engineer.

4. Slab Subdrains

Groundwater present at a shallow depth beneath the site. Groundwater effects on the floor of the building can be reduced by intercepting the groundwater with a subdrain system constructed beneath the slab. The subdrain should be constructed in accordance with the detail presented on Figure 5.

The slab subdrain system should consist of 4-inch diameter perforated pipe graded to flow at one percent in the base of 12-inch deep trench around the perimeter of the slab and spaced in a 10 feet grid pattern within the interior. The trench should be lined with non-woven filter fabric and backfilled with 1/2- or 3/4-inch rock. The slab subdrain piping system should be outlet per the Civil Engineer.

As an alternative to the recommended slab subdrain system, the slab may be waterproofed. Slab waterproofing design and details should be provided by the project architect or waterproofing consultant.

Structural Design of Retaining Walls

1. Lateral Loads

Active pressure forces acting on un-surcharged retaining walls which are backfilled with level, free draining granular material may be computed based on an equivalent fluid pressure of 35 pounds per cubic foot. Restrained walls should be designed for a pressure of 60 pounds per cubic foot equivalent fluid density. Structural surcharges from adjacent structures or improvements, as well as groundwater surcharges, if applicable, should also be considered in retaining wall design.

The site is classified as being in Seismic Design Category D (Type II occupancy, SDs $\geq$ 0.5g, SD1 $\geq$ 0.2g). Seismic design of all new retaining walls may be based on the Mononobe-Okabe method, as updated by Atik and Sitar (2010), using an additional dynamic load of 10 pounds per cubic foot equivalent fluid pressure, acting at 1/3 H above the base of the wall. Final design requirements should be determined by the Structural Engineer.

2. Retaining Wall Foundations

Bearing capacity and lateral resistance may be computed using the parameters presented in the foundation sections above.

3. Wall Excavations

Please refer to the Temporary Construction Slopes section above.

4. Subdrains

It is recommended that the drainage scheme depicted on Figure 6 or an approved alternative be used to reduce the potential for seepage forces behind retaining walls. Retaining walls with a properly installed subdrain need not be designed for hydrostatic water pressure, unless located below the design groundwater level.

Hardscape and Site Wall Design and Construction

Hardscape and site wall improvements may utilize conventional foundations embedded in approved engineered fill designed in accordance with the foundation recommendations presented above. Concrete flatwork should be divided into as nearly square panels as possible. Joints should be provided at maximum 6 feet intervals to give articulation to the concrete panels. Landscaping and planters adjacent to concrete flatwork should be designed in such a manner as to direct drainage away from concrete areas to approved outlets. Planters located adjacent to principal foundation elements should be sealed and drained.

Flatwork elements should be a minimum 5-inches thick (actual) and reinforced with No. 4 bars 18-inches on center both ways.

Conventional Pavement Design

It is anticipated that a new asphalt concrete pavement will be constructed in the parking and driveway areas. The pavement may consist of conventional asphalt pavement, or permeable pavement. Permeable pavement recommendations are presented in the next section. Conventional pavement recommendations are presented below.

The proposed pavement design is based on an assumed R-value of 30, and an assumed Traffic Index (TI) of 6. The R-value of the soil may be confirmed and/or re-evaluated after completion of the parking lot re-grading when the subgrade soil becomes exposed. The actual Traffic Index should be verified by the Project Civil Engineer.

Based on the above parameters, we recommend a preliminary pavement section of 4 inches of asphalt concrete over 6 inches of Caltrans Class 2 Aggregate Base. We recommend that the subgrade below driveway and parking areas be overexcavated as discussed in the grading section above, and compacted to 95 percent or more of the maximum dry density as evaluated by ASTM D 1557-07, for a depth of 12 inches or more. Aggregate based should also be compacted to 95 percent or more of the maximum dry density as evaluated by ASTM D 1557-07. The parking lot improvements should be designed by the Project Civil Engineer.

Permeable Pavement Design

Permeable pavement design may also be based on an assumed R-value of 30, and an assumed Traffic Index (TI) of 5. The R-value of the soil may be confirmed and/or re-evaluated after completion of the parking lot re-grading when the subgrade soil becomes exposed. The actual Traffic Index should be verified by the project civil engineer. The underlying soil may be estimated for percolation design as a Group B hydrologic soil, with a moderate percolation rate potential. Based on our particle size test on a sample obtained from one of our borings, we estimate an infiltration rate of approximately 0.001 inch per hour. Additional field testing, based on the type of infiltration system proposed and the proposed location(s), may be performed to more accurately evaluate soil percolation and/or infiltration rates.

Based on an assumed R-value and the anticipated soil conditions, we recommend a preliminary permeable pavement section of 4 inches of permeable asphalt concrete over 1 inch of 1" x No. 4 aggregate (such as Size #57 Aggregate per ASTM C33) over 12-inches of 1 1/2-inch crushed rock (such as Size #4 Aggregate per ASTM C33).

The upper 6- to 8-inches of the subgrade at the base of the rock zone should be scarified, moisture conditioned and compacted. The moisture content should be within 2 percent of the optimum moisture content and the subgrade should be compacted under the observation and testing of the soil engineer to a relative compaction of 85 to 90 percent of the maximum dry density as evaluated by ASTM D1557-07. A separation filter fabric such as Mirafi 140N or equivalent should be placed at the base of the rock zone excavation between the subgrade and rock. A minimum 8-inch overlap should exist at joints and splices. The rock material should then be placed over the fabric, and rolled/densified with vibratory compaction equipment under the observation of the soil engineer.

Pavement subgrade, crushed rock layers, and permeable pavement should be designed and constructed in general accordance with the County of San Diego Low Impact Development Handbook and requirements of the City and/or Civil Engineer.

Other Parking Lot Improvements

Other parking lot improvements, such as curbs, gutters and concrete swales should be designed and constructed in accordance with City or Public Works standards. We recommend that the subgrade below these improvements be compacted to 95 percent or more of the maximum dry density as evaluated by ASTM D 1557-07, for a depth of 12 inches or more. These improvements should also be underlain by aggregate base or rock, consistent with the respective recommendations above for conventional asphalt pavement or permeable pavement.

Seismic Design

Based on the geotechnical data and site parameters, the following is provided by the USGS (ASCE 7-10) to satisfy the 2013 California Building Code design criteria:

Table 2, Site and Seismic Design Criteria
For 2013 California Building Code

Design Parameters	Recommended Values
Site Class	D
Site Longitude (degrees)	-117.2738
Site Latitude (degrees)	33.0165
Ss (g) B	1.175
S1 (g) B	0.455
SMs (g) D	1.210
SM1 (g) D	0.703
SDs (g) D	0.807
SD1 (g) D	0.469
Fa	1.030
Fv	1.545
Seismic Design Category	D
PGAm	0.496

The Structural Engineer should review the above parameters and the California Building Code to evaluate the seismic design.

Finished Grade and Surface Drainage

Finished grades should be designed and constructed so that no water ponds in the vicinity of footings. Drainage design in accordance with the California Building Code, Section 1804.3, is recommended. Roofs should be guttered and discharge conducted away from the structure in a non-erosive manner as specified by the Project Civil Engineer or Landscape Architect. Proper interception and disposal of onsite surface discharge is presumed to be a matter of civil engineering or landscape architectural design.

Concrete

Recent laboratory test results indicate onsite soils have a negligible amount of sulfates and a severe potential to corrode buried metal elements. It is recommended that a concrete expert be retained to design an appropriate concrete mix. In lieu of retaining a concrete expert, the 2013 California Building Code, Section 1904.1, may be utilized, which refers to ACI 318, Table 4.3.1.

Foundation Plan Review

In order to help review for conformance with the recommendations of this report and as a condition of the use of this report, the undersigned should review final foundation plans and specifications prior to submission of such to the building official for issuance of permits. Such

review is to be performed only for the limited purpose of checking for conformance with the design concept and the information provided herein. This review shall not include review of the accuracy or completeness of details, such as quantities, dimensions, weights or gauges, fabrication processes, construction means or methods, coordination of the work with other trades or construction safety precautions, all of which are the sole responsibility of the Contractor. Stoney-Miller Consultants, Inc.'s review shall be conducted with reasonable promptness while allowing sufficient time in our judgment to permit adequate review. Review of a specific item shall not indicate that Stoney-Miller Consultants, Inc. has reviewed the entire system of which the item is a component. Stoney-Miller Consultants, Inc. shall not be responsible for any deviation from the Construction Documents not brought to our attention in writing by the Contractor. Stoney-Miller Consultants, Inc. shall not be required to review partial submissions or those for which submissions of correlated items have not been received.

Utility Trench Backfill

Utility trench backfill should be placed in accordance with Appendix F, Utility Trench Backfill Guidelines. It is the owners and contractors responsibility to inform subcontractors of these requirements and to notify Stoney-Miller Consultants, Inc. when backfill placement is to begin.

Jobsite Safety

Neither the professional activities of Stoney-Miller Consultants, Inc., nor the presence of Stoney-Miller Consultants, Inc.'s employees and subconsultants at a construction/project site, shall relieve the General Contractor of its obligations, duties and responsibilities including, but not limited to, construction means, methods, sequence, techniques or procedures necessary for performing, superintending and coordination the work in accordance with the contract documents and any health or safety precautions required by any regulatory agencies. Stoney-Miller Consultants, Inc. and its personnel have no authority to exercise any control over any construction contractor or its employees in connection with their work or any health or safety programs or procedures. The General Contractor shall be solely responsible for jobsite safety.

Pre-Grade Meeting

A pre-job conference should be held with representative of the owner, contractor, architect, civil engineer, soils engineer, engineering geologist, and building official prior to commencement of construction to clarify any questions relating to the intent of these recommendations or additional recommendations.

Observation and Testing

The 2013 California Building Code, Section 1705.6, requires geotechnical observation and testing during construction to verify proper removal of unsuitable materials, that foundation excavations are clean and founded in competent material, to test for proper moisture content and proper degree of compaction of fill, to test and observe placement of wall and trench backfill

materials, and to confirm design assumptions. It is noted that the California Building Code requires continuous verification and testing during placement of fill, pile driving, and pier/caisson drilling.

A Stoney-Miller Consultants, Inc. representative shall visit the site at intervals appropriate to the stage of construction, as notified by the Contractor, in order to observe the progress and quality of the work completed by the Contractor. Such visits and observation are not intended to be an exhaustive check or a detailed inspection of the Contractor's work but rather are to allow Stoney-Miller Consultants, Inc., as an experienced professional, to become generally familiar with the work in progress and to determine, in general, if the work is proceeding in accordance with the recommendations of this report.

Stoney-Miller Consultants, Inc. shall not supervise, direct, or have control over the Contractor's work nor have any responsibility for the construction means, methods, techniques, sequences, or procedures selected by the Contractor nor the Contractor's safety precautions or programs in connection with the work. These rights and responsibilities are solely those of the Contractor.

Stoney-Miller Consultants, Inc. shall not be responsible for any acts or omission of the Contractor, subcontractor, any entity performing any portion of the work, or any agents or employees of any of them. Stoney-Miller Consultants, Inc. does not guarantee the performance of the Contractor and shall not be responsible for the Contractor's failure to perform its work in accordance with the Contractor documents or any applicable law, codes, rules or regulations.

These observations are beyond the scope of this investigation and budget and are conducted on a time and material basis. The responsibility for timely notification of the start of construction and ongoing geotechnically involved phases of construction is that of the owner and his contractor. Typically, at least 24 hours' notice is required.

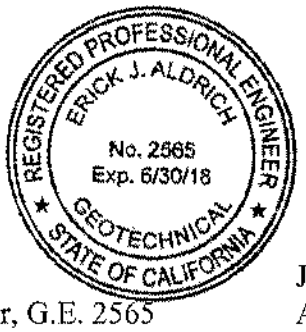
LIMITATIONS

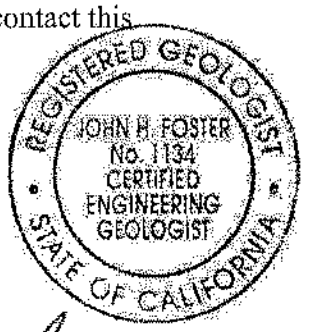
This investigation has been conducted in accordance with generally accepted practice in the engineering geologic and soils engineering field. No further warranty is offered or implied. Conclusions and recommendations presented are based on subsurface conditions encountered and are not meant to imply a control of nature. As site geotechnical conditions may alter with time, the recommendations presented herein are considered valid for a time period of one year from the report date. The recommendations are also specific to the current proposed development. Changes in proposed land use or development may require supplemental investigation or recommendations. Also, independent use of this report in any form cannot be approved unless specific written verification of the applicability of the recommendations is obtained from this firm.

Thank you for this opportunity to be of service. If you have any questions, please contact this office.

Respectfully submitted,

STONEY-MILLER CONSULTANTS, INC.



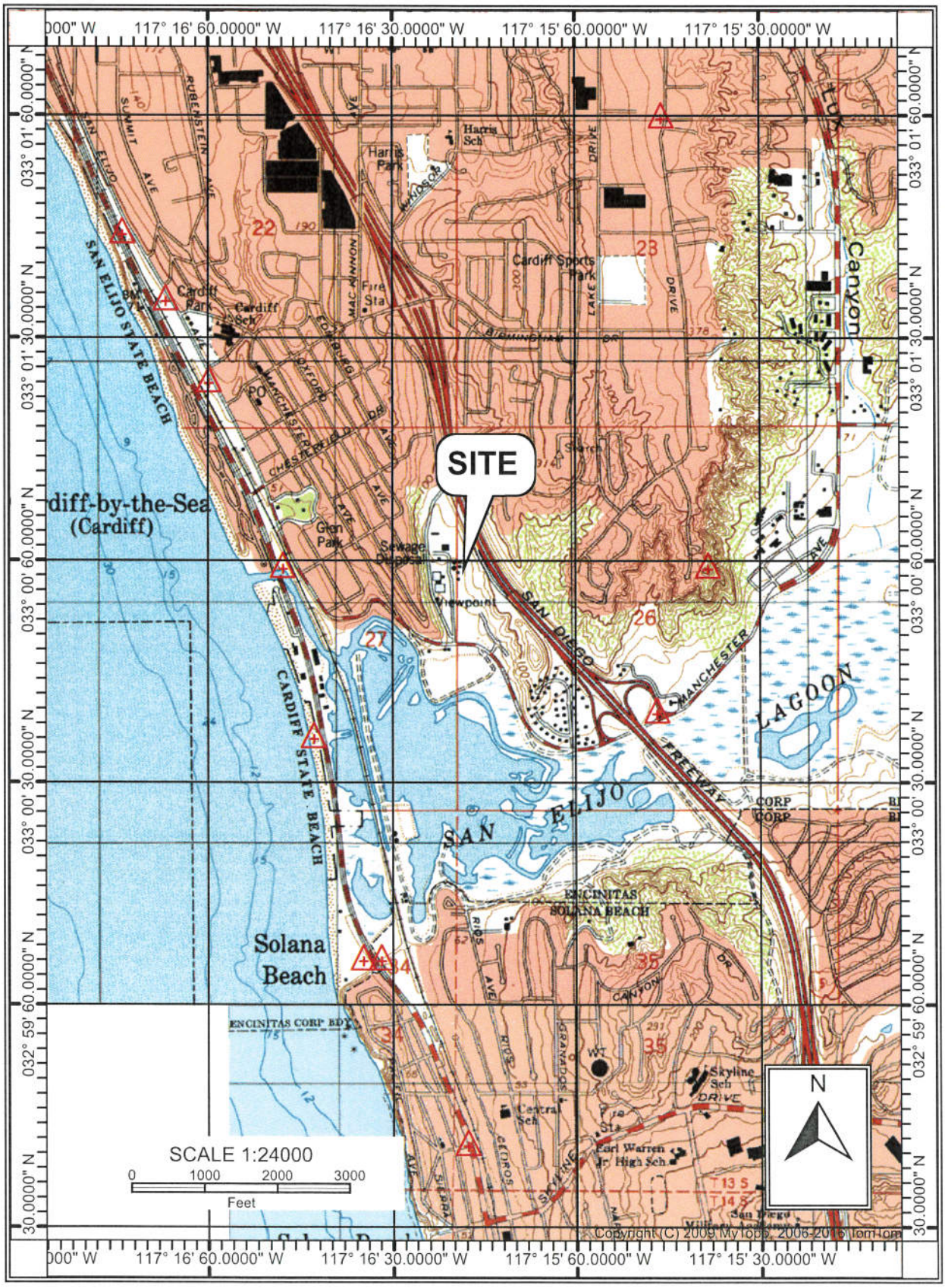


Erick J. Aldrich, GE, RCE
Senior Geotechnical Engineer, G.E. 2565
Registration Expires 6-30-18
Date Signed: / /

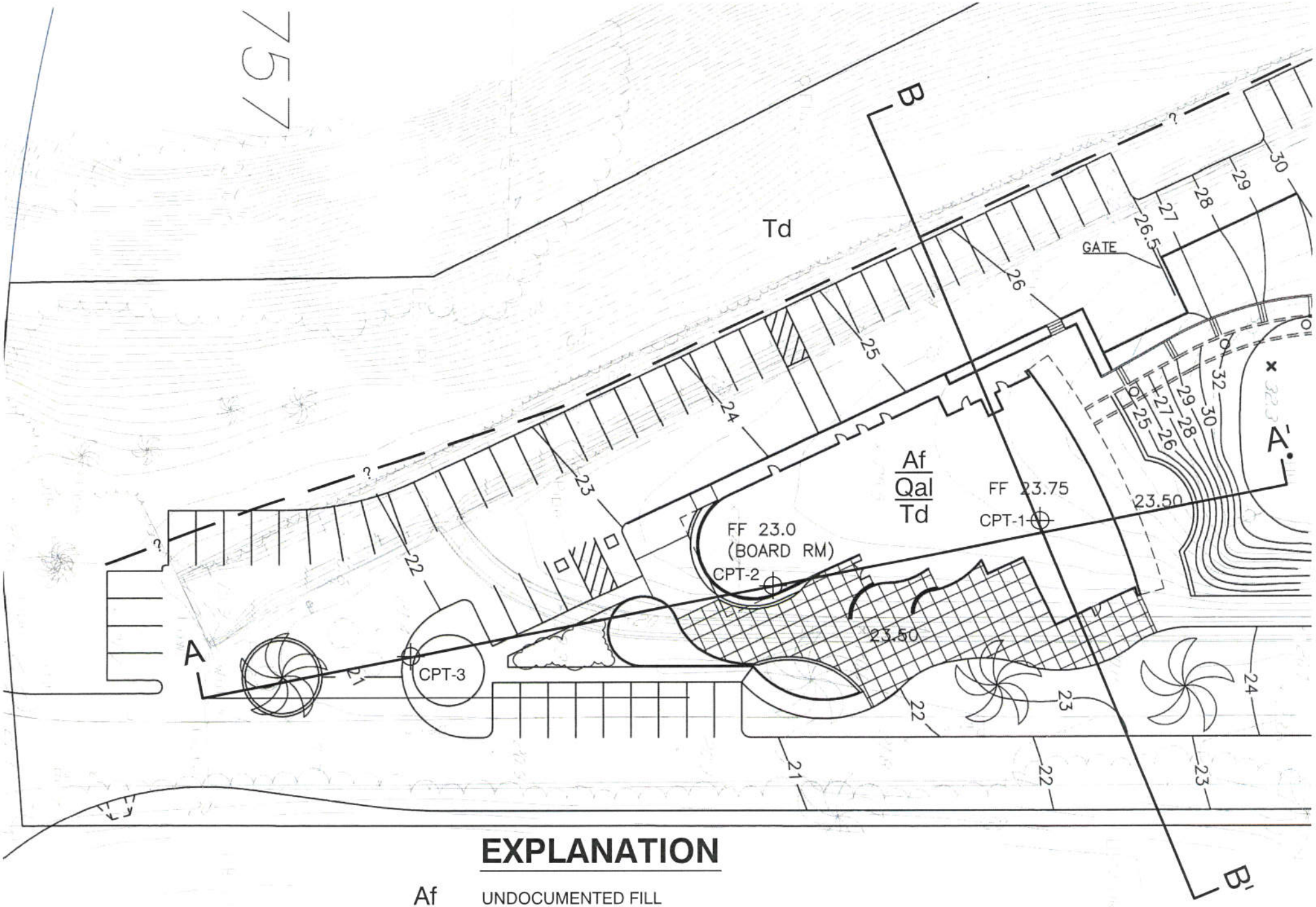
John H. Foster E.G. 1134
Associate Engineering Geologist
Registration Expires 3-31-17

EJA/JF:dd

Distribution: (2) to Addressee



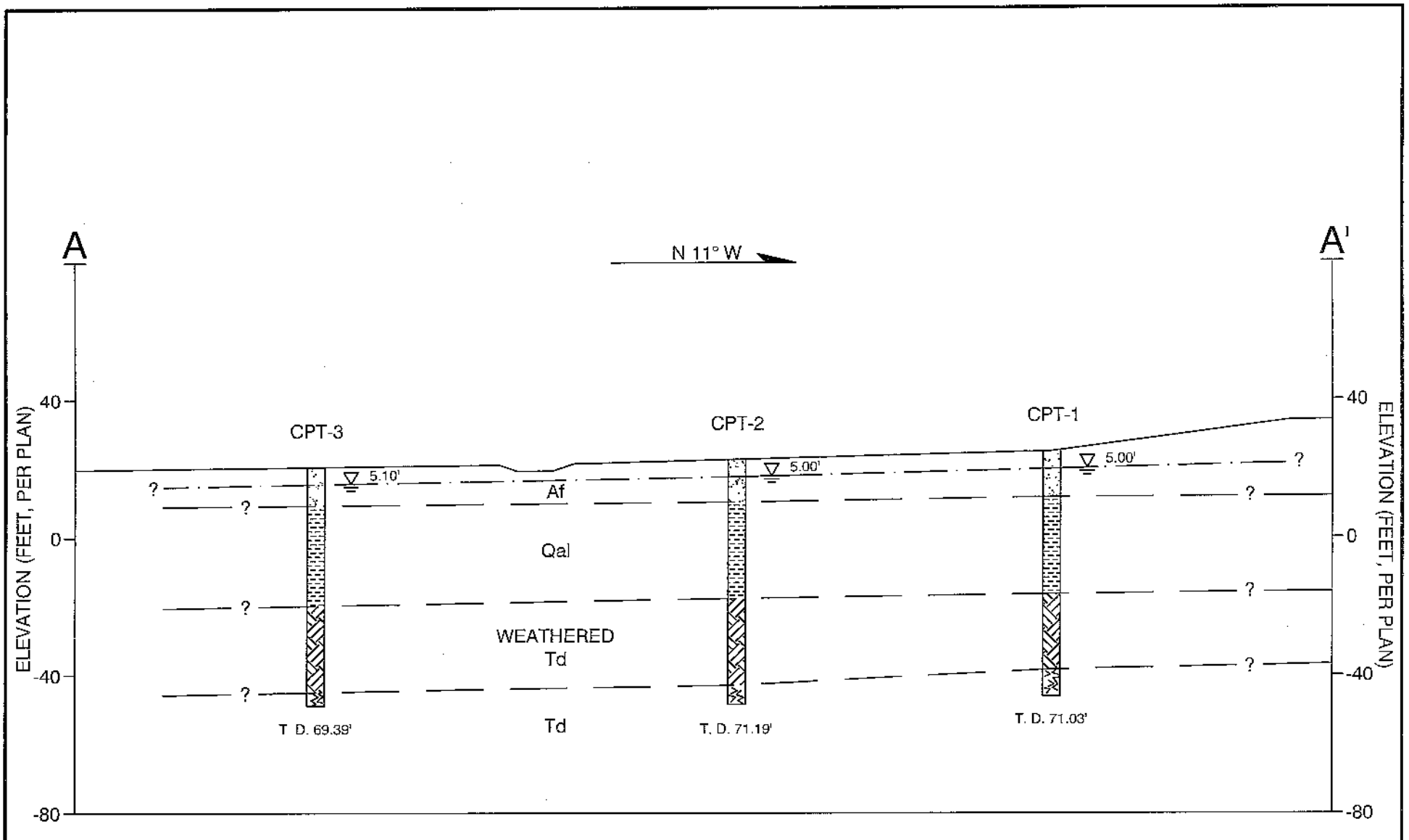
SITE LOCATION MAP
PROJECT NO. 50093-00 DATE: NOVEMBER 2016 FIGURE NO. 1



EXPLANATION

Af	UNDOCUMENTED FILL
Qal	ALLUVIUM DEPOSITS
Td	BEDROCK: DEL MAR FORMATION

GEO
SAN ELIJ



HORIZONTAL AND VERTICAL
SCALE: 1 INCH = 40 FEET

0 40 80
FEET

EXPLANATION

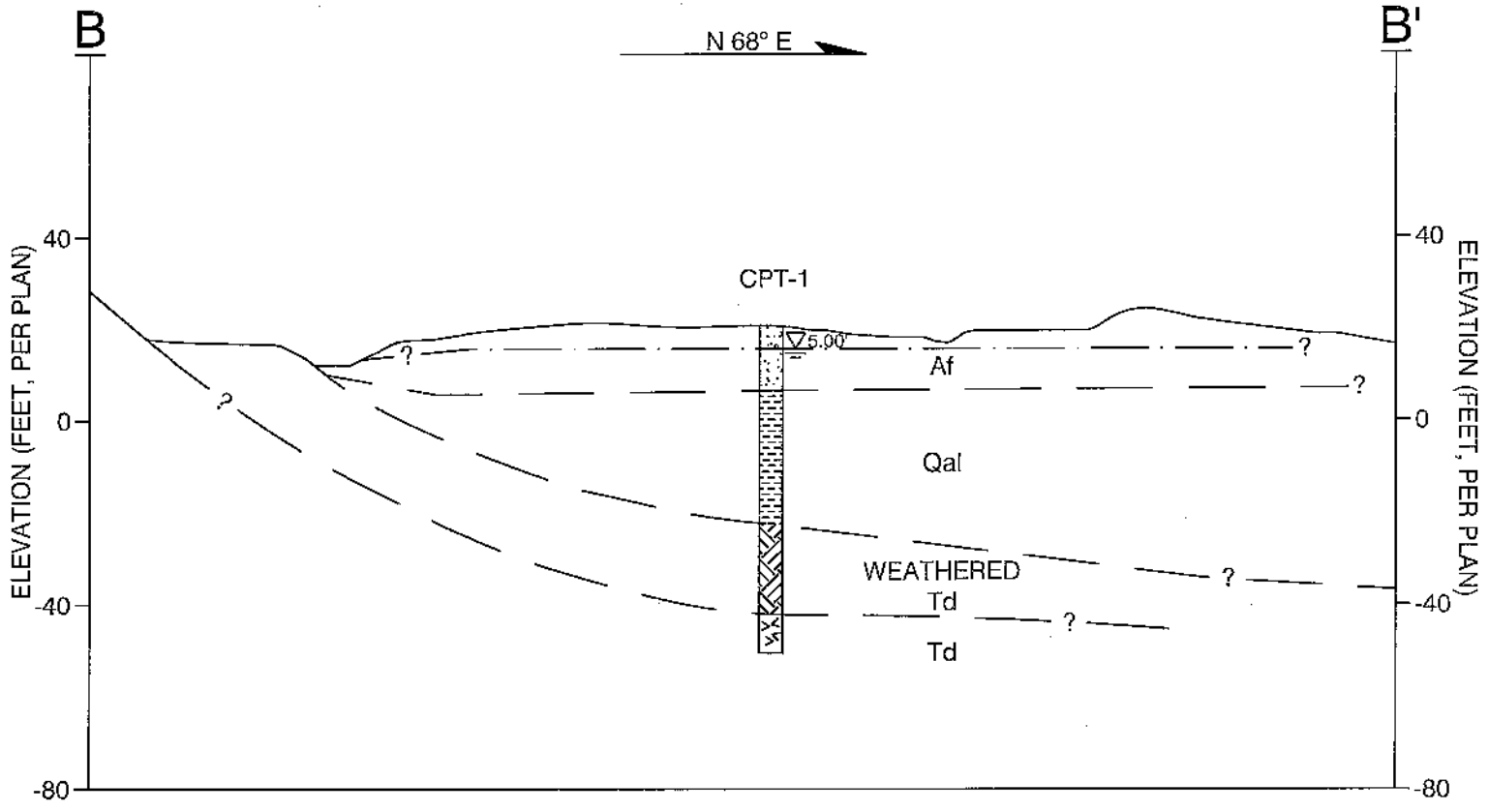
SEE FIGURE 2

GROUNDWATER

GEOTECHNICAL CROSS-SECTION A-A'
SAN ELIJO JOINT POWERS AUTHORITY
2695 MANCHESTER AVENUE
CARDIFF BY THE SEA, CALIFORNIA

STONEY-MILLER CONSULTANTS, INC.

JOB NO.:	REPORT NO.:	DATE:	FIGURE:
50093-00	16-C0582	NOVEMBER 2016	3



HORIZONTAL AND VERTICAL
SCALE: 1 INCH = 40 FEET

0 40 80
FEET

EXPLANATION

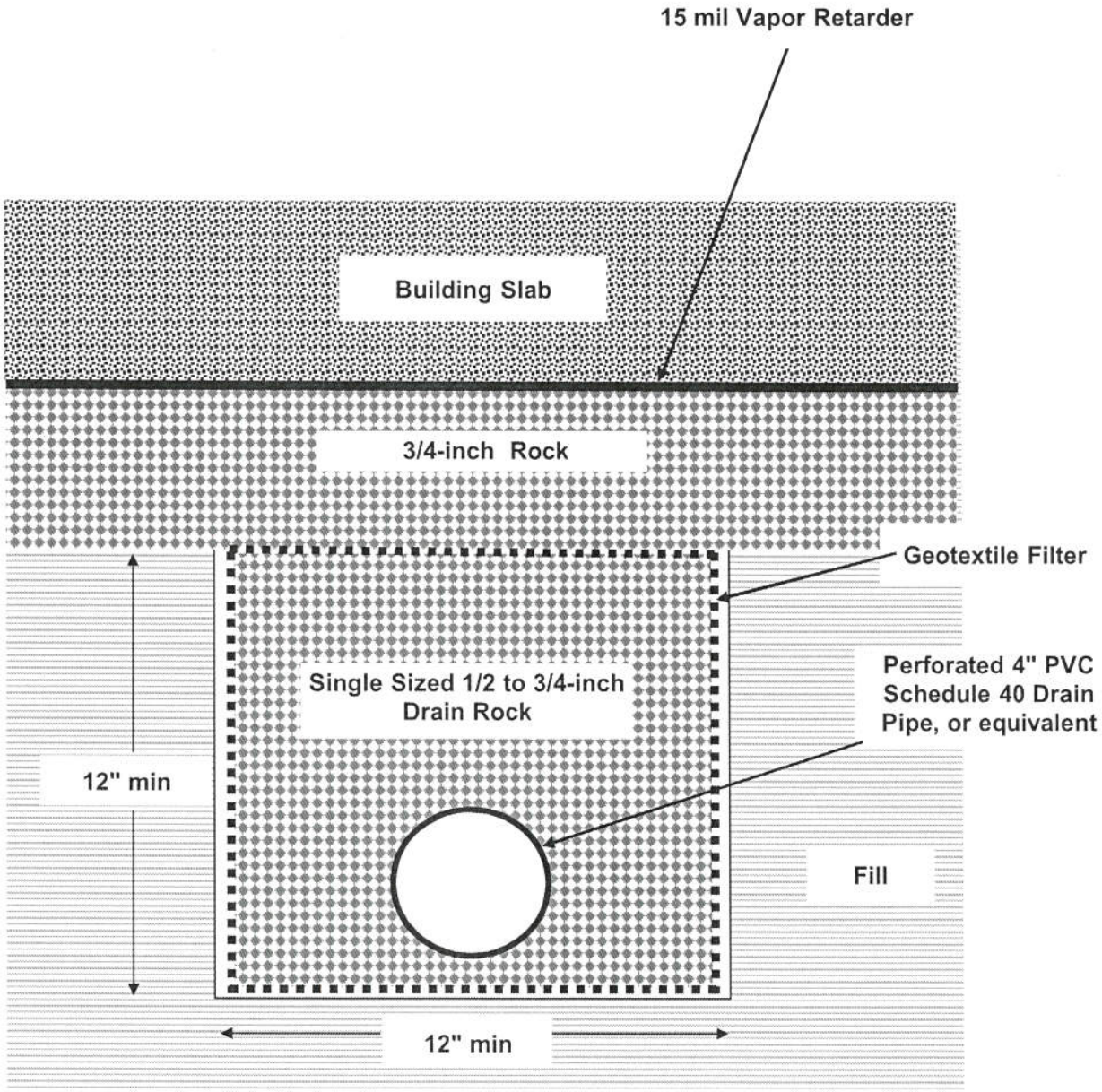
SEE FIGURE 2

GROUNDWATER

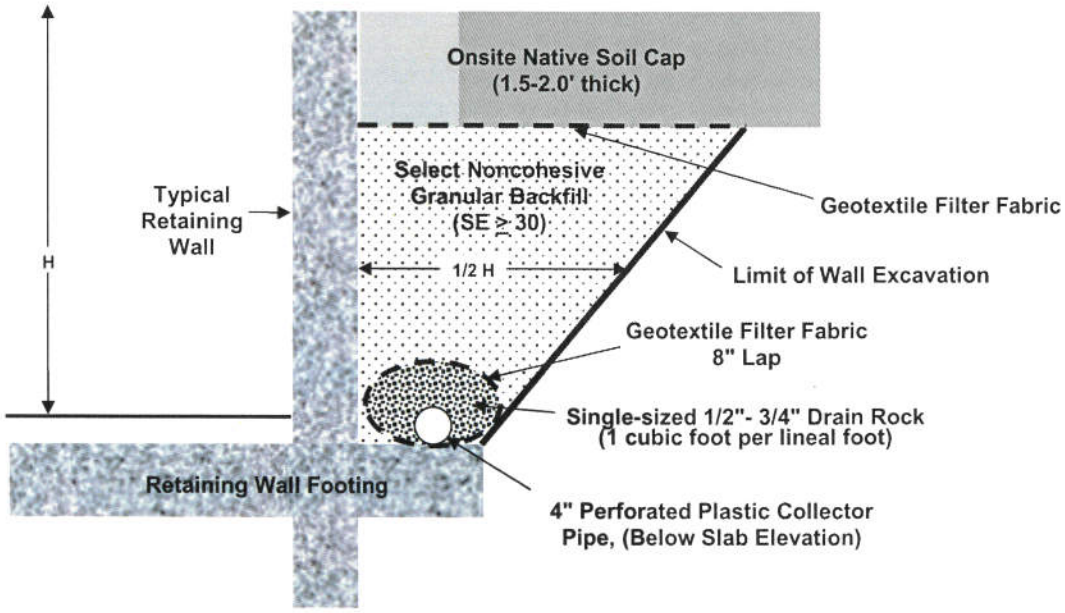
GEOTECHNICAL CROSS-SECTION B-B'
SAN ELIJO JOINT POWERS AUTHORITY
2695 MANCHESTER AVENUE
CARDIFF BY THE SEA, CALIFORNIA

STONEY-MILLER CONSULTANTS, INC.

JOB NO.:	REPORT NO.:	DATE:	FIGURE:
50093-00	16-C0582	NOVEMBER 2016	4



	Slab Subdrain Detail		
	JOB NO.: 50093-00	DATE: November 2016	FIGURE: 5



Notes: This system consists of a geotextile fabric-wrapped gravel envelope. Collection is with a 4-inch diameter perforated plastic pipe embedded in the gravel envelope and tied to a 4-inch diameter non-perforated plastic pipe which discharges at convenient locations. The outlet pipe should be placed such that the flow gradient is not less than 2.0 percent. The geotextile fabric-wrapped gravel envelope should be placed at a similar gradient

All drain pipes should be Schedule 40 PVC or ABS SDR-35. Perforations may be either bored 1/4-inch diameter holes or 3/16-inch slots placed on the bottom one-third of the pipe perimeter. If the pipe is to be bored, a minimum of 10 holes should be uniformly placed per foot of length. If slots are made, they should not exceed 2-1/2 inches in length and should not be closer than 2 inches. Total length of slots should not be less than 50 percent of the pipe length and should be uniformly spaced.

The fabric pore spaces should not exceed equivalent 30 mesh openings or be less than equivalent 100 mesh openings. The fabric should be placed such that a minimum lap of 8-inches exists at all splices.

	Typical Retaining Wall Subdrain Detail		
	JOB NO.: 50093-00	DATE: November 2016	FIGURE: 6

APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

1. Blake, T.F., 2000a, "EQSEARCH, Version 3.0b, A Computer Program for the Estimation of Peak Horizontal Acceleration from California Historical Earthquake Catalogs."

2. Blake, T.F., 2000b, "EQFAULT, Version 3.0b, A Computer Program for the Deterministic Prediction of Peak Horizontal Acceleration from 3-D Fault Sources", User's Manual" (Windows 95/98 Version).

3. Bozorgnia, Y., Campbell, K.W., and Niazi, M. M., 1999, "Vertical Ground Motion: Characteristics, Relationship with Horizontal Component, and Building Code Implications", Proceedings of the SMIP99 Seminar on Utilization of Strong-Motion Data, pp. 23-49, dated September 15.

4. California Building Code, 2013 Edition.

5. California Geological Survey, 2008, "Guidelines for Evaluating and Mitigating Seismic Hazards in California," Special Publication 117A.

6. Eisenberg, L., 1983, "Pleistocene and Eocene Geology of the Encinitas and Rancho Santa Fe Quadrangles", *in* Abbott, P.L. ed., "On the Manner of Deposition of the Eocene Strata in Northern San Diego County", San Diego Association of Geologists Guidebook April 13, 1985.

7. Jennings, Charles W., et al., 1994, "Fault Activity Map of California and Adjacent Areas," California Division of Mines and Geology, Geologic Data Map No. 6.

8. Kennedy, Michael P., and Peterson, Gary L., 1975, "Geology of the San Diego Metropolitan Area, California," California Division of Mines and Geology, Bulletin 200.

9. Kennedy, Michael P., and Tan, Siang S., 2005, "Geologic Map of the Oceanside 30' x 60' Quadrangle, California," California Geological Survey, Regional Geologic Map Series, Map No. 2.

10. Sharp, R.V., 1967, San Jacinto Fault Zone in the Peninsular Ranges of Southern California: Geological Society of America Bulletin, June, v. 78, no. 6, p. 705-730.

11. United States Geological Survey, Earthquake Hazards Program, 2011, "Earthquake Ground Motion Parameter Java Application, Ground Motion Tool", version 5.1.0, dated February 10.

12. Woodford, A.O., Shelton, J.S., Doehring, D.O., and Morton, R.K., 1971, Pliocene-Pleistocene History of the Perris Block, Southern California: Geological Society of America Bulletin, v. 82, p. 3421-3448.

APPENDIX B

TEST EXCAVATION LOGS AND CONE PENETRATION TEST RESULTS

Date(s) Logged: 10/11/2016
Logged By: EJA
Address: 2695 Manchester Ave.; Cardiff, CA

Method of Drilling: Hand Excavated
Drilling Company:

BORING NO.: T-1

Depth (feet)	USCS	Blows/6"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	Description	Geologic Attitude	Depth (feet)
0	SM				10.5		**Fill:** Dark grayish brown, damp to moist, silty SAND; few clay. Brown, moist, silty fine SAND; trace clay.		0
							Total Depth = 2.0 feet No Groundwater Encountered		
5									5
10									10
15									15
20									20
25									25
30									30
35									35

Project No.: 50093-00

LOG OF BORING

Figure No.: B-1

Stoney-Miller Consultants Inc.

Date(s) Logged: 10/11/2016
Logged By: EJA
Address: 2695 Manchester Ave.; Cardiff, CA

Method of Drilling: Hand Excavated
Drilling Company:

BORING NO.: T-2

Depth (feet)	USCS	Blows/6"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	Description	Geologic Attitude	Depth (feet)
0	SM				8.4		**Fill:** Brown, damp to moist, silty fine SAND; few gravel; trace clay.		0
	SP						Medium brown, moist, fine SAND; few silt.		
							Total Depth = 3.0 feet		
							No Groundwater Encountered		
5									5
10									10
15									15
20									20
25									25
30									30
35									35

Project No.: 50093-00

LOG OF BORING

Figure No.: B-2

Stoney-Miller Consultants Inc.

Date(s) Logged: 10/11/2016
Logged By: EJA
Address: 2695 Manchester Ave.; Cardiff, CA

Method of Drilling: Hand Excavated
Drilling Company:

BORING NO.: T-3

Depth (feet)	USCS	Blows/6"	Undisturbed Sample	Bulk Sample	Moisture Content (%)	In-place Dry Density (pcf)	Description	Geologic Attitude	Depth (feet)
0	CH						**Fill:** Dark gray, dark brown and gray, moist, silty fat CLAY.		0
	SW						Brown, moist, gravelly SAND; gravel up to 1-inch, less gravel at 2 feet.		
	SP						Light brown, moist, fine SAND; few silt.		
5							Total Depth = 3.0 feet No Groundwater Encountered		5
10									10
15									15
20									20
25									25
30									30
35									35

Project No.: 50093-00

LOG OF BORING

Figure No.: B-3

Stoney-Miller Consultants Inc.

SEJPA Operations Building

Project ID: Stoney Miller
Data File: SDP(164).cpt
CPT Date: 10/1/2016 8:28:26 AM
GW During Test: 3 ft

Sounding ID: CPT-01
Project No: 50293-00
Cone/Rig: DDG1287

Depth ft	qc PS tsf	qcln PS -	qlncs PS -	qt PS tsf	Slv Stss tsf	pore prss (psi)	Frc. Ratio %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-Nl 60%	Rel Den %	Fric Ang deg	Und Shr tsf	OCR -	Fin Ic %	Ic SBT Indx -	Nk -	Vel Strn %	Cycl Strn %
0.33	81.3	130.5	130.5	81.3	0.2	0.3	0.3	6	clean SAND to silty SAND	125	5.0	16	26	76	48	-	-	5	1.53	16	N/A	N/A
0.49	105.8	169.7	169.7	105.8	0.2	-0.4	0.2	6	clean SAND to silty SAND	125	5.0	21	34	84	48	-	-	5	1.37	16	N/A	N/A
0.66	115.5	185.3	185.3	115.5	0.5	-0.6	0.4	6	clean SAND to silty SAND	125	5.0	23	37	87	48	-	-	5	1.45	16	N/A	N/A
0.82	130.4	209.1	209.1	130.4	0.5	-0.6	0.4	6	clean SAND to silty SAND	125	5.0	26	42	91	48	-	-	5	1.38	16	N/A	N/A
0.98	120.2	192.9	192.9	120.2	0.5	-0.4	0.4	6	clean SAND to silty SAND	125	5.0	24	39	89	48	-	-	5	1.47	16	N/A	N/A
1.15	114.6	183.6	183.6	114.6	0.5	-0.4	0.5	6	clean SAND to silty SAND	125	5.0	23	37	87	48	-	-	5	1.49	16	N/A	N/A
1.31	116.5	186.8	186.8	116.5	0.6	-0.5	0.5	6	clean SAND to silty SAND	125	5.0	25	37	88	48	-	-	5	1.50	16	N/A	N/A
1.48	114.8	184.2	184.2	114.8	0.8	-0.6	0.7	6	clean SAND to silty SAND	125	5.0	23	37	87	48	-	-	5	1.50	16	N/A	N/A
1.64	93.4	149.9	165.9	93.4	1.0	-0.4	1.1	6	clean SAND to silty SAND	125	5.0	19	30	80	48	-	-	8	1.80	16	N/A	N/A
1.80	83.7	134.2	155.0	93.7	1.0	-0.4	1.2	6	clean SAND to silty SAND	125	5.0	17	27	77	48	-	-	9	1.86	16	N/A	N/A
1.97	77.8	124.8	143.0	77.8	0.8	-0.7	1.0	6	clean SAND to silty SAND	125	5.0	16	25	74	48	-	-	9	1.85	16	N/A	N/A
2.13	64.8	103.9	122.1	64.8	0.6	-0.7	1.0	6	clean SAND to silty SAND	125	5.0	13	21	66	48	-	-	10	1.89	16	N/A	N/A
2.30	64.3	103.2	121.8	64.3	0.6	-0.6	1.0	6	clean SAND to silty SAND	125	5.0	13	21	66	48	-	-	10	1.89	16	N/A	N/A
2.46	80.8	129.2	142.0	80.5	0.7	-0.7	0.9	6	clean SAND to silty SAND	125	5.0	16	26	75	48	-	-	8	1.73	16	N/A	N/A
2.62	102.1	163.8	174.7	102.1	1.0	-0.8	1.0	6	clean SAND to silty SAND	125	5.0	20	33	83	48	-	-	7	1.74	16	N/A	N/A
2.79	83.4	135.7	162.8	82.4	1.2	-0.7	1.5	6	clean SAND to silty SAND	125	5.0	17	27	77	48	-	-	11	1.93	16	N/A	N/A
2.96	69.2	111.0	152.4	69.2	1.2	-0.5	1.8	5	silty SAND to sandy SILT	120	3.0	23	37	70	47	-	-	14	2.05	16	N/A	N/A
3.12	81.3	130.4	149.2	81.3	0.9	-0.9	1.1	6	clean SAND to silty SAND	125	5.0	16	26	75	47	-	-	9	1.83	16	N/A	N/A
3.28	99.9	149.6	160.0	99.2	0.8	-0.8	0.8	6	clean SAND to silty SAND	125	5.0	19	30	80	48	-	-	7	1.75	16	N/A	N/A
3.45	113.3	181.7	189.8	113.3	1.1	-0.7	1.0	6	clean SAND to silty SAND	125	5.0	23	36	87	48	-	-	6	1.71	16	N/A	N/A
3.61	118.8	190.5	200.5	118.8	1.3	-0.8	1.1	6	clean SAND to silty SAND	125	5.0	24	38	88	48	-	-	7	1.72	16	N/A	N/A
3.77	139.4	223.5	223.5	139.3	1.2	-1.0	0.9	6	clean SAND to silty SAND	125	5.0	28	45	94	48	-	-	5	1.60	16	N/A	N/A
3.94	159.0	255.0	255.0	159.0	1.1	-1.6	0.7	6	clean SAND to silty SAND	125	5.0	32	51	95	48	-	-	5	1.49	16	N/A	N/A
4.10	187.1	300.0	300.0	187.0	1.3	-1.7	0.7	6	clean SAND to silty SAND	125	5.0	37	60	95	48	-	-	5	1.46	16	N/A	N/A
4.27	245.6	393.9	393.9	245.6	1.7	-1.8	0.7	6	clean SAND to silty SAND	125	5.0	49	79	95	48	-	-	5	1.37	16	N/A	N/A
4.43	277.9	445.8	445.8	277.9	1.8	-2.1	0.7	7	grvly SAND to dense SAND	130	6.0	46	74	95	48	-	-	5	1.33	16	N/A	N/A
4.59	279.2	447.7	447.7	279.1	1.9	-2.0	0.7	6	clean SAND to silty SAND	125	5.0	56	90	95	48	-	-	5	1.33	16	N/A	N/A
4.76	271.9	436.1	436.1	271.9	1.4	-2.2	0.5	7	grvly SAND to dense SAND	130	6.0	45	73	95	48	-	-	5	1.26	16	N/A	N/A
4.92	260.8	418.5	418.3	260.8	1.6	-2.2	0.6	7	grvly SAND to dense SAND	130	6.0	43	70	95	48	-	-	5	1.32	16	N/A	N/A
5.09	233.8	374.9	374.9	233.7	1.3	-2.2	0.6	7	grvly SAND to dense SAND	130	6.0	39	62	95	48	-	-	5	1.33	16	0.00	0.0
5.25	220.2	353.1	353.1	220.1	1.3	-2.2	0.6	6	clean SAND to silty SAND	125	5.0	44	71	95	48	-	-	8	1.36	16	0.00	0.0
5.41	200.4	321.4	321.4	200.3	1.1	-2.1	0.6	6	clean SAND to silty SAND	125	5.0	40	64	95	48	-	-	8	1.36	16	0.00	0.0
5.58	176.2	282.5	282.5	176.1	1.0	-2.0	0.6	6	clean SAND to silty SAND	125	5.0	35	57	95	48	-	-	8	1.40	16	0.00	0.0
5.74	144.6	232.0	232.0	144.6	0.8	-1.8	0.5	6	clean SAND to silty SAND	125	5.0	29	46	95	48	-	-	8	1.46	16	0.00	0.0
5.91	108.8	174.5	174.5	108.7	0.6	-1.6	0.6	6	clean SAND to silty SAND	125	5.0	22	35	85	46	-	-	5	1.57	16	0.00	0.0
6.07	85.4	137.0	137.0	85.4	0.4	-1.5	0.4	6	clean SAND to silty SAND	125	5.0	17	27	77	45	-	-	5	1.59	16	0.41	2.4
6.23	88.1	141.2	141.2	88.0	0.4	-1.5	0.4	6	clean SAND to silty SAND	125	5.0	18	28	78	45	-	-	5	1.59	16	0.53	2.2
6.40	117.3	188.1	188.1	117.2	0.6	-1.8	0.5	6	clean SAND to silty SAND	125	5.0	23	38	88	46	-	-	5	1.51	16	0.00	0.0
6.56	144.1	231.1	231.1	144.0	0.8	-2.0	0.5	6	clean SAND to silty SAND	125	5.0	29	46	95	47	-	-	5	1.46	16	0.00	0.0
6.73	151.0	242.1	242.1	150.9	0.8	-2.1	0.5	6	clean SAND to silty SAND	125	5.0	30	48	95	47	-	-	5	1.44	16	0.00	0.0
6.89	146.1	233.5	233.5	146.1	0.8	-2.1	0.5	6	clean SAND to silty SAND	125	5.0	29	47	95	47	-	-	5	1.46	16	0.00	0.0
7.05	137.5	218.1	218.1	137.4	0.8	-1.9	0.6	6	clean SAND to silty SAND	125	5.0	27	44	93	47	-	-	5	1.49	16	0.00	0.0
7.22	130.5	205.7	205.7	130.5	0.7	-2.2	0.5	6	clean SAND to silty SAND	125	5.0	26	41	91	47	-	-	5	1.49	16	0.00	0.0
7.38	116.9	183.0	183.0	116.8	0.6	-2.7	0.5	6	clean SAND to silty SAND	125	5.0	23	37	87	46	-	-	5	1.52	16	0.00	0.0
7.55	98.0	152.3	152.3	97.9	0.5	-1.6	0.5	6	clean SAND to silty SAND	125	5.0	20	30	81	45	-	-	5	1.60	16	0.27	1.8
7.71	78.2	120.9	123.5	78.2	0.4	-1.5	0.5	6	clean SAND to silty SAND	125	5.0	16	24	73	44	-	-	6	1.68	16	1.43	5.4
7.87	51.7	79.4	86.5	51.7	0.4	-1.2	0.8	6	clean SAND to silty SAND	125	5.0	10	16	59	42	-	-	11	1.93	16	2.41	23.4
8.04	31.1	47.5	87.6	31.1	0.6	-0.9	1.8	5	silty SAND to sandy SILT	120	3.0	10	16	42	39	-	-	24	2.33	16	2.38	47.1
8.20	22.5	34.1	88.6	22.5	0.4	-0.2	2.0	5	silty SAND to sandy SILT	120	3.0	8	11	32	37	-	-	29	2.48	16	2.56	51.2
8.37	27.7	41.8	90.1	27.8	0.5	1.5	1.7	5	silty SAND to sandy SILT	120	3.0	9	14	38	38	-	-	25	2.36	16	2.54	51.2
8.53	49.7	74.8	87.6	49.7	0.3	-2.0	0.6	6	clean SAND to silty SAND	125	5.0	20	15	67	41	-	-	10	1.68	16	2.61	25.8
8.69	34.1	50.8	94.4	34.1	0.5	-0.9	1.6	5	silty SAND to sandy SILT	120	3.0	11	17	45	39	-	-	21	2.27	16	2.45	43.3
8.86	19.0	28.2	90.6	19.1	0.4	0.6	2.3	4	clayy SILT to silty CLAY	115	2.0	10	14	-	-	1.3	9.9	34	2.58	15	2.53	51.2
9.02	16.0	25.7	84.9	16.1	0.3	1.9	2.2	4	clayy SILT to silty CLAY	115	2.0	8	13	-	-	1.1	9.9	35	2.60	15	2.67	51.2
9.19	29.9	49.9	84.9	29.9	0.2	-0.4	0.7	5	silty SAND to sandy SILT	120	3.0	10	15	40	38	-	-	16	2.11	16	3.34	51.2
9.35	58.5	96.1	95.7	58.4	0.1	-2.0	0.3	6	clean SAND to silty SAND	125	5.0	8	11	48	40	-	-	10	1.88	16	3.30	37.6
9.51	45.1	65.4	78.0	45.0	0.1	-1.9	0.3	6	clean SAND to silty SAND	125	5.0	9	13	53	41	-	-	8	1.79	16	3.06	30.7
9.68	50.0	72.1	77.8	50.0	0.1	-2.3	0.3	6	clean SAND to silty SAND	125	5.0	10	14	56	41	-	-	7	1.76	16	2.87	27.5
9.84	38.8	55.7	72.9	38.8	0.2	0.4	0.6	6	clean SAND to silty SAND	125	5.0	8	11	48	40	-	-	13	2.01	16	3.03	38.0
10.01	33.3	47.5	66.3	33.3	0.2	0.8	0.8	6	clean SAND to silty SAND	125	5.0	7	9	42	39	-	-	15	2.07	16	3.27	47.1
10.17	25.3	36.0	60.6	25.1	0.1	-5.8	0.3	6	clean SAND to silty SAND	125	5.0	7	10	44	39	-	-	11	1.92	16	3.53	44.1
10.34	28.0	39.6	64.4	27.9	0.2	-6.5	0.8	5	silty SAND to sandy SILT	120	3.0	9	13	36	38	-	-	18	2.18	16	3.35	51.2
10.50	20.9	29.5	60.5	20.8	0.2	-5.8	0.9	5	silty SAND to sandy SILT	120	3.0	7	10	26	36	-	-	24	2.33	16	3.53	51.2
10.66	38.1	53.3	64.5	38.0	0.1	-4.7	0.4	6	clean SAND to silty SAND	125	5.0	8	11	46	39	-	-	11	1.92	16	3.35	40.6
10.83	51.5	71.5	78.8	51.4	0.2	-3.9	0.4	6	clean SAND to silty SAND	125	5.0	10	14	56	41	-	-	8	1.79	16	2.84	27.3
10.99	56.5	78.1	87.1	56.4	0.2	-3.8	0.5	6	clean SAND to silty SAND	125	5.0	11	16	59	41	-	-	8	1.81	16	2.62	24.0
11.16	69.5	81.8	91.8	69.4	0.3	-3.7	0.5	6	clean SAND to silty SAND	125	5.0	12	16	60	41	-	-	9	1.82	16	2.51	22.4
11.32	58.6	80.2	89.8	58.6	0.3	-3.5	0.5	6	clean SAND to silty SAND	125	5.0	12	16	60	41	-	-	8	1.82	16	2.55	23.0
11.48	59.0	80.4	87.2	59.0	0.2	-3.8	0.4	6	clean SAND to silty SAND	125	5.0	12	16	60	41	-	-	7	1.77	16	2.62	22.9
11.65	55.8	75.6	83.2	55.8	0.2	-3.0	0.4	6	clean SAND to silty SAND	125	5.0	11	15	58	41	-	-	8	1.79	16	2.72	25.2
11.81	55.4	74.6	82.5	55.3	0.2	-2.9	0.4	6	clean SAND to silty SAND	125	5.0	11	15	57	41	-	-	8	1.80	16	2.74	25.7
11.98	56.4	75.6	83.5	56.3	0.2	-1.0	0.4	6	clean SAND to silty SAND	125	5.0	11	15	58	41	-	-	8	1.80	16	2.71	25.2
12.14	57.9	77.3	84.9	57.9	0.2	0.1	0.4	6	clean SAND to silty SAND	125	5.0	12	15	59	42	-	-	8	1.79	16	2.67	24.4
12.30	53.8	71.5	84.7	53.8	0.5	0.2	0.6	6	clean SAND to silty SAND	125	5.0	11	14	56	41	-	-	10	1.90	16	2.68	27.4
12.47	35.6	47.1	88.5	35.6	0.5	1.6	1.4	5	silty SAND to sandy SILT	120	3.0	12	16	42	38	-	-	21	2.28	16	2.83	47.5
12.63	17.4	27.8	-	17.4	0.5	1.7	2.9	4	clayy SILT to silty CLAY	115	2.0	9	14	-	-	1.2	9.9	38	2.65	15	-	-
12.80	13.7	22.0	-	13.8	0.2	2.1	1.9	4	clayy SILT to silty CLAY	115	2.0	7	11	-	-	0.9	7.8	36	2.62	15	-	-
12.96	11.2	17.9	-	11.2	0.2	3.0	1.8	4	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.7	6.2	40	2.70	15	-	-
13.12	10.2	16.3	-	10.2	0.2	4.1	1.9	4	clayy SILT to silty CLAY	115	2.0	5	8	-	-	0.7	5.6	43	2.74	15	-	-
13.29	14.4	18.6	57.1	14.5	0.1	5.3	1.1	5	silty SAND to sandy SILT	120	3.0	5	6	12	32	-	-	33	2.56	16	3.70	51.2
13.45	18.1	23.4	56.0	18.2	0.2	2.6	0.9	5	silty SAND to sandy SILT	120	3.0	6	8	19	34	-	-	27	2.42	16	3.76	51.2
13.62	19.3	24.8	53.5	19.2	0.1	-1.6	0.7	5	silty SAND to sandy SILT	120	3.0	6	8	21	34	-	-	25	2.36	16	3.90	51.2
13.78	14.3	20.6	66.6	14.3	0.2	0.7	1.5	4	clayy SILT to silty CLAY	115	2.0	7	10	-	-	1.0	7.7	35	2.58	15	3.95	51.2
13.94	17.2	21.9	60.2	17.2	0.2	0.4	1.1	5	silty SAND to sandy SILT	120	3.0	6	7	17	33	-	-	31	2.39	16	3.34	51.2
14.11	25.8	32.9	52.6	25.8	0.1	-0.7	0.5	5	silty SAND to sandy SILT	120	3.0	9	11	30	36	-	-	18	2.17	16	3.96	51.2
14.27	43.5	55.1	62.2	43.5	0.1	-2.2	0.2	6	clean SAND to silty SAND	125	5.0	9	11	47	39	-	-	9	1.83	16	3.45	36.7
14.44	53.8	67.9	75.2	53.9	0.2	-2.1	0.3	6	clean SAND to silty SAND	125	5.0	11	14	54	42	-	-	8	1.80	16	2.95	29.9
14.60	57.6	72.3	82.4	57.6	0.3	-2.0	0.5	6	clean SAND to silty SAND	125	5.0	12	14	56	42	-	-	9	1.84	16	2.77	26.9
14.76	52.0	64.9	80.7	51.9	0.3	-1.9	0.6	6	clean SAND to silty SAND	125	5.0	10	13	53	40	-	-	12	1.93	16	2.79	31.0
14.93	32.9	40.9	77.6	32.9	0.4	-0.7	1.2	5	silty SAND to sandy SILT	120	3.0	11	14	38	37	-	-	22	2.28	16	2.88	51.2
15.09	23.0	28.5	75.5	23.0	0.3	0.4	1.6	5	silty SAND to sandy SILT	120	3.0	8	9	26	35	-	-	30	2.48	16	2.84	51.2
15.26	19.7	22.0	-	19.8	0.3	3.5	2.2	4	clayy SILT to silty CLAY	115	2.0	7	11	-	-	0.8	6.8	39	2.67	15	-	-
15.42	18.3	21.5	-	18.4	0.2	4.2	1.9	4	clayy SILT to silty CLAY	115	2.0	7	11	-	-	0.8	6.6	37	2.66	15	-	-

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

Middle Earth Geo Testing

Project ID: Stoney Miller
Data File: SDF(154).cpt
CPT Date: 10/11/2016 8:28:26 AM
GW During Test: 5 ft

Sounding ID: CPT-01
Project No: 50093-03
Cone/Rig: DOGI281

Depth ft	qc PS tsf	qcln PS -	qInes PS -	qt PS tsf	Slv Stss tsf	pore pres (psi)	Frct Ratio %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-Nl 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	Fin Ic %	Ic SBT Indx	Nk -	Vol Strn %	Cycl SStn %
15.58	14.3	17.6	54.5	14.4	0.1	5.7	1.0	5	silty SAND to sandy SILT	120	3.0	5	6	10	32	-	-	34	2.56	16	3.84	51.2
15.75	11.6	18.5	-	11.7	0.2	4.6	2.0	4	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.8	3.5	41	2.72	15	-	-
15.91	19.9	24.2	76.7	20.0	0.3	5.0	1.8	4	clayy SILT to silty CLAY	115	2.0	10	12	-	-	1.4	9.8	34	2.57	15	2.90	51.2
16.09	24.4	29.6	64.4	24.4	0.2	8.3	1.0	5	silty SAND to sandy SILT	120	3.0	8	10	27	38	-	-	25	2.37	16	3.36	51.2
16.24	14.8	19.8	-	14.9	0.2	2.6	1.6	4	clayy SILT to silty CLAY	115	2.0	7	10	-	-	1.0	7.1	36	2.62	15	-	-
16.40	12.0	18.5	-	12.1	0.2	3.0	2.1	4	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.8	5.6	41	2.72	15	-	-
16.57	12.2	18.6	-	12.2	0.2	3.1	1.9	4	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.8	5.6	40	2.69	15	-	-
16.73	11.2	17.0	-	11.2	0.2	3.2	1.9	4	clayy SILT to silty CLAY	115	2.0	6	8	-	-	0.7	5.1	42	2.73	15	-	-
16.90	11.4	17.1	-	11.4	0.2	3.3	1.8	4	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.8	5.1	41	2.71	15	-	-
17.06	12.5	18.7	-	12.6	0.2	3.3	1.7	4	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.8	5.7	39	2.67	15	-	-
17.23	12.6	18.8	-	12.7	0.3	3.3	2.4	4	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.8	5.7	43	2.75	15	-	-
17.39	16.1	20.9	-	16.2	0.3	3.4	1.7	4	clayy SILT to silty CLAY	115	2.0	8	10	-	-	1.1	7.4	36	2.62	15	-	-
17.55	16.3	26.8	-	18.4	0.5	3.4	2.6	4	clayy SILT to silty CLAY	115	2.0	9	13	-	-	1.2	8.4	37	2.64	15	-	-
17.72	19.4	28.3	-	19.5	0.6	3.3	3.0	4	clayy SILT to silty CLAY	115	2.0	10	14	-	-	1.3	8.8	38	2.68	15	-	-
17.88	21.7	27.7	-	21.8	0.5	3.8	2.5	4	clayy SILT to silty CLAY	115	2.0	11	14	-	-	1.5	9.9	36	2.67	15	-	-
18.05	28.0	32.7	89.5	28.1	0.5	1.2	2.0	5	silty SAND to sandy SILT	120	5.0	9	11	30	35	-	-	30	2.49	16	2.86	51.2
18.21	36.9	42.9	88.6	36.8	0.6	-3.8	1.6	5	silty SAND to sandy SILT	120	3.0	12	14	39	37	-	-	24	2.33	16	2.58	51.2
18.37	20.5	25.8	81.8	20.4	0.4	-5.1	2.0	4	clayy SILT to silty CLAY	115	2.0	10	13	-	-	1.4	9.1	34	2.57	15	2.76	51.2
18.54	11.6	18.7	-	11.8	0.3	-4.9	3.0	3	silty CLAY to CLAY	115	1.5	8	11	-	-	0.9	5.0	49	2.85	15	-	-
18.70	11.1	15.6	-	11.3	0.3	-4.8	2.5	4	clayy SILT to silty CLAY	115	2.0	6	8	-	-	0.7	4.6	48	2.83	15	-	-
18.87	11.6	16.2	-	11.8	0.3	-4.7	3.0	3	silty CLAY to CLAY	115	1.5	8	11	-	-	0.8	4.8	50	2.86	15	-	-
19.03	14.6	20.2	-	14.8	0.5	-4.6	3.5	3	silty CLAY to CLAY	115	1.5	10	13	-	-	1.0	6.1	47	2.82	15	-	-
19.19	22.2	30.6	-	22.4	0.7	-4.6	3.5	4	clayy SILT to silty CLAY	115	2.0	11	15	-	-	1.5	9.6	39	2.67	15	-	-
19.36	36.5	41.3	100.9	36.2	0.8	-5.5	2.2	5	silty SAND to sandy SILT	120	3.0	12	14	38	37	-	-	28	2.43	16	2.82	51.2
19.52	59.2	67.1	86.1	59.1	0.4	-7.1	0.6	6	clean SAND to silty SAND	125	5.0	12	13	54	39	-	-	13	1.99	16	2.64	29.7
19.69	80.5	90.9	90.9	80.9	0.2	-7.9	0.2	6	clean SAND to silty SAND	125	5.0	16	18	64	41	-	-	5	1.69	16	2.53	19.5
19.85	73.3	82.5	93.7	73.1	0.4	-8.2	0.6	6	clean SAND to silty SAND	125	5.0	15	17	61	40	-	-	8	1.84	16	2.66	22.2
20.01	34.4	38.8	84.6	34.2	0.5	-7.9	1.6	5	silty SAND to sandy SILT	120	3.0	11	13	26	36	-	-	25	2.37	16	2.68	51.2
20.18	17.5	23.2	-	17.4	0.4	-6.7	2.2	4	clayy SILT to silty CLAY	115	2.0	9	12	-	-	1.2	7.1	38	2.64	15	-	-
20.34	13.0	18.5	51.0	12.8	0.1	-6.5	0.9	4	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.9	5.1	35	2.60	15	4.06	51.2
20.51	11.4	16.6	-	11.3	0.1	-6.3	0.7	4	clayy SILT to silty CLAY	115	2.0	6	7	-	-	0.8	4.4	36	2.61	15	-	-
20.67	11.7	15.2	-	11.5	0.1	-6.2	1.4	4	clayy SILT to silty CLAY	115	2.0	6	8	-	-	0.8	4.5	40	2.70	15	-	-
20.83	13.2	17.1	-	13.1	0.2	-6.2	2.0	4	clayy SILT to silty CLAY	115	2.0	7	9	-	-	0.9	5.1	43	2.74	15	-	-
21.00	12.0	15.5	-	11.9	0.3	-6.2	2.9	3	silty CLAY to CLAY	115	1.5	8	10	-	-	0.8	4.6	51	2.88	15	-	-
21.16	11.9	15.3	-	11.8	0.3	-6.2	3.1	3	silty CLAY to CLAY	115	1.5	8	10	-	-	0.9	4.5	52	2.90	15	-	-
21.33	12.0	15.2	-	11.9	0.4	-6.2	3.4	3	silty CLAY to CLAY	115	1.5	8	10	-	-	0.8	4.5	53	2.92	15	-	-
21.49	11.8	14.7	-	11.6	0.3	-6.1	3.2	3	silty CLAY to CLAY	115	1.5	8	10	-	-	0.8	4.3	53	2.92	15	-	-
21.65	11.7	14.8	-	11.6	0.3	-6.0	2.8	3	silty CLAY to CLAY	115	1.5	8	10	-	-	0.8	4.3	51	2.88	15	-	-
21.82	12.2	15.3	-	12.0	0.3	-6.0	3.2	3	silty CLAY to CLAY	115	1.5	8	10	-	-	0.8	4.5	52	2.90	15	-	-
21.98	12.4	15.5	-	12.3	0.5	-6.0	4.6	3	silty CLAY to CLAY	115	1.5	8	10	-	-	0.8	4.6	58	3.00	15	-	-
22.15	15.1	18.8	-	15.0	0.4	-6.0	2.8	4	clayy SILT to silty CLAY	115	2.0	8	9	-	-	1.0	5.6	46	2.79	15	-	-
22.31	13.0	16.0	-	12.9	0.3	-6.0	2.9	3	silty CLAY to CLAY	115	1.5	8	11	-	-	0.9	4.7	50	2.86	15	-	-
22.47	11.5	14.2	-	11.4	0.2	-6.0	2.9	4	clayy SILT to silty CLAY	115	2.0	6	7	-	-	0.8	4.7	48	2.86	15	-	-
22.64	12.3	15.0	-	12.2	0.3	-5.9	2.9	3	silty CLAY to CLAY	115	1.5	8	10	-	-	0.8	4.4	51	2.88	15	-	-
22.80	15.4	18.7	-	15.3	0.4	-5.9	2.6	4	clayy SILT to silty CLAY	115	2.0	8	9	-	-	1.0	5.6	44	2.77	15	-	-
22.97	22.4	22.9	75.8	20.3	0.3	-5.9	1.8	4	clayy SILT to silty CLAY	115	2.0	10	11	-	-	1.4	7.6	35	2.60	15	2.93	51.2
23.13	18.6	22.4	-	18.5	0.4	-6.1	2.1	4	clayy SILT to silty CLAY	115	2.0	9	11	-	-	1.3	6.8	38	2.65	15	-	-
23.30	33.8	35.9	60.2	33.7	0.2	-6.1	0.7	5	silty SAND to sandy SILT	120	3.0	11	12	33	35	-	-	19	2.20	16	3.54	51.2
23.46	60.1	68.7	69.6	60.0	0.1	-6.6	0.2	6	clean SAND to silty SAND	125	5.0	12	13	52	39	-	-	7	1.76	16	3.18	31.7
23.62	46.7	53.3	75.9	46.6	0.4	-6.8	0.9	5	silty SAND to sandy SILT	120	3.0	16	16	44	37	-	-	17	2.14	16	2.93	44.8
23.79	21.7	22.8	69.7	21.5	0.3	-6.6	1.5	4	clayy SILT to silty CLAY	115	2.0	11	11	-	-	1.6	7.8	33	2.55	15	3.14	51.2
23.95	12.8	15.0	-	12.7	0.3	-6.4	2.4	4	clayy SILT to silty CLAY	115	2.0	6	8	-	-	0.8	4.4	48	2.84	15	-	-
24.12	9.8	11.4	-	9.7	0.2	-6.2	1.8	4	clayy SILT to silty CLAY	115	2.0	5	6	-	-	0.6	3.2	51	2.93	15	-	-
24.28	12.7	14.7	-	12.6	0.4	-6.1	3.4	3	silty CLAY to CLAY	115	1.5	8	10	-	-	0.8	4.3	54	2.94	15	-	-
24.44	17.5	20.2	-	17.4	0.4	-6.1	2.7	4	clayy SILT to silty CLAY	115	2.0	9	10	-	-	1.2	6.1	44	2.78	15	-	-
24.61	58.9	61.3	78.0	58.8	0.4	-7.0	0.6	6	clean SAND to silty SAND	125	5.0	12	12	51	38	-	-	12	1.98	16	2.86	33.2
24.77	77.7	80.6	82.4	77.6	0.2	-7.6	0.2	6	clean SAND to silty SAND	125	5.0	15	16	60	42	-	-	6	1.68	16	2.74	22.8
24.94	75.4	78.0	79.5	76.3	0.1	-8.3	0.2	6	clean SAND to silty SAND	125	5.0	15	16	59	42	-	-	5	1.65	16	2.82	23.6
25.10	53.3	54.9	73.7	53.1	0.3	-7.5	0.7	6	clean SAND to silty SAND	125	5.0	11	11	47	36	-	-	14	2.03	16	3.00	36.8
25.26	28.1	28.9	83.9	27.9	0.2	-7.4	0.6	5	silty SAND to sandy SILT	120	3.0	9	10	26	34	-	-	22	2.27	16	3.88	51.2
25.43	17.1	19.0	-	16.9	0.3	-7.3	1.6	4	clayy SILT to silty CLAY	115	2.0	9	10	-	-	1.1	5.7	38	2.65	15	-	-
25.59	16.4	17.3	57.3	16.3	0.2	-7.2	1.1	4	clayy SILT to silty CLAY	115	2.0	9	9	-	-	1.1	5.4	35	2.60	15	3.69	51.2
25.76	12.3	14.3	-	12.2	0.3	-7.2	3.0	3	silty CLAY to CLAY	115	1.5	9	13	-	-	0.8	4.1	53	2.92	15	-	-
25.92	13.7	17.2	-	13.5	0.3	-7.1	2.2	4	clayy SILT to silty CLAY	115	2.0	8	9	-	-	1.0	5.1	44	2.77	15	-	-
26.09	48.3	58.1	74.5	49.1	0.4	-7.4	0.8	5	silty SAND to sandy SILT	120	3.0	16	17	44	37	-	-	16	2.12	16	2.98	44.1
26.25	65.9	66.8	86.3	65.8	0.5	-7.6	0.8	6	clean SAND to silty SAND	125	5.0	13	13	54	38	-	-	13	1.93	16	2.84	29.9
26.41	73.2	73.9	97.4	73.0	0.7	-8.0	1.0	6	clean SAND to silty SAND	125	5.0	15	15	57	39	-	-	13	2.01	16	2.89	26.1
26.58	77.6	78.2	88.9	77.5	0.4	-8.7	0.5	6	clean SAND to silty SAND	125	5.0	16	16	59	42	-	-	9	1.84	16	2.57	24.0
26.74	81.5	81.9	88.7	81.3	0.5	-8.7	0.4	6	clean SAND to silty SAND	125	5.0	16	16	60	42	-	-	7	1.77	16	2.58	22.4
26.90	76.5	76.6	91.6	76.3	0.2	-8.8	0.3	6	clean SAND to silty SAND	125	5.0	15	15	58	39	-	-	7	1.74	16	2.76	24.7
27.07	62.9	62.8	83.6	62.7	0.2	-8.7	0.3	6	clean SAND to silty SAND	125	5.0	13	13	52	38	-	-	8	1.80	16	3.15	32.2
27.23	34.2	34.1	62.7	34.1	0.3	-8.7	0.8	5	silty SAND to sandy SILT	120	3.0	11	11	32	35	-	-	21	2.26	16	3.42	51.2
27.40	17.5	18.3	-	17.3	0.4	-8.5	2.6	4	clayy SILT to silty CLAY	115	2.0	9	9	-	-	1.2	5.5	46	2.80	15	-	-
27.56	11.0	11.4	-	10.8	0.3	-8.4	3.4	3	silty CLAY to CLAY	115	1.5	7	8	-	-	0.7	3.2	61	3.04	15	-	-
27.72	21.4	21.2	56.7	21.2	0.2	-8.3	0.9	5	silty SAND to sandy SILT	120	3.0	7	7	16	31	-	-	30	2.48	16	3.72	51.2
27.89	13.5	13.9	-	13.3	0.2	-8.5	1.5	4	clayy SILT to silty CLAY	115	2.0	7	7	-	-	0.8	4.0	44	2.76	15	-	-
28.05	9.8	10.0	-	9.6	0.3	-8.3	3.8	3	silty CLAY to CLAY	115	1.5	7	7	-	-	0.6	2.7	67	3.12	15	-	-
28.22	15.5	15.9	-	15.4	0.3	-8.3	2.5	4	clayy SILT to silty CLAY	115	2.0	8	8	-	-	1.0	4.7	47	2.82	15	-	-
28.38	31.5	30.8	48.7	31.3	0.1	-8.4	0.4	5	silty SAND to sandy SILT	120	3.0	11	10	28	34	-	-	18	2.16	16	4.21	51.2
28.54	19.6	19.8	-	19.4	0.3	-8.3	1.3	4	clayy SILT to silty CLAY	115	2.0	10	10	-	-	1.3	6.0	39	2.68	15	-	-
28.71	18.8	19.0	-	18.6	0.6	-8.3	3.3	3	silty CLAY to CLAY	115	1.5	13	13	-	-	1.3	5.7	50	2.87	15	-	-
28.87	40.6	39.6	96.8	40.4	0.8	-8.4	2.0	5	silty SAND to sandy SILT	120	3.0	14	13	36	35	-	-	28	2.42	16	2.40	51.2
29.04	62.3	60.5	80.8	62.1	0.5	-8.6	0.8	6	clean SAND to silty SAND	125	5.0	12	12	50	38	-	-	14	2.03	16	2.78	33.6
29.20	74.8	72.5	77.7	74.6	0.2	-8.8	0.3	6	clean SAND to silty SAND	125	5.0	15	14	56	39	-	-	7	1.75	16	2.87	26.8
29.36	72.9	70.5	76.8	72.7	0.2	-8.8	0.3	6	clean SAND to silty SAND	125	5.0	15	14	55	39	-	-	8	1.78	16	2.90	27.9
29.53	55.7	53.7	68.6	55.5	0.3	-8.8	0.5	6	clean SAND to silty SAND	125	5.0	11	11	46	37	-	-	12	1.98	16	3.18	40.2
29.69	31.1	29.9	57.3	30.9	0.3	-8.6	1.1	5	silty SAND to sandy SILT	120	3.0	10	10	27	34	-	-	26	2.38	16	3.23	51.2
29.86	16.3	15.8	-	16.2	0.3	-8.5	2.0	4	clayy SILT to silty CLAY	115	2.0	8	8	-	-	1.1	4.7	44	2.77	15	-	-
30.02	11.3	10.9	-	11.1	0.1	-8.3	1.1	4	clayy SILT to silty CLAY	115	2.0	6	6	-	-	0.7	3.0	57	2.82	15	-	-
30.19	9.9	9.6	-	9.7	0.1	-8.5	0.9	4	clayy SILT to silty CLAY	115	2.0	5	5	-	-	0.6	2.6	48	2.64	15	-	-
30.35	8.9	8.6	-	8.7	0.1	-8.4	1.7	3	silty CLAY to CLAY	115	1.5	6	8	-	-	0.6	2.2	59	3.01	15	-	-
30.51	9.2	8.8	-	9.0	0.2	-8.4	2.4	3	silty CLAY to CLAY	115	1.5	6	6	-	-	0.6	2.3	63	3.07	15	-	-
30.68	9.5	9.0	-	9.3	0.3	-8.4	4.0	3	silty CLAY to CLAY	115	1.5	6	6	-	-	0.6	2.4	72	3.18	15	-	-
30.84	12.8	12.2	-	12.7	0.7	-8.4	6.5	3	silty CLAY to CLAY	115	1.5	9	8	-	-	0.8	3.4	72	3.18	15	-	-

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

SEJPA Operations Building

Project ID: Stoney Miller
Data File: SDF(164).cpt
CPT Date: 10/11/2018 8:28:26 AM
GW During Test: 5 ft

Sounding ID: CPT-01
Project No: 52093-00
Cone/Rig: DDG1281

Depth ft	qc PS tsf	qcln PS -	qlncs PS -	qt PS tsf	Slv Stss tsf	pore prss (psi)	Fric Ratio %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc Nc N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	Fin Ic %	Ic SBT Index	Nk -	Vol Strn %	Cycl SStn %
31.01	29.0	27.4	56.4	28.6	0.2	-8.5	0.7	5	silty SAND to sandy SILT	120	3.0	10	9	24	33	-	-	24	2.33	16	3.74	51.2
31.17	18.3	17.3	-	18.2	0.2	-8.6	1.1	4	clayy SILT to silty CLAY	115	2.0	9	9	-	-	1.2	5.1	36	2.61	15	-	-
31.33	10.2	9.6	-	10.0	0.3	-7.7	3.4	3	silty CLAY to CLAY	115	1.5	7	6	-	-	0.6	2.6	67	3.12	15	-	-
31.50	26.4	24.9	54.5	26.3	0.2	-7.7	0.7	5	silty SAND to sandy SILT	120	3.0	9	8	21	32	-	-	25	2.37	16	3.84	51.2
31.66	22.0	20.6	63.7	21.8	0.3	-7.8	1.2	4	clayy SILT to silty CLAY	115	2.0	11	10	-	-	1.5	6.2	33	2.55	15	3.38	51.2
31.83	19.8	18.2	-	19.4	0.2	-7.7	1.4	4	clayy SILT to silty CLAY	115	2.0	10	9	-	-	1.3	5.4	37	2.67	15	-	-
31.99	71.9	67.1	77.5	71.7	0.3	-8.0	0.4	6	clean SAND to silty SAND	125	5.0	14	13	54	38	-	-	10	1.88	16	2.88	29.7
32.15	103.9	96.9	104.9	103.8	0.5	-8.2	0.5	6	clean SAND to silty SAND	125	5.0	21	19	66	40	-	-	7	1.77	16	2.25	17.8
32.32	118.0	110.6	120.8	118.8	0.8	-8.9	0.7	6	clean SAND to silty SAND	125	5.0	24	22	70	41	-	-	8	1.78	16	2.00	14.4
32.48	121.7	112.9	125.2	121.6	0.9	-8.2	0.8	6	clean SAND to silty SAND	125	5.0	24	23	71	41	-	-	9	1.80	16	1.98	12.7
32.65	108.5	100.4	114.6	108.4	0.8	-8.0	0.8	6	clean SAND to silty SAND	125	5.0	22	20	67	40	-	-	9	1.85	16	2.09	16.9
32.81	100.4	92.6	103.2	100.2	0.6	-7.9	0.6	6	clean SAND to silty SAND	125	5.0	20	19	64	40	-	-	9	1.81	16	2.28	19.0
32.97	112.8	103.8	106.0	112.7	0.4	-7.9	0.4	6	clean SAND to silty SAND	125	5.0	23	21	68	41	-	-	6	1.67	16	2.23	15.9
33.14	112.2	103.1	105.1	112.1	0.4	-7.8	0.4	6	clean SAND to silty SAND	125	5.0	22	21	68	41	-	-	6	1.67	16	2.24	16.1
33.30	110.9	101.7	109.9	110.7	0.6	-7.7	0.6	6	clean SAND to silty SAND	125	5.0	22	20	68	40	-	-	7	1.76	16	2.16	16.5
33.47	78.5	71.8	102.4	78.3	0.9	-7.5	1.2	5	silty SAND to sandy SILT	120	3.0	26	24	58	39	-	-	15	2.08	16	2.29	27.2
33.63	42.4	38.7	111.6	42.2	1.1	-7.2	2.7	4	clayy SILT to silty CLAY	115	2.0	20	19	-	-	2.9	9.0	32	2.52	15	2.13	51.2
33.79	21.0	18.5	-	20.8	0.7	-7.0	3.6	3	silty CLAY to CLAY	115	1.5	14	12	-	-	1.4	5.5	50	2.87	15	-	-
33.96	16.6	14.6	-	16.5	0.5	-6.8	3.5	3	silty CLAY to CLAY	115	1.5	11	10	-	-	1.1	4.2	55	2.95	15	-	-
34.12	16.8	14.7	-	16.7	0.3	-6.6	2.2	4	clayy SILT to silty CLAY	115	2.0	8	7	-	-	1.1	4.3	48	2.83	15	-	-
34.29	10.3	9.0	-	10.2	0.3	-6.7	3.2	3	silty CLAY to CLAY	115	1.5	7	6	-	-	0.6	2.4	68	3.13	15	-	-
34.45	8.1	7.1	-	8.0	0.1	-6.7	1.7	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	1.7	66	3.11	15	-	-
34.61	7.8	6.7	-	7.7	0.1	-6.4	1.1	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.5	1.6	62	3.06	15	-	-
34.78	7.8	6.7	-	7.6	0.0	-6.3	0.1	1	sensitive fine SOIL	115	2.0	4	3	-	-	0.5	1.6	46	2.79	15	-	-
34.94	7.8	6.7	-	7.6	0.0	-6.3	0.4	1	sensitive fine SOIL	115	2.0	4	3	-	-	0.5	1.6	52	2.90	15	-	-
35.11	8.5	7.2	-	8.3	0.0	-5.8	0.3	1	sensitive fine SOIL	115	2.0	4	4	-	-	0.5	1.8	48	2.84	15	-	-
35.27	9.3	7.9	-	9.2	0.0	-5.8	0.5	1	sensitive fine SOIL	115	2.0	5	4	-	-	0.6	2.0	48	2.84	15	-	-
35.43	8.3	7.0	-	8.2	0.1	-5.7	0.9	4	clayy SILT to silty CLAY	115	2.0	4	4	-	-	0.5	1.7	57	2.98	15	-	-
35.60	8.8	7.4	-	8.7	0.1	-5.6	1.3	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.9	61	3.03	15	-	-
35.76	10.5	8.8	-	10.4	0.1	-5.6	1.2	4	clayy SILT to silty CLAY	115	2.0	5	4	-	-	0.7	2.3	54	2.93	15	-	-
35.93	9.3	7.9	-	9.2	0.1	-5.5	1.0	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.6	2.0	64	3.08	15	-	-
36.09	12.7	10.8	-	12.6	0.1	-5.4	0.6	4	clayy SILT to silty CLAY	115	2.0	6	6	-	-	0.8	2.9	42	2.72	15	-	-
36.26	33.6	29.8	55.9	33.5	0.2	-5.5	0.7	5	silty SAND to sandy SILT	120	3.0	11	10	27	33	-	-	22	2.28	16	3.77	51.2
36.42	19.6	16.7	-	19.5	0.2	-5.4	1.2	4	clayy SILT to silty CLAY	115	2.0	10	8	-	-	1.5	4.8	36	2.65	15	-	-
36.58	12.2	10.8	-	12.1	0.2	-5.2	2.0	3	silty CLAY to CLAY	115	1.5	8	7	-	-	0.8	2.7	57	2.98	15	-	-
36.75	18.9	16.6	40.2	18.8	0.1	-5.1	0.3	5	silty SAND to sandy SILT	120	3.0	6	6	8	29	-	-	27	2.43	16	4.93	51.2
36.91	22.4	19.7	54.7	22.3	0.2	-5.1	0.9	5	silty SAND to sandy SILT	120	3.0	7	7	13	30	-	-	31	2.50	16	3.83	51.2
37.08	17.9	14.6	-	17.8	0.2	-4.9	1.5	4	clayy SILT to silty CLAY	115	2.0	9	7	-	-	1.2	4.2	43	2.74	15	-	-
37.24	20.0	16.3	-	19.9	0.3	-4.7	1.7	4	clayy SILT to silty CLAY	115	2.0	10	8	-	-	1.3	4.8	42	2.73	15	-	-
37.40	26.2	22.9	62.7	26.1	0.3	-4.9	1.1	5	silty SAND to sandy SILT	120	3.0	9	8	18	31	-	-	30	2.48	16	4.73	51.2
37.57	24.2	19.6	-	24.1	0.4	-4.7	1.7	4	clayy SILT to silty CLAY	115	2.0	12	10	-	-	1.6	5.9	38	2.68	15	-	-
37.73	12.7	10.2	-	12.6	0.3	-4.1	2.7	3	silty CLAY to CLAY	115	1.5	8	7	-	-	0.8	2.8	61	3.02	15	-	-
37.90	8.2	6.6	-	8.1	0.2	-4.0	2.7	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.5	1.6	76	3.24	15	-	-
38.06	7.8	6.2	-	7.7	0.1	-3.9	0.9	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.5	1.5	63	3.06	15	-	-
38.22	7.8	6.2	-	7.8	0.0	-3.7	0.9	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.5	1.5	62	3.05	15	-	-
38.39	7.7	6.1	-	7.6	0.0	-3.6	0.8	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.5	1.4	62	3.06	15	-	-
38.55	8.6	6.8	-	8.5	0.1	-3.5	0.8	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.6	59	3.01	15	-	-
38.72	9.2	7.2	-	9.1	0.1	-3.3	1.3	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.6	1.8	62	3.04	15	-	-
38.88	8.8	6.9	-	8.7	0.1	-3.2	1.4	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.7	65	3.09	15	-	-
39.04	9.9	7.8	-	9.8	0.0	-3.2	0.3	1	sensitive fine SOIL	115	2.0	5	4	-	-	0.6	2.0	46	2.80	15	-	-
39.21	9.4	7.3	-	9.3	0.0	-3.1	0.3	1	sensitive fine SOIL	115	2.0	5	4	-	-	0.6	1.8	48	2.83	15	-	-
39.37	11.5	9.0	-	11.4	0.0	-3.0	0.5	4	clayy SILT to silty CLAY	115	2.0	6	4	-	-	0.7	2.2	45	2.78	15	-	-
39.54	32.9	28.1	44.0	32.8	0.1	-3.1	0.3	5	silty SAND to sandy SILT	120	3.0	11	9	25	32	-	-	28	2.16	16	4.63	51.2
39.70	36.0	30.8	62.7	36.0	0.2	-3.1	0.3	5	silty SAND to sandy SILT	120	3.0	12	10	28	33	-	-	24	2.33	16	3.43	51.2
39.86	25.1	17.8	-	23.1	0.5	-3.0	2.6	4	clayy SILT to silty CLAY	115	2.0	12	9	-	-	1.5	5.3	48	2.79	15	-	-
40.03	14.5	11.1	-	14.4	0.3	-2.9	2.3	3	silty CLAY to CLAY	115	1.5	10	7	-	-	0.9	3.1	58	2.96	15	-	-
40.19	9.9	7.6	-	9.8	0.1	-1.9	1.3	4	clayy SILT to silty CLAY	115	2.0	5	4	-	-	0.6	1.9	57	2.97	15	-	-
40.36	8.5	6.5	-	8.5	0.1	-1.9	1.2	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.5	1.5	63	3.07	15	-	-
40.52	8.2	6.2	-	8.2	0.1	-1.8	0.9	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.5	1.4	63	3.06	15	-	-
40.68	7.8	5.9	-	7.8	0.0	-1.7	0.3	1	sensitive fine SOIL	115	2.0	4	3	-	-	0.5	1.3	55	2.94	15	-	-
40.85	7.8	5.9	-	7.7	0.0	-1.6	0.2	1	sensitive fine SOIL	115	2.0	4	3	-	-	0.5	1.3	52	2.90	15	-	-
41.01	8.4	6.3	-	8.3	0.1	-1.2	1.2	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.5	1.5	66	3.10	15	-	-
41.18	9.6	7.2	-	9.6	0.2	-1.2	2.5	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.6	1.8	72	3.19	15	-	-
41.34	10.8	8.1	-	10.8	0.3	-1.2	4.1	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.7	2.1	76	3.24	15	-	-
41.50	12.2	9.1	-	12.2	0.4	-1.1	4.1	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.4	72	3.19	15	-	-
41.67	12.3	9.1	-	12.3	0.5	-1.1	4.7	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.4	75	3.22	15	-	-
41.83	12.4	9.1	-	12.3	0.4	-1.1	4.3	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.4	73	3.20	15	-	-
42.00	12.3	9.1	-	12.3	0.4	-1.1	4.3	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.4	73	3.20	15	-	-
42.16	12.1	8.9	-	12.1	0.4	-1.1	4.5	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.3	74	3.21	15	-	-
42.32	11.7	8.6	-	11.7	0.4	-1.0	4.4	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.7	2.2	73	3.20	15	-	-
42.49	12.3	9.0	-	12.3	0.5	-1.0	5.1	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.4	77	3.25	15	-	-
42.65	13.2	9.6	-	13.2	0.6	-1.1	5.6	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.6	76	3.24	15	-	-
42.82	13.6	9.9	-	13.6	0.5	-1.2	4.3	3	silty CLAY to CLAY	115	1.5	9	7	-	-	0.8	2.6	73	3.20	15	-	-
42.98	13.1	9.5	-	13.0	0.4	-1.2	3.7	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.5	69	3.14	15	-	-
43.15	12.0	8.7	-	12.0	0.5	-1.1	4.9	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.7	2.2	77	3.25	15	-	-
43.31	10.6	7.7	-	10.6	0.5	-1.1	5.8	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.7	1.9	86	3.36	15	-	-
43.47	10.4	7.5	-	10.4	0.5	-1.1	5.8	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.6	1.8	87	3.37	15	-	-
43.64	10.7	7.7	-	10.7	0.4	-1.1	5.0	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.7	1.9	82	3.32	15	-	-
43.80	11.2	8.0	-	11.2	0.6	-1.1	6.6	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.7	2.0	87	3.37	15	-	-
43.97	13.3	9.4	-	13.2	0.8	-1.1	8.1	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.5	66	3.11	15	-	-
44.13	13.2	9.4	-	13.2	0.6	-1.1	5.3	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.5	76	3.24	15	-	-
44.29	18.2	12.8	-	18.2	1.0	-1.4	6.4	3	silty CLAY to CLAY	115	1.5	12	8	-	-	1.2	3.6	70	3.16	15	-	-
44.46	21.3	15.0	-	21.3	1.5	-2.8	6.7	5	silty CLAY to CLAY	115	1.5	14	10	-	-	1.4	4.3	67	3.12	15	-	-
44.62	21.5	15.1	-	21.5	1.2	-3.3	6.1	3	silty CLAY to CLAY	115	1.5	14	10	-	-	1.4	4.4	65	3.05	15	-	-
44.79	17.3	12.1	-	17.2	0.7	-5.0	4.9	3	silty CLAY to CLAY	115	1.5	12	8	-	-	1.1	3.4	67	3.12	15	-	-
44.95	14.7	10.3	-	14.6	0.7	-5.0	5.8	3	silty CLAY to CLAY	115	1.5	10	7	-	-	0.9	2.8	76	3.23	15	-	-
45.11	16.0	11.5	-	16.4	0.8	-4.8	5.7	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.2	71	3.18	15	-	-
45.28	17.7	12.3	-	17.7	0.9	-4.9	5.7	3	silty CLAY to CLAY	115	1.5	12	8	-	-	1.2	3.4	69	3.15	15	-	-
45.44	17.4	12.1	-	17.3	0.8	-5.3	5.6	3	silty CLAY to CLAY	115	1.5	12	8	-	-	1.1	3.4	69	3.15	15	-	-
45.61	15.9	10.9	-	15.8	0.7	-5.5	5.0	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.0	3.0	72	3.16	15	-	-
45.77	14.7	10.1	-	14.6	0.6	-5.7	4.9	3	silty CLAY to CLAY	115	1.5	10	7	-	-	0.9	2.7	72	3.19	15	-	-
45.93	13.6	9.3	-	13.5	0.6	-5.8	5.8	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.9	2.5	79	3.27	15	-	-
46.10	12.5	8.5	-	12.4	0.6	-5.8	6.3	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.2	83	3.33	15	-	-
46.26	11.9	8.1	-	11.7	0.5	-5.8	5.3	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.7	2.0	82	3.31	15	-	-

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

Middle Earth Geo Testing

SEJPA Operations Building

Project ID: Rooney Miller
Data File: SDF(184).cpt
CPT Date: 10/21/2016 8:28:26 AM
GW During Test: 0 Ft

Sounding ID: CPT-01
Project No: 50098-00
Cone/Rig: DDG1281

Depth ft	qc PS tsf	qcln PS -	qinc PS -	qt PS tsf	Slv Stea tsf	pore press (psi)	Frct Ratio %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	Fin Ic %	Ic SBT Indx	Nk -	Vol Strn %	Cycl SStn %
46.43	10.5	7.1	-	10.4	0.4	-5.7	5.8	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.6	1.7	98	3.38	15	-	-
46.59	10.2	6.9	-	10.1	0.4	-5.7	6.0	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.6	1.7	91	3.41	15	-	-
46.75	41.8	32.7	95.2	40.9	0.8	-5.7	2.2	4	clayy SILT to silty CLAY	115	2.0	20	16	-	-	2.8	8.5	32	2.55	15	2.43	51.2
46.92	41.7	33.3	98.7	41.6	0.9	-5.8	2.3	4	clayy SILT to silty CLAY	115	2.0	21	17	-	-	2.9	8.7	32	2.54	15	2.36	51.2
47.08	17.1	11.5	-	17.0	0.7	-5.6	5.0	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.2	68	3.14	15	-	-
47.25	13.1	8.8	-	13.0	0.5	-5.3	4.8	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.9	2.3	77	3.25	15	-	-
47.41	11.4	7.6	-	11.4	0.4	-4.7	4.7	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.7	1.8	82	3.31	15	-	-
47.57	11.2	7.5	-	11.1	0.4	-4.6	4.2	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.7	1.8	80	3.29	15	-	-
47.74	11.3	7.6	-	11.2	0.3	-4.6	4.1	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.7	1.8	80	3.28	15	-	-
47.90	12.1	8.0	-	12.0	0.4	-4.5	4.1	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.7	2.0	77	3.25	15	-	-
48.07	12.5	8.3	-	12.3	0.4	-4.5	3.7	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.1	73	3.21	15	-	-
48.23	12.5	8.2	-	12.4	0.3	-4.5	3.5	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.1	73	3.20	15	-	-
48.39	12.7	8.3	-	12.6	0.3	-4.4	3.5	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.1	73	3.20	15	-	-
48.56	13.1	8.6	-	13.0	0.3	-4.4	3.3	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.2	70	3.17	15	-	-
48.72	13.1	9.6	-	13.0	0.4	-4.4	4.2	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.2	75	3.23	15	-	-
48.89	12.9	8.4	-	12.8	0.4	-4.4	3.9	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.1	74	3.22	15	-	-
49.05	14.2	9.2	-	14.1	0.5	-4.4	3.8	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.9	2.4	71	3.17	15	-	-
49.22	14.1	9.1	-	14.0	0.5	-4.3	4.0	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.9	2.4	76	3.23	15	-	-
49.38	17.0	11.0	-	17.0	0.7	-4.3	4.8	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.1	3.0	69	3.15	15	-	-
49.54	17.8	11.3	-	17.5	0.7	-4.3	4.5	3	silty CLAY to CLAY	115	1.5	12	8	-	-	1.1	3.1	68	3.12	15	-	-
49.71	15.5	9.9	-	15.4	0.6	-4.3	4.4	3	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	2.6	71	3.17	15	-	-
49.87	13.2	8.4	-	13.1	0.5	-4.2	4.5	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.2	85	3.34	15	-	-
50.04	12.8	8.1	-	12.7	0.5	-4.2	5.7	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.1	83	3.32	15	-	-
50.20	15.2	9.7	-	15.2	0.6	-3.8	4.8	3	silty CLAY to CLAY	115	1.5	10	6	-	-	1.0	2.6	73	3.20	15	-	-
50.36	15.9	10.1	-	15.8	0.6	-3.7	4.5	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.0	2.7	71	3.17	15	-	-
50.53	17.7	11.2	-	17.6	0.7	-3.7	4.5	3	silty CLAY to CLAY	115	1.5	12	7	-	-	1.1	3.1	67	3.12	15	-	-
50.69	14.7	9.3	-	14.6	0.5	-3.7	4.0	3	silty CLAY to CLAY	115	1.5	10	6	-	-	0.9	2.4	71	3.17	15	-	-
50.86	12.2	7.7	-	12.1	0.4	-3.6	4.3	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.7	1.9	79	3.28	15	-	-
51.02	13.3	8.4	-	13.2	0.4	-3.6	3.7	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.1	73	3.20	15	-	-
51.19	13.2	8.3	-	13.2	0.5	-3.5	4.6	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.1	78	3.26	15	-	-
51.35	13.2	8.3	-	13.2	0.4	-3.5	4.2	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.1	76	3.24	15	-	-
51.51	13.3	8.3	-	13.2	0.5	-3.5	5.0	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.1	80	3.29	15	-	-
51.68	18.4	11.5	-	18.4	0.8	-3.5	5.2	3	silty CLAY to CLAY	115	1.5	12	8	-	-	1.2	3.2	69	3.15	15	-	-
51.84	23.9	14.8	-	23.8	0.9	-3.5	4.2	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.6	4.3	58	3.00	15	-	-
52.00	23.0	14.2	-	22.9	1.0	-3.5	6.8	3	silty CLAY to CLAY	115	1.5	15	9	-	-	1.5	4.1	69	3.14	15	-	-
52.17	33.3	20.5	-	33.3	1.8	-3.6	6.0	3	silty CLAY to CLAY	115	1.5	22	14	-	-	2.2	6.2	57	2.97	15	-	-
52.33	37.9	23.3	-	37.8	1.6	-3.7	4.5	3	silty CLAY to CLAY	115	1.5	25	16	-	-	2.6	7.1	48	2.84	15	-	-
52.50	42.3	25.9	-	42.2	0.9	-4.0	2.4	4	clayy SILT to silty CLAY	115	2.0	21	15	-	-	2.9	7.9	30	2.63	15	-	-
52.66	28.6	17.5	-	28.6	1.2	-3.9	3.9	3	silty CLAY to CLAY	115	1.5	19	12	-	-	1.9	5.1	53	2.91	15	-	-
52.82	19.0	11.6	-	17.9	0.8	-3.9	5.2	3	silty CLAY to CLAY	115	1.5	12	7	-	-	1.2	3.0	71	3.17	15	-	-
52.99	13.0	7.9	-	12.9	0.4	-3.8	4.5	3	silty CLAY to CLAY	115	1.5	9	5	-	-	0.8	2.0	79	3.28	15	-	-
53.15	12.1	7.3	-	12.0	0.3	-3.5	3.5	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.7	1.8	76	3.24	15	-	-
53.32	14.4	8.7	-	14.3	0.5	-3.4	4.4	3	silty CLAY to CLAY	115	1.5	10	6	-	-	0.9	2.2	75	3.23	15	-	-
53.48	15.2	9.2	-	15.1	0.6	-3.4	5.3	3	silty CLAY to CLAY	115	1.5	10	6	-	-	1.0	2.4	77	3.25	15	-	-
53.64	15.8	9.5	-	15.7	0.7	-3.3	5.5	3	silty CLAY to CLAY	115	1.5	11	6	-	-	1.0	2.5	76	3.24	15	-	-
53.81	17.8	10.7	-	17.7	0.6	-3.3	4.4	3	silty CLAY to CLAY	115	1.5	12	7	-	-	1.1	2.9	69	3.14	15	-	-
53.97	18.9	11.3	-	18.8	0.9	-3.2	5.6	3	silty CLAY to CLAY	115	1.5	13	8	-	-	1.2	3.1	71	3.18	15	-	-
54.14	19.5	11.7	-	19.5	1.0	-3.3	6.1	3	silty CLAY to CLAY	115	1.5	13	8	-	-	1.3	3.2	72	3.19	15	-	-
54.30	18.8	11.2	-	18.7	0.9	-3.4	6.7	3	silty CLAY to CLAY	115	1.5	13	7	-	-	1.2	3.1	75	3.23	15	-	-
54.46	18.8	11.2	-	18.8	0.9	-3.4	6.0	3	silty CLAY to CLAY	115	1.5	13	7	-	-	1.2	3.1	73	3.20	15	-	-
54.63	19.6	11.6	-	19.5	0.8	-3.4	4.8	3	silty CLAY to CLAY	115	1.5	13	8	-	-	1.3	3.2	68	3.13	15	-	-
54.79	21.1	12.5	-	21.1	1.0	-3.4	5.3	3	silty CLAY to CLAY	115	1.5	14	8	-	-	1.4	3.5	67	3.13	15	-	-
54.96	22.5	13.2	-	22.4	1.0	-3.5	5.1	3	silty CLAY to CLAY	115	1.5	15	8	-	-	1.5	3.7	65	3.09	15	-	-
55.12	23.9	14.1	-	23.8	1.2	-3.2	5.6	3	silty CLAY to CLAY	115	1.5	16	9	-	-	1.6	4.0	65	3.09	15	-	-
55.28	25.9	15.2	-	25.9	1.4	-3.2	6.2	3	silty CLAY to CLAY	115	1.5	17	10	-	-	1.7	4.4	65	3.09	15	-	-
55.45	26.1	15.3	-	26.0	1.5	-3.2	6.6	3	silty CLAY to CLAY	115	1.5	17	10	-	-	1.7	4.4	66	3.11	15	-	-
55.61	24.5	14.3	-	24.5	1.3	-3.3	6.2	3	silty CLAY to CLAY	115	1.5	16	10	-	-	1.6	4.1	66	3.11	15	-	-
55.78	22.6	13.1	-	22.5	1.2	-3.3	6.1	3	silty CLAY to CLAY	115	1.5	15	9	-	-	1.5	3.7	66	3.10	15	-	-
55.94	21.2	12.3	-	21.2	1.1	-3.5	6.2	3	silty CLAY to CLAY	115	1.5	14	8	-	-	1.4	3.4	71	3.17	15	-	-
56.11	22.5	13.0	-	22.4	1.3	-3.5	5.6	3	silty CLAY to CLAY	115	1.5	15	9	-	-	1.5	3.7	67	3.12	15	-	-
56.27	32.6	18.6	-	32.5	1.5	-3.5	4.3	3	silty CLAY to CLAY	115	1.5	22	13	-	-	2.2	5.6	53	2.91	15	-	-
56.43	40.0	23.1	-	40.0	1.9	-3.6	5.1	3	silty CLAY to CLAY	115	1.5	27	15	-	-	2.7	7.0	51	2.88	15	-	-
56.60	39.2	22.6	-	39.1	1.9	-4.1	5.3	3	silty CLAY to CLAY	115	1.5	26	15	-	-	2.6	6.8	52	2.90	15	-	-
56.76	33.8	19.4	-	33.7	1.7	-4.5	5.8	3	silty CLAY to CLAY	115	1.5	23	13	-	-	2.3	5.8	57	2.97	15	-	-
56.93	35.2	20.1	-	35.1	1.8	-4.7	4.8	3	silty CLAY to CLAY	115	1.5	25	13	-	-	2.4	6.0	51	2.89	15	-	-
57.09	44.0	25.1	-	43.9	2.0	-5.2	5.0	3	silty CLAY to CLAY	115	1.5	29	17	-	-	3.0	7.7	49	2.85	15	-	-
57.25	41.7	23.8	-	41.6	2.5	-5.6	6.6	3	silty CLAY to CLAY	115	1.5	28	16	-	-	2.8	7.2	55	2.95	15	-	-
57.42	36.6	20.8	-	36.5	2.0	-5.7	6.1	3	silty CLAY to CLAY	115	1.5	24	14	-	-	2.5	6.2	57	2.97	15	-	-
57.58	33.6	19.1	-	33.5	1.6	-5.9	5.1	3	silty CLAY to CLAY	115	1.5	22	13	-	-	2.3	5.7	55	2.95	15	-	-
57.75	38.9	22.0	-	38.8	1.6	-6.3	4.5	3	silty CLAY to CLAY	115	1.5	26	15	-	-	2.6	6.6	50	2.86	15	-	-
57.91	36.3	20.5	-	36.2	1.7	-6.4	5.2	3	silty CLAY to CLAY	115	1.5	24	14	-	-	2.4	6.1	54	2.93	15	-	-
58.07	46.4	26.5	-	46.3	1.9	-6.5	4.4	3	silty CLAY to CLAY	115	1.5	30	17	-	-	3.1	7.8	46	2.91	15	-	-
58.24	43.1	24.2	-	43.0	2.1	-6.5	5.2	3	silty CLAY to CLAY	115	1.5	29	16	-	-	2.9	7.3	50	2.87	15	-	-
58.40	46.3	26.4	-	46.2	2.3	-6.6	5.4	3	silty CLAY to CLAY	115	1.5	30	17	-	-	3.1	7.7	50	2.87	15	-	-
58.57	40.3	22.9	-	40.2	1.9	-6.8	5.0	3	silty CLAY to CLAY	115	1.5	27	15	-	-	2.8	6.9	51	2.88	15	-	-
58.73	38.0	21.2	-	37.9	1.5	-7.1	4.4	3	silty CLAY to CLAY	115	1.5	25	14	-	-	2.6	6.4	50	2.87	15	-	-
58.89	38.9	21.6	-	38.7	1.6	-7.5	4.4	3	silty CLAY to CLAY	115	1.5	26	14	-	-	2.6	6.5	50	2.86	15	-	-
59.06	40.8	22.6	-	40.6	2.0	-7.8	5.2	3	silty CLAY to CLAY	115	1.5	27	15	-	-	2.8	6.8	52	2.90	15	-	-
59.22	34.6	19.1	-	34.4	1.3	-8.0	6.2	3	silty CLAY to CLAY	115	1.5	23	13	-	-	2.3	5.7	59	3.01	15	-	-
59.39	38.2	21.1	-	38.1	2.0	-8.1	5.6	3	silty CLAY to CLAY	115	1.5	25	14	-	-	2.6	6.3	55	2.95	15	-	-
59.55	40.1	22.1	-	40.0	1.4	-8.5	3.9	3	silty CLAY to CLAY	115	1.5	27	15	-	-	2.7	6.7	47	2.82	15	-	-
59.71	47.7	26.2	-	47.6	1.2	-8.7	2.6	4	clayy SILT to silty CLAY	115	2.0	24	13	-	-	3.9	8.9	38	2.65	15	-	-
59.88	29.4	16.1	-	29.2	1.0	-8.4	5.9	3	silty CLAY to CLAY	115	1.5	20	11	-	-	1.9	4.7	55	2.94	15	-	-
60.04	23.7	13.0	-	23.6	1.0	-8.3	4.8	3	silty CLAY to CLAY	115	1.5	16	9	-	-	1.5	3.6	64	3.08	15	-	-
60.21	25.9	14.1	-	25.7	1.1	-8.3	5.0	3	silty CLAY to CLAY	115	1.5	17	9	-	-	1.7	4.0	63	3.06	15	-	-
60.37	24.2	13.2	-	24.1	1.1	-8.4	5.3	3	silty CLAY to CLAY	115	1.5	16	9	-	-	1.6	3.7	66	3.10	15	-	-
60.53	23.9	12.9	-	23.7	0.9	-8.3	4.7	3	silty CLAY to CLAY	115	1.5	16	9	-	-	1.6	3.6	64	3.08	15	-	-
60.70	27.3	14.8	-	27.2	1.2	-8.4	5.1	3	silty CLAY to CLAY	115	1.5	18	10	-	-	1.8	4.2	62	3.05	15	-	-
60.86	30.3	16.4	-	30.1	1.4	-8.4	5.3	3	silty CLAY to CLAY	115	1.5	20	11	-	-	2.0	4.8	60	3.02	15	-	-
61.03	29.4	15.8	-	29.2	1.6	-8.4	6.1	3	silty CLAY to CLAY	115	1.5	20	11	-	-	1.9	4.6	64	3.07	15	-	-
61.19	27.3	14.5	-	26.9	1.4	-8.4	5.9	3	silty CLAY to CLAY	115	1.5	18	10	-	-	1.8	4.2	65	3.09	15	-	-
61.35	24.5	13.1	-	24.3	1.1	-8.4	5.3	3	silty CLAY to CLAY	115	1.5	16	9	-	-	1.6	3.7	65	3.11	15	-	-
61.52	23.2	12.4	-	23.1	1.0	-8.4	4.9	3	silty CLAY to CLAY	115	1.5	15	8	-	-	1.5	3.5	66	3.11	15	-	-
61.68	24.5	13.1	-	24.3	0.9	-8.4	4.2	3	silty CLAY to CLAY	115	1.5	16	9	-	-	1.6	3.7	61	3.04	15	-	-

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

Middle Earth Geo Testing

SEJPA Operations Building

Project ID: Stoney Miller
Data File: SDP(164).cpt
CPT Date: 10/11/2016 8:28:26 AM
GW During Test: 5 ft

Sounding ID: CPT-01
Project No: 50093-06
Cone/Rig: DDG1281

Depth ft	qc PS tsf	qcln PS -	qlncs PS -	qt PS tsf	Slv Stss tsf	pore pres (psi)	Frct Ratio %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT N-60	SPT N-N1 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	Fin Ic %	Ic SBT Indx	Nk -	Vol Strn %	Cycl SStn %
61.85	25.7	13.7	-	25.8	1.0	-8.4	4.5	3	silty CLAY to CLAY	115	1.5	17	9	-	-	1.7	3.9	61	3.04	15	-	-
62.01	29.5	15.7	-	29.3	1.2	-8.4	4.8	3	silty CLAY to CLAY	115	1.5	20	10	-	-	2.0	4.5	59	3.01	15	-	-
62.17	33.2	17.6	-	33.0	1.5	-8.4	5.1	3	silty CLAY to CLAY	115	1.5	22	12	-	-	2.2	5.2	57	2.98	15	-	-
62.34	34.4	18.2	-	34.2	1.6	-8.4	5.4	3	silty CLAY to CLAY	115	1.5	23	12	-	-	2.3	5.4	57	2.98	15	-	-
62.50	31.4	16.6	-	31.2	1.5	-8.4	5.6	3	silty CLAY to CLAY	115	1.5	21	11	-	-	2.1	4.8	60	3.03	15	-	-
62.67	29.2	15.4	-	29.1	1.5	-8.5	5.7	3	silty CLAY to CLAY	115	1.5	19	10	-	-	1.9	4.4	63	3.06	15	-	-
62.83	29.4	15.4	-	29.2	1.4	-8.6	5.4	3	silty CLAY to CLAY	115	1.5	20	10	-	-	1.9	4.5	62	3.05	15	-	-
63.00	29.5	15.5	-	29.3	1.2	-8.7	4.8	3	silty CLAY to CLAY	115	1.5	20	10	-	-	1.9	4.5	60	3.02	15	-	-
63.16	31.9	16.7	-	31.7	1.4	-8.8	4.8	3	silty CLAY to CLAY	115	1.5	21	11	-	-	2.1	4.9	58	2.99	15	-	-
63.32	34.4	17.9	-	34.2	1.5	-8.9	5.0	3	silty CLAY to CLAY	115	1.5	23	12	-	-	2.3	5.3	56	2.97	15	-	-
63.49	34.4	17.9	-	34.2	1.7	-8.9	5.5	3	silty CLAY to CLAY	115	1.5	23	12	-	-	2.3	5.3	58	3.00	15	-	-
63.65	36.3	18.9	-	36.1	2.1	-9.0	6.4	3	silty CLAY to CLAY	115	1.5	24	13	-	-	2.4	5.6	60	3.02	15	-	-
63.82	34.1	17.7	-	33.9	2.1	-9.1	6.9	3	silty CLAY to CLAY	115	1.5	23	12	-	-	2.3	5.2	63	3.06	15	-	-
63.98	30.6	15.9	-	30.5	2.0	-9.1	7.3	3	silty CLAY to CLAY	115	1.5	20	11	-	-	2.0	4.6	67	3.12	15	-	-
64.14	32.2	16.6	-	32.1	1.9	-9.1	6.7	3	silty CLAY to CLAY	115	1.5	21	11	-	-	2.1	4.8	64	3.08	15	-	-
64.31	29.8	15.4	-	29.6	1.9	-9.2	7.3	3	silty CLAY to CLAY	115	1.5	20	10	-	-	2.0	4.4	68	3.13	15	-	-
64.47	32.5	16.7	-	32.3	2.1	-9.2	7.2	3	silty CLAY to CLAY	115	1.5	22	11	-	-	2.2	4.9	65	3.10	15	-	-
64.64	32.1	16.5	-	31.9	2.2	-9.2	7.7	3	silty CLAY to CLAY	115	1.5	21	11	-	-	2.1	4.8	67	3.13	15	-	-
64.80	33.0	16.9	-	32.8	2.3	-9.2	8.0	3	silty CLAY to CLAY	115	1.5	22	11	-	-	2.2	4.9	67	3.13	15	-	-
64.96	33.6	17.2	-	33.4	2.2	-9.2	7.5	3	silty CLAY to CLAY	115	1.5	22	11	-	-	2.2	5.0	66	3.10	15	-	-
65.13	29.9	15.2	-	29.7	1.9	-9.2	7.1	3	silty CLAY to CLAY	115	1.5	20	10	-	-	2.0	4.4	68	3.13	15	-	-
65.29	41.1	20.9	-	41.0	2.1	-9.3	5.6	3	silty CLAY to CLAY	115	1.5	27	14	-	-	2.8	6.3	55	2.94	15	-	-
65.46	53.1	26.9	-	52.9	2.8	-9.4	5.6	3	silty CLAY to CLAY	115	1.5	35	18	-	-	3.6	8.2	50	2.86	15	-	-
65.62	74.6	37.8	-	74.5	3.7	-9.5	5.2	3	silty CLAY to CLAY	115	1.5	50	25	-	-	5.1	9.9	42	2.72	15	-	-
65.78	88.7	44.8	-	88.5	5.0	-9.5	5.9	3	silty CLAY to CLAY	115	1.5	59	30	-	-	6.2	9.9	41	2.71	15	-	-
65.95	92.1	46.4	-	91.9	5.7	-9.3	6.4	3	silty CLAY to CLAY	115	1.5	61	31	-	-	6.4	9.9	42	2.73	15	-	-
66.11	84.1	42.3	-	83.9	4.9	-9.2	6.2	3	silty CLAY to CLAY	115	1.5	56	28	-	-	5.8	9.9	43	2.74	15	-	-
66.28	83.9	42.1	-	83.7	4.5	-9.1	5.6	3	silty CLAY to CLAY	115	1.5	56	28	-	-	5.8	9.9	41	2.71	15	-	-
66.44	98.1	49.1	-	97.9	5.2	-9.2	5.6	3	silty CLAY to CLAY	115	1.5	65	33	-	-	6.8	9.9	38	2.68	15	-	-
66.60	108.5	54.2	-	108.3	6.0	-9.2	5.7	3	silty CLAY to CLAY	115	1.5	72	36	-	-	7.5	9.9	37	2.64	15	-	-
66.77	127.9	87.7	225.4	127.8	6.2	-9.3	5.0	9	very stiff fine SOIL	120	1.0	100	86	-	-	4.4	9.9	29	2.46	30	0.00	0.0
66.93	131.5	90.1	228.7	131.4	6.0	-9.2	4.7	4	clayy SILT to silty CLAY	115	2.0	66	45	-	-	9.2	9.8	28	2.43	15	0.00	0.0
67.10	163.0	119.6	296.8	168.8	7.0	-9.2	4.3	9	very stiff fine SOIL	120	1.0	100	100	-	-	5.9	9.9	24	2.39	30	0.00	0.0
67.26	197.0	134.7	247.1	196.8	7.6	-9.3	3.9	8	stiff SAND to clayy SAND	115	5.0	39	27	77	40	-	-	21	2.26	16	0.00	0.0
67.42	215.0	146.8	250.4	214.9	7.8	-9.2	3.7	8	stiff SAND to clayy SAND	115	5.0	43	29	80	41	-	-	20	2.22	16	0.00	0.0
67.59	199.9	136.3	234.2	199.8	6.9	-9.0	3.5	6	silty SAND to sandy SILT	120	3.0	67	43	77	40	-	-	20	2.22	16	0.00	0.0
67.75	171.5	116.8	231.5	171.3	6.8	-8.9	4.1	9	very stiff fine SOIL	120	1.0	100	100	-	-	5.0	9.9	23	2.31	30	0.00	0.0
67.92	181.9	123.8	228.1	181.8	6.6	-9.0	3.7	8	stiff SAND to clayy SAND	115	5.0	36	25	74	40	-	-	21	2.27	16	0.00	0.0
68.08	183.4	124.8	235.5	183.2	7.0	-8.8	3.9	8	stiff SAND to clayy SAND	115	5.0	37	25	74	40	-	-	22	2.28	16	0.00	0.0
68.24	193.1	131.1	245.9	192.9	7.6	-7.8	4.0	8	stiff SAND to clayy SAND	115	5.0	39	26	75	40	-	-	22	2.28	16	0.00	0.0
68.41	210.8	143.0	244.7	210.7	7.5	-8.6	3.6	8	stiff SAND to clayy SAND	115	5.0	42	29	79	41	-	-	20	2.22	16	0.00	0.0
68.57	205.1	139.0	237.9	205.0	7.1	-8.5	3.6	8	stiff SAND to clayy SAND	115	5.0	41	28	78	41	-	-	20	2.22	16	0.00	0.0
68.74	198.9	134.8	249.2	198.8	7.8	-8.4	4.0	8	stiff SAND to clayy SAND	115	5.0	40	27	77	40	-	-	21	2.27	16	0.00	0.0
68.90	184.1	124.8	257.1	184.0	8.2	-8.3	4.6	9	very stiff fine SOIL	120	1.0	100	100	-	-	6.4	9.9	24	2.33	30	0.00	0.0
69.07	176.9	119.6	243.8	176.8	7.5	-8.5	4.4	9	very stiff fine SOIL	120	1.0	100	100	-	-	6.1	9.9	24	2.33	30	0.00	0.0
69.23	132.3	87.9	233.7	132.1	6.6	-8.4	5.3	9	very stiff fine SOIL	120	1.0	100	88	-	-	4.5	9.9	30	2.48	30	0.00	0.0
69.39	152.0	102.4	232.3	152.0	6.7	-8.1	4.6	9	very stiff fine SOIL	120	1.0	100	100	-	-	5.3	9.9	26	2.39	30	0.00	0.0
69.56	176.8	119.0	243.1	176.7	7.5	-2.8	4.3	9	very stiff fine SOIL	120	1.0	100	100	-	-	6.2	9.9	24	2.33	30	0.00	0.0
69.72	197.2	132.8	246.1	197.1	7.7	-3.0	4.0	8	stiff SAND to clayy SAND	115	5.0	39	27	76	40	-	-	21	2.27	16	0.00	0.0
69.89	186.8	126.6	255.7	186.8	8.2	-2.9	4.5	9	very stiff fine SOIL	120	1.0	100	100	-	-	6.5	9.9	24	2.32	30	0.00	0.0
70.05	180.7	121.2	257.7	180.6	8.3	-2.9	4.7	9	very stiff fine SOIL	120	1.0	100	100	-	-	6.3	9.9	22	2.35	30	0.00	0.0
70.21	192.9	128.6	251.0	192.8	8.0	-2.7	4.3	9	very stiff fine SOIL	120	1.0	100	100	-	-	6.7	9.9	23	2.32	30	0.00	0.0
70.38	178.1	119.8	248.2	178.0	7.8	-2.6	4.7	9	very stiff fine SOIL	120	1.0	100	100	-	-	5.9	9.9	25	2.37	30	0.00	0.0
70.54	146.6	98.0	225.9	146.5	6.5	-1.4	4.6	9	very stiff fine SOIL	120	1.0	100	98	-	-	5.1	9.9	26	2.40	30	0.00	0.0
70.71	134.9	90.1	228.5	134.9	6.3	-1.7	5.0	9	very stiff fine SOIL	120	1.0	100	90	-	-	4.7	9.9	28	2.45	30	0.00	0.0

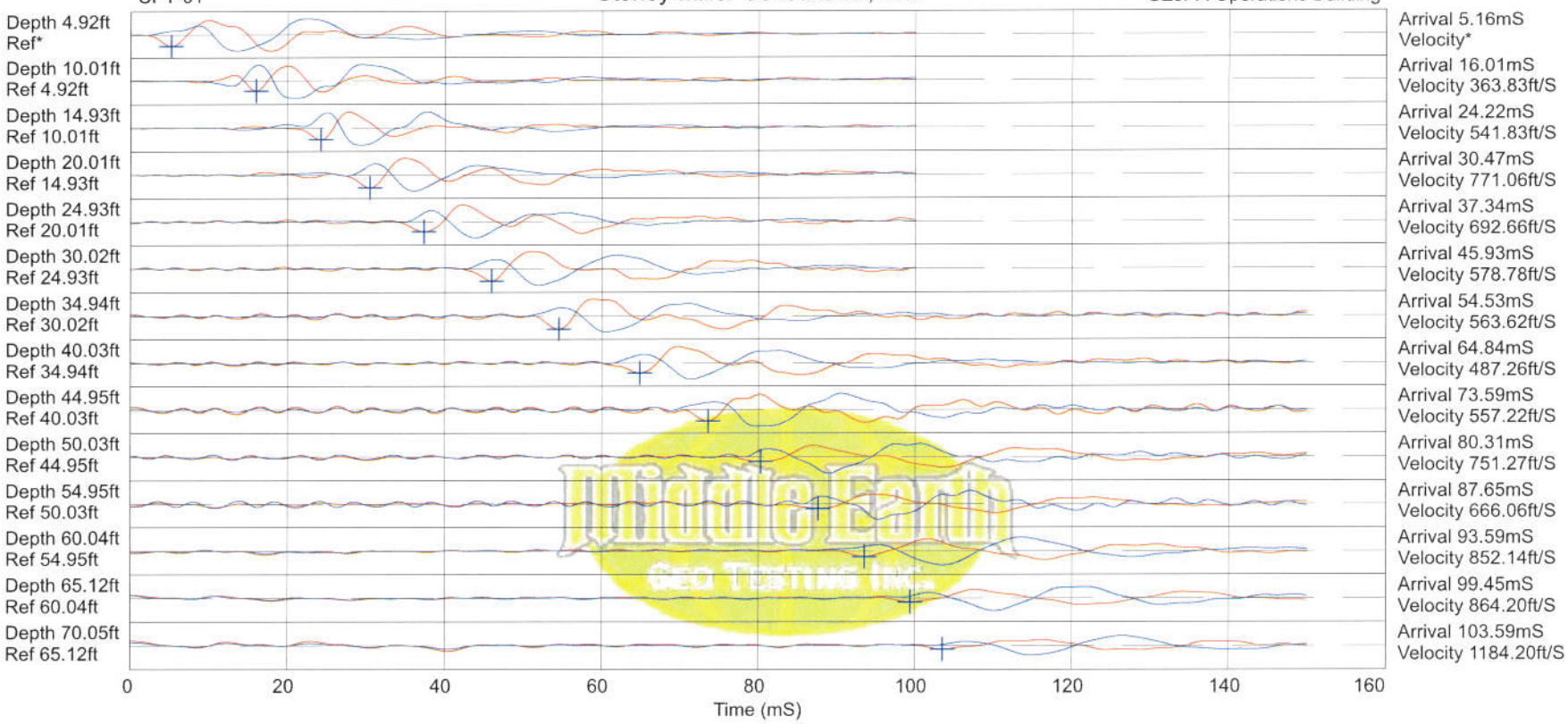
* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Middle Earth Geo Testing

CPT-01

Stoney-Miller Consultants, Inc.

SEJPA Operations Building



Hammer to Rod String Distance (ft): 5.83

* = Not Determined

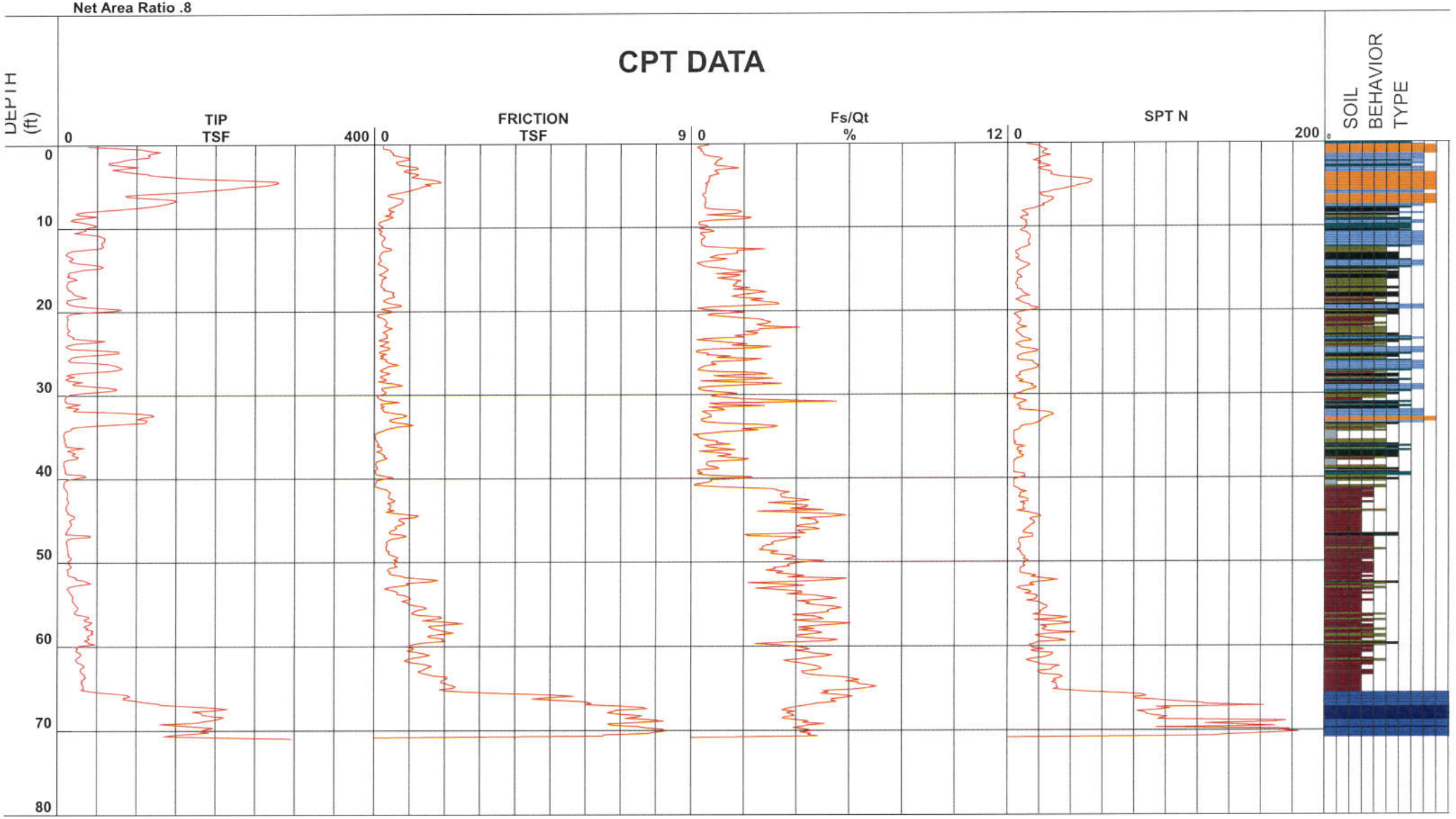
COMMENT:

Stoney-Miller Consultants, Inc.

Project	SEJPA Operations Building	Operator	DG-RC	Filename	SDF(164).cpt
Job Number	50093-00	Cone Number	DDG1281	GPS	
Hole Number	CPT-01	Date and Time	10/11/2016 8:28:26 AM	Maximum Depth	71.03 ft
EST GW Depth During Test		5.00 ft			

Net Area Ratio .8

CPT DATA



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

SEJPA Operations Building

Project ID: Stoney Miller
Data File: SDF(165).cpt
CPT Date: 10/11/2016 9:22:49 AM
GW During Test: 5 ft

Sounding ID: CPT-32
Project No: 50093-02
Cone/Rig: DDG1281

Depth ft	qc PS tsf	qc/n PS -	qincs PS -	qt PS tsf	Slv Stss tsf	pore pres (psi)	Frct Ratio %	Mat Typ Zon	Material Behavior Descriptor	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Fric Ang deg	Und Shr tsf	OCR -	Fin Ic %	Ic SBT Indx	Nk -	Vol Strn %	Cycl SSin %
0.33	138.6	222.3	255.7	138.6	2.4	-0.9	1.8	6	clean SAND to silty SAND	125	5.0	28	44	93	48	-	-	9	1.65	16	N/A	N/A
0.49	147.6	237.0	287.8	147.8	3.4	-1.1	2.3	6	clean SAND to silty SAND	125	5.0	30	47	95	48	-	-	11	1.93	16	N/A	N/A
0.66	113.9	182.7	282.4	113.9	4.1	-0.8	3.6	8	stiff SAND to clayy SAND	115	5.0	23	37	87	48	-	-	17	2.15	16	N/A	N/A
0.82	151.3	242.7	295.9	151.3	3.6	-1.0	2.4	6	clean SAND to silty SAND	125	5.0	30	49	95	48	-	-	11	1.92	16	N/A	N/A
0.98	186.9	299.8	328.1	186.9	3.4	-1.5	1.8	6	clean SAND to silty SAND	125	5.0	37	60	95	48	-	-	8	1.78	16	N/A	N/A
1.15	201.0	322.4	362.0	201.0	4.3	-1.8	2.1	6	clean SAND to silty SAND	125	5.0	40	64	98	48	-	-	9	1.82	16	N/A	N/A
1.31	172.5	276.7	353.1	172.5	5.1	-1.0	3.0	8	stiff SAND to clayy SAND	115	5.0	35	55	95	48	-	-	12	1.98	16	N/A	N/A
1.48	124.7	200.0	284.9	124.7	4.0	-1.0	3.2	8	stiff SAND to clayy SAND	115	5.0	25	40	90	48	-	-	15	2.08	16	N/A	N/A
1.64	121.6	195.1	295.0	121.6	4.4	-1.2	3.6	8	stiff SAND to clayy SAND	115	5.0	24	39	89	48	-	-	17	2.13	16	N/A	N/A
1.80	121.6	195.0	289.1	121.6	4.2	-2.1	3.4	8	stiff SAND to clayy SAND	115	5.0	24	39	89	48	-	-	16	2.12	16	N/A	N/A
1.97	139.3	223.3	294.8	139.2	4.0	-2.0	2.8	8	stiff SAND to clayy SAND	115	5.0	28	45	94	48	-	-	13	2.02	16	N/A	N/A
2.13	161.4	258.8	296.6	161.3	3.3	-2.2	2.0	6	clean SAND to silty SAND	125	5.0	32	52	95	48	-	-	9	1.86	16	N/A	N/A
2.30	167.4	269.8	290.0	167.4	2.7	-1.5	1.6	6	clean SAND to silty SAND	125	5.0	33	54	95	48	-	-	7	1.76	16	N/A	N/A
2.46	182.7	293.1	306.0	182.7	2.7	-1.9	1.5	6	clean SAND to silty SAND	125	5.0	37	59	95	48	-	-	6	1.72	16	N/A	N/A
2.62	183.5	294.4	315.4	183.5	3.1	-1.9	1.7	6	clean SAND to silty SAND	125	5.0	37	59	95	48	-	-	7	1.75	16	N/A	N/A
2.79	162.5	260.6	288.3	162.5	2.8	-1.7	1.7	6	clean SAND to silty SAND	125	5.0	32	52	95	48	-	-	8	1.80	16	N/A	N/A
2.95	143.1	229.5	257.5	143.0	2.4	-1.7	1.7	6	clean SAND to silty SAND	125	5.0	29	46	94	48	-	-	9	1.82	16	N/A	N/A
3.12	133.4	213.8	245.4	133.4	2.3	-1.6	1.7	6	clean SAND to silty SAND	125	5.0	27	43	92	48	-	-	9	1.85	16	N/A	N/A
3.28	114.4	183.5	253.7	114.4	2.5	-1.5	2.2	5	silty SAND to sandy SILT	120	3.0	38	61	87	48	-	-	12	1.98	16	N/A	N/A
3.45	82.3	131.9	210.8	82.2	2.5	-1.5	3.0	5	silty SAND to sandy SILT	120	3.0	27	44	76	47	-	-	18	2.17	16	N/A	N/A
3.61	65.9	105.7	174.7	65.9	1.8	-1.2	2.7	5	silty SAND to sandy SILT	120	3.0	22	35	69	46	-	-	19	2.19	16	N/A	N/A
3.77	62.1	99.7	137.7	62.1	1.0	-1.2	1.6	5	silty SAND to sandy SILT	120	3.0	21	33	67	45	-	-	15	2.05	16	N/A	N/A
3.94	70.9	113.7	136.2	70.8	0.9	-1.3	1.2	6	clean SAND to silty SAND	125	5.0	14	23	71	46	-	-	11	1.93	16	N/A	N/A
4.10	85.1	136.4	159.5	85.0	1.1	-1.4	1.3	6	clean SAND to silty SAND	125	5.0	17	27	77	46	-	-	10	1.88	16	N/A	N/A
4.27	80.8	129.6	165.9	80.8	1.4	-1.5	1.7	6	clean SAND to silty SAND	125	5.0	16	26	76	46	-	-	13	1.98	16	N/A	N/A
4.43	74.5	119.5	188.9	74.5	2.0	-1.5	2.7	5	silty SAND to sandy SILT	120	3.0	25	40	73	46	-	-	18	2.16	16	N/A	N/A
4.59	61.2	98.2	173.3	61.2	1.8	-1.4	2.9	5	silty SAND to sandy SILT	120	3.0	20	32	66	44	-	-	20	2.24	16	N/A	N/A
4.76	59.5	95.3	142.2	59.4	1.1	-1.2	1.9	5	silty SAND to sandy SILT	120	3.0	20	32	65	44	-	-	18	2.12	16	N/A	N/A
4.92	126.1	202.2	230.5	126.1	2.0	-2.0	1.6	6	clean SAND to silty SAND	125	5.0	25	40	90	47	-	-	9	1.84	16	N/A	N/A
5.09	112.4	180.3	240.2	112.4	2.8	-2.2	2.5	5	silty SAND to sandy SILT	120	3.0	37	60	86	47	-	-	14	2.02	16	0.00	0.0
5.25	165.7	265.8	308.5	165.7	3.5	-1.7	2.1	6	clean SAND to silty SAND	125	5.0	33	53	95	48	-	-	10	1.87	16	0.00	0.0
5.41	226.3	363.0	382.7	226.3	4.0	-2.5	1.8	6	clean SAND to silty SAND	125	5.0	45	73	98	48	-	-	7	1.72	16	0.00	0.0
5.58	241.7	387.6	405.9	241.6	4.3	-2.6	1.8	6	clean SAND to silty SAND	125	5.0	48	78	98	48	-	-	6	1.71	16	0.00	0.0
5.74	235.0	376.8	403.0	234.9	4.5	-2.7	1.9	6	clean SAND to silty SAND	125	5.0	47	75	95	48	-	-	7	1.75	16	0.00	0.0
5.91	225.6	361.8	390.2	225.5	4.3	-2.5	1.9	6	clean SAND to silty SAND	125	5.0	45	72	96	48	-	-	7	1.76	16	0.00	0.0
6.07	212.9	341.5	357.8	212.9	3.9	-2.5	1.9	6	clean SAND to silty SAND	125	5.0	42	68	95	48	-	-	7	1.76	16	0.00	0.0
6.23	202.8	325.3	347.6	202.8	3.5	-2.7	1.7	6	clean SAND to silty SAND	125	5.0	41	65	95	48	-	-	7	1.75	16	0.00	0.0
6.40	202.8	325.4	333.5	202.8	2.9	-3.2	1.4	6	clean SAND to silty SAND	125	5.0	41	65	95	48	-	-	6	1.68	16	0.00	0.0
6.56	198.8	318.8	322.3	198.8	2.7	-2.6	1.3	6	clean SAND to silty SAND	125	5.0	40	64	95	48	-	-	5	1.66	16	0.00	0.0
6.73	186.8	299.7	301.5	186.8	2.3	-2.3	1.3	6	clean SAND to silty SAND	125	5.0	37	60	93	48	-	-	5	1.65	16	0.00	0.0
6.89	157.5	252.6	273.2	157.4	2.4	-2.5	1.5	6	clean SAND to silty SAND	125	5.0	31	51	95	48	-	-	7	1.76	16	0.00	0.0
7.05	108.4	173.8	226.5	108.4	2.5	-1.7	2.3	5	silty SAND to sandy SILT	120	3.0	36	58	85	46	-	-	13	2.00	16	0.00	0.0
7.22	51.1	81.8	183.2	51.1	1.9	-1.2	3.8	4	clayy SILT to silty CLAY	115	2.0	26	41	-	-	3.6	9.9	26	2.38	15	0.00	0.0
7.38	29.2	46.3	143.2	29.2	1.1	-0.9	3.9	4	clayy SILT to silty CLAY	115	2.0	15	23	-	-	2.0	9.9	33	2.56	15	0.38	1.2
7.55	68.3	107.8	162.7	68.3	1.5	-0.9	2.2	5	silty SAND to sandy SILT	120	3.0	23	36	69	44	-	-	17	2.13	16	0.00	0.0
7.71	73.8	115.8	168.0	73.8	1.6	-0.9	2.2	5	silty SAND to sandy SILT	120	3.0	25	39	72	44	-	-	16	2.10	16	0.00	0.0
7.87	80.8	133.8	174.5	80.8	1.8	0.5	1.8	5	silty SAND to sandy SILT	120	3.0	29	45	77	45	-	-	13	2.00	16	0.00	0.0
8.04	108.2	169.2	197.7	108.1	1.7	-2.0	1.5	6	clean SAND to silty SAND	125	5.0	22	34	84	46	-	-	10	1.88	16	0.00	0.0
8.20	87.0	134.0	168.4	87.0	1.1	-1.4	1.3	6	clean SAND to silty SAND	125	5.0	17	27	77	44	-	-	10	1.83	16	0.18	1.5
8.37	77.5	119.6	149.7	77.5	1.1	-1.2	1.5	6	clean SAND to silty SAND	125	5.0	16	24	73	44	-	-	12	1.97	16	0.29	1.9
8.53	58.2	89.5	142.6	58.2	1.2	-2.6	2.1	5	silty SAND to sandy SILT	120	3.0	19	29	65	42	-	-	18	2.18	16	0.49	2.6
8.69	36.8	56.6	132.5	36.8	1.1	-0.1	2.9	4	clayy SILT to silty CLAY	115	2.0	18	28	-	-	2.6	9.9	27	2.42	15	1.03	19.5
8.86	30.0	45.2	112.2	30.0	0.7	0.0	2.5	5	silty SAND to sandy SILT	120	3.0	10	15	41	38	-	-	28	2.44	16	2.01	49.9
9.02	36.1	53.9	97.5	36.0	0.8	-1.0	1.6	5	silty SAND to sandy SILT	120	3.0	12	19	47	40	-	-	21	2.25	16	2.38	38.9
9.18	29.5	43.8	90.1	29.5	0.5	0.6	1.6	5	silty SAND to sandy SILT	120	3.0	10	16	40	38	-	-	24	2.33	16	2.55	51.2
9.35	23.1	34.1	88.7	23.1	0.4	1.2	2.0	5	silty SAND to sandy SILT	120	3.0	8	11	32	37	-	-	28	2.46	16	2.58	51.2
9.51	21.0	30.9	80.0	21.0	0.3	1.6	1.7	5	silty SAND to sandy SILT	120	3.0	7	10	28	36	-	-	28	2.46	16	2.61	51.2
9.68	20.4	29.9	71.6	20.4	0.3	0.1	1.4	5	silty SAND to sandy SILT	120	3.0	7	10	27	36	-	-	27	2.42	16	3.07	51.2
9.84	17.4	25.4	68.6	17.5	0.2	1.1	1.4	5	silty SAND to sandy SILT	120	3.0	6	8	22	35	-	-	30	2.49	16	3.18	51.2
10.01	19.8	29.7	68.6	19.9	0.2	2.2	1.3	5	silty SAND to sandy SILT	120	3.0	7	10	26	36	-	-	27	2.42	16	3.19	51.2
10.17	26.2	37.7	74.5	26.2	0.3	1.8	1.2	5	silty SAND to sandy SILT	120	3.0	9	13	35	37	-	-	23	2.31	16	2.99	51.2
10.34	33.0	47.3	81.4	33.0	0.4	0.8	1.2	5	silty SAND to sandy SILT	120	3.0	11	16	42	39	-	-	20	2.22	16	2.77	47.3
10.50	38.0	54.2	85.2	38.0	0.4	0.5	1.2	5	silty SAND to sandy SILT	120	3.0	13	18	47	39	-	-	18	2.17	16	2.64	39.8
10.66	44.0	62.5	92.3	44.1	0.5	0.5	1.2	5	silty SAND to sandy SILT	120	3.0	15	21	51	40	-	-	16	2.11	16	2.50	32.4
10.83	51.5	72.7	101.0	51.5	0.6	0.3	1.2	5	silty SAND to sandy SILT	120	3.0	17	24	56	41	-	-	15	2.06	16	2.32	26.7
10.99	58.7	82.5	109.4	58.7	0.7	0.3	1.2	6	clean SAND to silty SAND	125	5.0	12	16	61	42	-	-	13	2.02	16	2.17	22.2
11.16	62.1	86.7	112.2	62.1	0.7	0.3	1.1	6	clean SAND to silty SAND	125	5.0	12	17	62	42	-	-	13	2.00	16	2.13	20.9
11.32	60.8	84.4	110.9	60.8	0.7	0.3	1.2	6	clean SAND to silty SAND	125	5.0	12	17	61	42	-	-	13	2.01	16	2.15	21.8
11.48	57.5	79.5	105.5	57.5	0.6	0.4	1.1	6	clean SAND to silty SAND	125	5.0	12	16	59	41	-	-	13	2.02	16	2.24	23.4
11.65	52.5	72.2	93.6	52.5	0.5	0.4	0.9	6	clean SAND to silty SAND	125	5.0	11	14	56	41	-	-	13	2.00	16	2.47	27.0
11.81	54.4	74.9	95.6	54.4	0.5	0.3	0.9	6	clean SAND to silty SAND	125	5.0	11	15	57	41	-	-	13	1.99	16	2.42	25.9
11.98	62.6	85.2	103.1	62.6	0.5	0.6	0.8	6	clean SAND to silty SAND	125	5.0	13	17	62	42	-	-	11	1.92	16	2.28	21.3
12.14	54.3	73.5	102.4	54.3	0.6	0.7	1.2	5	silty SAND to sandy SILT	120	3.0	18	24	57	41	-	-	15	2.06	16	2.29	26.3
12.30	30.9	41.6	109.1	30.9	0.8	0.9	2.5	5	silty SAND to sandy SILT	120	3.0	10	14	38	38	-	-	29	2.47	16	2.18	51.2
12.47	14.0	22.4	-	14.0	0.6	1.3	4.3	3	silty CLAY to CLAY	115	1.5	9	15	-	-	0.9	9.3	48	2.84	15	-	-
12.63	9.7	15.6	-	9.7	0.2	0.7	2.8	4	clayy SILT to silty CLAY	115	2.0	5	8	-	-	0.6	5.6	49	2.85	15	-	-
12.80	10.1	16.2	-	10.1	0.2	1.8	1.6	4	clayy SILT to silty CLAY	115	2.0	5	8	-	-	0.7	5.9	42	2.71	15	-	-
12.96	9.7	15.6	-	9.8	0.2	2.4	1.9	4	clayy SILT to silty CLAY	115	2.0	5	8	-	-	0.7	5.5	43	2.75	15	-	-
13.12	8.2	13.2	-	8.3	0.2	2.6	2.2	4	clayy SILT to silty CLAY	115	2.0	4	7	-	-	0.5	4.5	49	2.86	15	-	-
13.29	16.2	21.3	87.4	16.3	0.2	2.8	1.5	4	clayy SILT to silty CLAY	115	2.0	8	11	-	-	1.1	9.3	31	2.57	15	3.23	51.2
13.45	21.0	27.5	63.2	21.1	0.2	2.9	1.1	5	silty SAND to sandy SILT	120	3.0	7	9	24	35	-	-	26	2.40	16	3.40	51.2
13.62	35.6	46.4	75.8	35.6	0.3	1.9	1.0	5	silty SAND to sandy SILT	120	3.0	12	15	42	39	-	-	19	2.19	16	2.93	48.4
13.78	45.4	58.9	88.1	45.4	0.5	0.5	1.1	5	silty SAND to sandy SILT	120	3.0	15	20	50	39	-	-	16	2.12	16	2.59	34.9
13.94	56.1	72.5	99.6	56.0	0.6	-3.1	1.1	5	silty SAND to sandy SILT	120	3.0	13	24	56	40	-	-	14	2.05	16	2.35	26.8
14.11	49.5	63.7	117.5	49.5	1.0	-2.5	2.0	5	silty SAND to sandy SILT	120	3.0	16	21	52	40	-	-	21	2.27	16	2.04	31.7
14.27	30.7	39.4	102.3	30.7	0.7	-2.4	2.3	5	silty SAND to sandy SILT	120	3.0	10	13	36	37	-	-	29	2.47	16	2.29	51.2
14.44	17.2	27.5	-	17.1	0.5	-0.6	3.2	4	clayy SILT to silty CLAY	115	2.0	9	14	-	-	1.2	9.3	39	2.68	15	-	-
14.60	13.3	21.4	-	13.3	0.5	-0.4	3.7	3	silty CLAY to CLAY	115	1.5	9	14	-	-	0.9	7.0	47	2.81	15	-	-
14.76	14.9	23.8	-	14.9	0.5	-0.3	3.6	4	clayy SILT to silty CLAY	115	2.0	7	12	-	-	1.0	7.9	44	2.76	15	-	-
14.93	16.6	26.7	-	16.6	0.5	-0.3	3.4	4	clayy SILT to silty CLAY	115	2.0	8	13	-	-	1.1	8.8	41	2.71	15	-	-
15.09	13.7	22.0	-	13.7	0.5	-0.5	3.8	3	silty CLAY to CLAY	115	1.5	9	15	-	-	0.9	7.1	46	2.81	15	-	-
15.26	11.3	18.1	-	11.3	0.4	-0.3	3.8	3	silty CLAY to CLAY	115	1.5	8	12	-	-	0.8	6.7	51	2.88	15	-	-
15.42	21.6	30.9	85.7	21.6	0.5	-0.2	2.4	4	clayy SILT to silty CLAY	115	2.0	11	15	-	-	1.5	9.9	34	2.57	15	2.49	51.2

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

Middle Earth Geo Testing

SEJPA Operations Building

Project ID: Stoney Miller
Data File: SEP(165).cpt
CPT Date: 10/ 1/2015 9:22:49 AM
GW During Test: 3 ft

Sounding ID: CPT-02
Project No: 50095-02
Cone/Rig: DDG1281

Depth ft	qc PS tsf	qcln PS -	qlncs PS -	qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Rato %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT N-N 60%	SPT N-1 60%	Rel Den %	Fin Ang deg	Jnd Shr tsf	OCR -	Fin Fc %	Ic SBT Indx	Nk -	Vel Strn %	Cycl Strn %
15.58	27.7	34.5	95.4	27.7	0.6	-1.0	2.2	4	clayy SILT to silty CLAY	115	2.0	14	17	-	-	1.9	5.9	31	2.50	15	2.43	51.2
15.75	17.5	28.1	-	17.5	0.6	-1.0	3.6	4	clayy SILT to silty CLAY	115	2.0	9	14	-	-	1.2	9.9	41	2.71	15	-	-
15.91	14.0	22.5	-	14.0	0.5	-0.8	3.8	3	silty CLAY to CLAY	115	1.5	9	16	-	-	0.9	7.0	46	2.81	15	-	-
16.08	13.3	21.3	-	13.3	0.5	-0.8	3.7	3	silty CLAY to CLAY	115	1.5	9	14	-	-	0.9	6.5	47	2.81	15	-	-
16.24	17.9	24.3	-	17.9	0.4	-0.7	2.3	4	clayy SILT to silty CLAY	115	2.0	9	12	-	-	1.2	8.9	37	2.64	15	-	-
16.40	14.6	22.9	-	14.4	0.3	-1.2	2.1	4	clayy SILT to silty CLAY	115	2.0	7	11	-	-	1.0	7.0	37	2.64	15	-	-
16.57	11.4	18.0	-	11.4	0.2	-1.3	2.1	4	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.8	5.4	42	2.73	15	-	-
16.73	12.3	19.2	-	12.2	0.2	-1.0	2.1	4	clayy SILT to silty CLAY	115	2.0	6	10	-	-	0.8	5.8	41	2.71	15	-	-
16.90	17.8	27.7	-	17.8	0.4	-0.9	2.5	4	clayy SILT to silty CLAY	115	2.0	9	14	-	-	1.2	8.6	36	2.62	15	-	-
17.06	21.6	28.8	-	21.6	0.6	-1.0	2.7	4	clayy SILT to silty CLAY	115	2.0	11	14	-	-	1.5	9.9	36	2.62	15	-	-
17.23	19.8	26.3	-	19.8	0.4	-1.1	2.3	4	clayy SILT to silty CLAY	115	2.0	10	13	-	-	1.4	9.5	36	2.61	15	-	-
17.39	12.6	19.2	-	12.6	0.4	-0.8	3.5	3	silty CLAY to CLAY	115	1.5	8	13	-	-	0.8	5.8	48	2.84	15	-	-
17.55	11.7	17.7	-	11.7	0.3	-0.7	2.9	4	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.8	5.5	47	2.82	15	-	-
17.72	10.6	16.0	-	10.6	0.3	-0.6	2.8	3	silty CLAY to CLAY	115	1.5	7	11	-	-	0.7	4.7	49	2.85	15	-	-
17.88	10.8	16.1	-	10.8	0.3	-0.5	3.0	3	silty CLAY to CLAY	115	1.5	7	11	-	-	0.7	4.8	50	2.86	15	-	-
18.05	17.2	22.3	71.1	17.2	0.3	-0.5	1.6	4	clayy SILT to silty CLAY	115	2.0	9	11	-	-	1.2	7.9	34	2.58	15	3.09	51.2
18.21	26.9	31.8	76.2	26.9	0.4	-1.0	1.5	5	silty SAND to sandy SILT	120	3.0	9	11	29	35	-	-	27	2.42	16	2.82	51.2
18.37	14.9	21.8	-	14.9	0.3	-1.5	1.9	4	clayy SILT to silty CLAY	115	2.0	7	11	-	-	1.0	6.7	37	2.63	15	-	-
18.54	10.2	14.8	-	10.2	0.2	-1.4	2.3	4	clayy SILT to silty CLAY	115	2.0	5	7	-	-	0.7	4.4	48	2.83	15	-	-
18.70	8.8	12.7	-	8.8	0.2	-1.3	2.3	3	silty CLAY to CLAY	115	1.5	6	8	-	-	0.6	3.7	52	2.90	15	-	-
18.87	10.6	15.2	-	10.6	0.3	-1.2	2.7	3	silty CLAY to CLAY	115	1.5	7	10	-	-	0.7	4.5	50	2.86	15	-	-
19.03	12.8	18.2	-	12.7	0.3	-1.2	2.6	4	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.8	5.5	45	2.78	15	-	-
19.19	13.3	19.0	-	13.3	0.4	-1.1	3.1	4	clayy SILT to silty CLAY	115	2.0	7	9	-	-	0.8	5.7	47	2.81	15	-	-
19.36	16.0	22.6	-	16.0	0.5	-1.1	3.1	4	clayy SILT to silty CLAY	115	2.0	8	11	-	-	1.1	6.9	43	2.75	15	-	-
19.52	15.2	21.4	-	15.2	0.6	-1.2	4.1	3	silty CLAY to CLAY	115	1.5	10	14	-	-	1.0	6.5	49	2.85	15	-	-
19.69	18.5	25.8	-	18.5	0.7	-1.2	3.9	4	clayy SILT to silty CLAY	115	2.0	9	13	-	-	1.3	8.0	44	2.76	15	-	-
19.85	22.6	31.3	-	22.6	0.8	-1.0	3.7	4	clayy SILT to silty CLAY	115	2.0	11	16	-	-	1.5	9.6	39	2.68	15	-	-
20.01	31.5	35.3	105.8	31.4	0.8	-2.3	2.6	4	clayy SILT to silty CLAY	115	2.0	16	18	-	-	2.2	9.9	32	2.53	15	2.23	51.2
20.18	32.7	36.1	91.1	32.6	0.6	-5.6	1.8	5	silty SAND to sandy SILT	120	3.0	11	12	33	36	-	-	28	2.45	16	2.52	51.2
20.34	17.8	24.2	-	17.8	0.6	-5.3	3.6	4	clayy SILT to silty CLAY	115	2.0	9	12	-	-	1.2	7.4	44	2.77	15	-	-
20.51	12.9	17.4	-	12.8	0.4	-2.5	3.8	3	silty CLAY to CLAY	115	1.5	8	12	-	-	0.9	5.2	52	2.89	15	-	-
20.67	10.7	14.4	-	10.7	0.4	-1.5	3.7	3	silty CLAY to CLAY	115	1.5	7	10	-	-	0.7	4.2	56	2.97	15	-	-
20.83	10.4	13.9	-	10.4	0.3	-1.0	3.5	3	silty CLAY to CLAY	115	1.5	7	9	-	-	0.7	4.0	56	2.96	15	-	-
21.00	11.7	15.5	-	11.7	0.5	-0.8	4.4	3	silty CLAY to CLAY	115	1.5	9	13	-	-	0.8	4.6	57	2.99	15	-	-
21.16	19.4	25.7	-	19.4	0.4	-0.8	2.3	4	clayy SILT to silty CLAY	115	2.0	10	13	-	-	1.3	7.9	36	2.62	15	-	-
21.33	14.7	19.3	-	14.6	0.2	-2.1	1.8	4	clayy SILT to silty CLAY	115	2.0	7	10	-	-	1.0	5.8	39	2.67	15	-	-
21.49	9.7	12.7	-	9.7	0.2	-1.8	2.4	3	silty CLAY to CLAY	115	1.5	6	8	-	-	0.6	3.7	52	2.90	15	-	-
21.65	9.9	12.9	-	9.9	0.2	-1.3	2.4	3	silty CLAY to CLAY	115	1.5	7	9	-	-	0.6	3.7	52	2.90	15	-	-
21.82	9.9	12.9	-	9.9	0.2	-1.2	2.8	3	silty CLAY to CLAY	115	1.5	7	9	-	-	0.6	3.7	55	2.94	15	-	-
21.98	9.6	12.7	-	9.6	0.3	-1.2	3.0	3	silty CLAY to CLAY	115	1.5	6	8	-	-	0.6	3.5	57	2.98	15	-	-
22.15	10.5	13.2	-	10.3	0.3	-1.2	3.0	3	silty CLAY to CLAY	115	1.5	7	9	-	-	0.7	3.8	55	2.95	15	-	-
22.31	11.2	14.2	-	11.1	0.3	-1.2	2.8	3	silty CLAY to CLAY	115	1.5	7	9	-	-	0.7	4.1	51	2.88	15	-	-
22.47	10.6	13.4	-	10.6	0.3	-1.0	3.0	3	silty CLAY to CLAY	115	1.5	7	9	-	-	0.7	3.9	55	2.94	15	-	-
22.64	10.9	13.7	-	10.8	0.3	-1.0	3.0	3	silty CLAY to CLAY	115	1.5	7	9	-	-	0.7	4.0	54	2.92	15	-	-
22.80	11.6	14.5	-	11.6	0.4	-1.0	4.1	3	silty CLAY to CLAY	115	1.5	8	10	-	-	0.8	4.2	58	2.99	15	-	-
22.97	18.4	23.0	-	18.4	0.7	-0.9	4.2	3	silty CLAY to CLAY	115	1.5	12	15	-	-	1.2	7.0	47	2.82	15	-	-
23.13	43.0	46.4	105.8	42.9	0.9	-1.4	2.2	5	silty SAND to sandy SILT	120	3.0	14	16	42	37	-	-	26	2.39	16	2.23	48.3
23.30	60.5	65.2	96.4	60.4	0.7	-5.5	1.2	5	silty SAND to sandy SILT	120	3.0	20	22	53	39	-	-	16	2.11	16	2.41	30.9
23.46	56.7	60.9	79.6	55.6	0.4	-5.7	0.7	6	clean SAND to silty SAND	125	5.0	11	12	57	38	-	-	13	2.00	16	2.82	33.4
23.62	41.8	44.8	75.4	41.7	0.4	-4.2	1.0	5	silty SAND to sandy SILT	120	3.0	14	15	40	37	-	-	19	2.21	16	2.95	50.4
23.79	23.0	24.8	58.4	23.0	0.3	-3.4	1.4	5	silty SAND to sandy SILT	120	3.0	8	8	21	33	-	-	31	2.50	16	3.19	51.2
23.95	11.2	13.5	-	11.2	0.2	-2.9	2.2	4	clayy SILT to silty CLAY	115	2.0	6	7	-	-	0.7	3.9	50	2.86	15	-	-
24.12	9.9	11.8	-	9.8	0.2	-2.3	2.2	3	silty CLAY to CLAY	115	1.5	7	8	-	-	0.6	3.3	55	2.92	15	-	-
24.28	10.1	12.0	-	10.1	0.3	-2.1	3.0	3	silty CLAY to CLAY	115	1.5	7	8	-	-	0.7	3.4	62	3.05	15	-	-
24.44	29.7	27.2	75.8	29.7	0.4	-1.7	1.6	5	silty SAND to sandy SILT	120	3.0	9	9	24	33	-	-	31	2.60	16	2.93	51.2
24.61	43.1	45.5	80.8	45.1	0.5	-2.9	1.2	5	silty SAND to sandy SILT	120	3.0	14	15	41	37	-	-	20	2.24	16	2.78	49.5
24.77	50.6	53.2	90.3	50.6	0.7	-2.9	1.3	5	silty SAND to sandy SILT	120	3.0	17	18	46	38	-	-	19	2.21	16	2.64	40.6
24.94	53.9	56.5	85.1	53.8	0.5	-4.9	1.0	5	silty SAND to sandy SILT	120	3.0	18	19	48	38	-	-	17	2.13	16	2.87	37.3
25.10	35.3	36.9	87.1	35.2	0.6	-6.0	1.7	5	silty SAND to sandy SILT	120	3.0	12	12	34	35	-	-	27	2.41	16	2.82	51.2
25.26	19.2	22.1	-	19.1	0.6	-5.6	3.2	4	clayy SILT to silty CLAY	115	2.0	10	11	-	-	1.3	6.7	44	2.76	15	-	-
25.43	17.8	20.5	-	17.8	0.4	-4.1	2.4	4	clayy SILT to silty CLAY	115	2.0	9	10	-	-	1.2	6.2	42	2.72	15	-	-
25.59	24.7	25.6	78.3	24.6	0.4	-2.4	1.6	4	clayy SILT to silty CLAY	115	2.0	12	13	-	-	1.7	8.7	34	2.56	15	2.82	51.2
25.76	28.7	29.7	70.4	28.6	0.3	-1.5	1.3	5	silty SAND to sandy SILT	120	3.0	10	10	27	34	-	-	27	2.41	16	3.12	51.2
25.92	50.3	52.5	75.7	50.9	0.7	-1.6	0.8	5	silty SAND to sandy SILT	120	3.0	17	18	46	37	-	-	16	2.10	16	2.91	41.4
26.08	43.1	44.3	70.8	43.0	0.4	-1.2	0.9	5	silty SAND to sandy SILT	120	3.0	14	15	40	36	-	-	18	2.17	16	3.10	51.0
26.25	49.0	50.3	67.6	49.0	0.3	-1.0	0.6	6	clean SAND to silty SAND	125	5.0	10	10	44	37	-	-	14	2.03	16	3.22	43.8
26.41	46.8	47.9	63.4	46.8	0.2	-1.0	0.5	6	clean SAND to silty SAND	125	5.0	9	10	43	37	-	-	13	2.02	16	3.40	46.6
26.58	48.5	49.5	62.8	48.5	0.2	-0.9	0.4	6	clean SAND to silty SAND	125	5.0	10	10	44	37	-	-	12	1.98	16	3.42	44.7
26.74	38.6	39.3	60.1	38.6	0.5	-0.8	1.4	5	silty SAND to sandy SILT	120	3.0	13	13	36	36	-	-	24	2.33	16	2.80	51.2
26.90	19.7	21.5	-	19.7	0.4	-0.6	2.3	4	clayy SILT to silty CLAY	115	2.0	10	11	-	-	1.3	6.5	40	2.69	15	-	-
27.07	52.2	52.8	71.9	52.2	0.3	-0.6	0.7	6	clean SAND to silty SAND	125	5.0	10	11	46	37	-	-	14	2.04	16	3.06	41.0
27.23	58.4	59.0	92.8	58.4	0.7	-1.2	1.3	5	silty SAND to sandy SILT	120	3.0	19	20	50	38	-	-	18	2.16	16	2.48	34.8
27.40	22.9	25.7	-	23.3	0.8	-1.0	3.6	4	clayy SILT to silty CLAY	115	2.0	12	13	-	-	1.6	7.9	43	2.75	15	-	-
27.56	12.0	12.9	-	12.0	0.5	-0.9	4.6	3	silty CLAY to CLAY	115	1.5	8	9	-	-	0.8	3.7	63	3.07	15	-	-
27.72	9.2	9.8	-	9.2	0.1	-0.6	1.4	4	clayy SILT to silty CLAY	115	2.0	5	5	-	-	0.6	2.6	52	2.90	15	-	-
27.88	9.3	9.9	-	9.3	0.1	-0.3	1.3	4	clayy SILT to silty CLAY	115	2.0	5	5	-	-	0.6	2.7	51	2.89	15	-	-
28.05	11.7	12.4	-	11.7	0.1	-0.1	1.4	4	clayy SILT to silty CLAY	115	2.0	6	6	-	-	0.8	3.5	46	2.79	15	-	-
28.22	14.0	14.7	-	14.0	0.2	0.8	1.3	4	clayy SILT to silty CLAY	115	2.0	7	7	-	-	0.9	4.3	41	2.71	15	-	-
28.38	9.5	10.0	-	9.6	0.5	0.8	3.4	3	silty CLAY to CLAY	115	1.5	6	7	-	-	0.6	2.7	65	3.10	15	-	-
28.54	9.1	9.4	-	9.1	0.2	1.0	3.0	3	silty CLAY to CLAY	115	1.5	6	6	-	-	0.6	2.5	65	3.06	15	-	-
28.71	54.7	54.1	79.1	54.7	0.5	0.8	0.9	5	silty SAND to sandy SILT	120	3.0	18	18	47	37	-	-	16	2.10	16	2.83	38.7
28.87	96.0	94.7	119.3	96.0	1.0	0.4	1.1	6	clean SAND to silty SAND	125	5.0	19	19	65	40	-	-	12	1.96	16	2.04	18.4
29.04	110.5	108.7	136.2	110.5	1.4	0.4	1.3	6	clean SAND to silty SAND	125	5.0	22	22	70	41	-	-	12	1.96	16	1.49	8.0
29.20	117.9	115.7	141.9	117.9	1.5	0.5	1.3	6	clean SAND to silty SAND	125	5.0	24	23	72	41	-	-	11	1.94	16	1.21	5.8
29.36	108.5	106.2	131.6	108.5	1.3	0.7	1.2	6	clean SAND to silty SAND	125	5.0	22	21	69	41	-	-	12	1.95	16	1.71	10.3
29.53	109.5	107.0	127.0	109.6	1.1	0.9	1.0	6	clean SAND to silty SAND	125	5.0	22	21	69	41	-	-	10	1.90	16	1.87	13.0
29.69	101.5	98.9	120.7	101.6	1.0	1.0	1.0	6	clean SAND to silty SAND	125	5.0	20	20	67	41	-	-	11	1.93	16	2.00	17.3
29.86	74.6	72.3	109.0	74.6	1.0	1.3	1.4	5	silty SAND to sandy SILT	120	3.0	25	24	58	39	-	-	17	2.13	16	2.18	26.9
30.02	60.7	59.8	119.1	60.7	1.1	1.5	1.9	5	silty SAND to sandy SILT	120	3.0	20	20	49	38	-	-	22	2.28	16	2.76	35.0
30.19	32.9	32.6	-	33.0	1.0	1.8	3.1	4	clayy SILT to silty CLAY	115	2.0	16	16	-	-	2.3	9.9	36	2.61	15	-	-
30.35	16.7	16.5	-	16.7	0.6	2.1	3.9	3	silty CLAY to CLAY	115	1.5	11	11	-	-	1.4	4.8	54	2.93	15	-	-
30.51	10.1	9.9	-	10.2	0.2	2.3	3.0	3	silty CLAY to CLAY	115	1.5	7	7	-	-	0.6	2.7	63	3.07	15	-	-
30.66	7.9	7.7	-	8.0	0.1	2.5	2.9	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	2.0	67	3.12	15	-	-
30.84	7.2	7.0	-	7.3	0.1	2.6	1.9	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.4	1.7	68	3.14	15	-	-

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

Middle Earth Geo Testing

Project ID: Stoney Miller
Data File: SBI(165).cpt
CPT Date: 10/11/2016 9:22:49 AM
GW During Test: 5 ft

Sounding ID: CPT-02
Project No: 50093-03
Cone/Rig: DDGI28I

Depth ft	qc tsf	qcln tsf	qlncs fs	qt tsf	Slv Stss tsf	pore pres (psi)	Frct Ratio %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT N-BN 60%	SPT N-Nl 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	Fin Fc %	Ic SBT Indx	Nk -	Vol Strn %	Cycl Strn %
31.01	7.3	7.1	-	7.4	0.1	2.7	1.9	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.4	1.8	67	3.13	15	-	-
31.17	7.7	7.4	-	7.7	0.1	2.7	1.8	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	1.9	65	3.09	15	-	-
31.33	8.7	8.3	-	8.7	0.0	2.7	0.2	1	sensitive fine SOIL	115	2.0	4	4	-	-	0.5	2.2	42	2.72	15	-	-
31.50	8.9	8.5	-	8.9	0.1	2.8	0.8	4	clayy SILT to silty CLAY	115	2.0	4	4	-	-	0.6	2.2	50	2.87	15	-	-
31.66	9.1	8.7	-	9.2	0.1	3.0	1.3	4	clayy SILT to silty CLAY	115	2.0	5	4	-	-	0.6	2.3	55	2.94	15	-	-
31.83	9.5	9.1	-	9.6	0.1	3.2	1.0	4	clayy SILT to silty CLAY	115	2.0	5	5	-	-	0.6	2.4	50	2.87	15	-	-
31.99	10.2	9.7	-	10.3	0.0	3.3	0.6	4	clayy SILT to silty CLAY	115	2.0	5	5	-	-	0.6	2.6	44	2.78	15	-	-
32.15	8.9	8.3	-	8.9	0.1	3.0	1.4	3	silty CLAY to CLAY	115	1.5	6	6	-	-	0.6	2.2	57	2.98	15	-	-
32.32	11.6	10.8	-	11.6	0.0	3.5	0.5	4	clayy SILT to silty CLAY	115	2.0	6	6	-	-	0.7	3.0	40	2.68	15	-	-
32.48	13.8	12.9	-	13.9	0.1	3.6	0.6	4	clayy SILT to silty CLAY	115	2.0	7	6	-	-	0.9	3.7	37	2.62	15	-	-
32.65	9.8	9.1	-	9.9	0.2	3.7	2.1	3	silty CLAY to CLAY	115	1.5	7	6	-	-	0.6	2.4	60	3.03	15	-	-
32.81	14.6	13.5	-	14.7	0.2	3.8	1.2	4	clayy SILT to silty CLAY	115	2.0	7	7	-	-	1.0	3.9	42	2.73	15	-	-
32.97	16.1	14.9	-	16.2	0.2	3.8	1.6	4	clayy SILT to silty CLAY	115	2.0	8	7	-	-	1.1	4.3	43	2.75	15	-	-
33.14	17.8	16.4	-	17.9	0.3	3.9	1.8	4	clayy SILT to silty CLAY	115	2.0	9	8	-	-	1.2	4.8	42	2.74	15	-	-
33.30	18.8	17.2	-	18.8	0.2	4.0	1.4	4	clayy SILT to silty CLAY	115	2.0	9	9	-	-	1.2	5.1	38	2.66	15	-	-
33.47	11.5	10.5	-	11.5	0.2	4.0	2.5	3	silty CLAY to CLAY	115	1.5	8	7	-	-	0.7	2.9	59	3.01	15	-	-
33.63	9.3	8.5	-	9.4	0.2	4.2	2.3	3	silty CLAY to CLAY	115	1.5	6	6	-	-	0.6	2.2	65	3.09	15	-	-
33.79	8.2	7.4	-	8.3	0.1	4.3	2.2	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	1.9	68	3.13	15	-	-
33.96	8.0	7.2	-	8.0	0.1	4.3	1.9	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	1.8	67	3.12	15	-	-
34.12	7.7	6.9	-	7.8	0.1	4.4	1.9	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	1.7	68	3.14	15	-	-
34.29	7.6	6.8	-	7.7	0.1	4.5	1.6	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	1.6	67	3.12	15	-	-
34.45	7.5	6.7	-	7.6	0.1	4.6	1.7	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.5	1.6	68	3.13	15	-	-
34.61	7.2	6.4	-	7.3	0.1	4.9	1.5	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.4	1.5	68	3.14	15	-	-
34.78	7.3	6.5	-	7.4	0.1	5.0	1.2	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.4	1.5	65	3.09	15	-	-
34.94	7.4	6.5	-	7.5	0.1	5.0	1.3	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.4	1.6	62	3.06	15	-	-
35.11	7.7	6.7	-	7.8	0.1	5.1	1.1	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.5	1.6	62	3.05	15	-	-
35.27	7.9	6.9	-	8.0	0.1	5.1	1.2	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	1.7	62	3.05	15	-	-
35.43	8.4	7.3	-	8.5	0.1	5.2	1.2	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.8	60	3.02	15	-	-
35.60	7.9	6.9	-	8.0	0.1	5.2	1.2	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	1.7	63	3.06	15	-	-
35.76	7.8	6.7	-	7.9	0.1	5.3	1.2	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.5	1.6	63	3.07	15	-	-
35.93	8.1	6.9	-	8.2	0.1	5.4	1.4	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	1.7	64	3.08	15	-	-
36.09	8.8	7.6	-	8.9	0.1	5.4	1.6	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.9	62	3.06	15	-	-
36.26	9.2	7.8	-	9.3	0.1	5.5	1.5	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.6	2.0	61	3.04	15	-	-
36.42	8.1	6.9	-	8.3	0.2	5.5	3.6	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	1.7	80	3.28	15	-	-
36.58	10.8	10.0	-	10.9	0.1	5.5	1.4	4	clayy SILT to silty CLAY	115	2.0	6	5	-	-	0.7	2.7	52	2.90	15	-	-
36.75	21.0	17.8	-	21.2	0.3	5.5	1.4	4	clayy SILT to silty CLAY	115	2.0	11	9	-	-	1.4	5.3	37	2.64	15	-	-
36.91	15.5	12.9	-	15.6	0.3	5.6	2.5	3	silty CLAY to CLAY	115	1.5	10	9	-	-	1.0	3.7	55	2.92	15	-	-
37.08	9.1	7.6	-	9.2	0.3	5.7	4.1	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.6	1.8	78	3.27	15	-	-
37.24	7.9	6.6	-	8.0	0.2	5.9	1.6	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.5	1.6	66	3.14	15	-	-
37.40	7.6	6.3	-	7.7	0.1	5.9	1.6	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.4	1.5	70	3.16	15	-	-
37.57	7.8	6.5	-	7.9	0.1	6.0	1.5	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.5	1.6	67	3.13	15	-	-
37.75	8.3	6.9	-	8.4	0.1	6.1	1.6	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.7	66	3.10	15	-	-
37.90	8.3	6.9	-	8.4	0.1	6.2	1.6	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.7	66	3.11	15	-	-
38.06	8.8	7.2	-	8.9	0.1	6.3	1.4	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.8	63	3.06	15	-	-
38.22	8.7	7.1	-	8.8	0.1	6.5	1.3	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.7	63	3.06	15	-	-
38.39	8.6	7.1	-	8.8	0.1	6.5	1.5	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.7	65	3.09	15	-	-
38.55	8.8	7.1	-	8.9	0.1	6.6	1.2	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.7	62	3.04	15	-	-
38.72	9.4	7.6	-	9.5	0.1	6.6	1.1	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.6	1.9	59	2.99	15	-	-
38.86	10.3	8.3	-	10.4	0.1	6.6	0.7	4	clayy SILT to silty CLAY	115	2.0	5	4	-	-	0.6	2.1	50	2.86	15	-	-
39.04	8.8	7.1	-	8.9	0.1	6.8	1.2	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.7	61	3.04	15	-	-
39.21	10.8	8.7	-	10.9	0.1	6.8	0.8	4	clayy SILT to silty CLAY	115	2.0	5	4	-	-	0.7	2.2	47	2.82	15	-	-
39.37	8.8	7.0	-	8.9	0.1	6.9	1.0	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.7	59	3.01	15	-	-
39.54	8.9	7.1	-	9.0	0.1	6.9	1.0	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.7	59	3.00	15	-	-
39.70	9.6	7.6	-	9.7	0.1	7.0	0.7	4	clayy SILT to silty CLAY	115	2.0	5	4	-	-	0.6	1.9	53	2.92	15	-	-
39.86	9.1	7.2	-	9.2	0.1	7.0	0.8	4	clayy SILT to silty CLAY	115	2.0	5	4	-	-	0.6	1.8	56	2.96	15	-	-
40.03	8.7	6.9	-	8.9	0.1	7.0	0.9	5	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.7	59	3.00	15	-	-
40.19	8.5	6.8	-	8.6	0.0	7.1	0.7	1	sensitive fine SOIL	115	2.0	4	3	-	-	0.5	1.8	57	2.98	15	-	-
40.36	8.7	6.8	-	8.8	0.1	7.1	0.9	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.8	59	3.01	15	-	-
40.52	8.3	6.5	-	8.4	0.2	7.2	2.6	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.5	1.5	77	3.25	15	-	-
40.68	22.0	17.1	-	22.1	0.3	7.1	1.4	4	clayy SILT to silty CLAY	115	2.0	11	9	-	-	1.5	5.0	38	2.86	15	-	-
40.85	40.0	34.2	69.1	40.2	0.4	6.9	1.0	5	silty SAND to sandy SILT	120	3.0	13	11	32	34	-	-	23	2.32	16	3.17	51.2
41.01	35.7	30.5	91.8	35.9	0.7	6.5	2.2	4	clayy SILT to silty CLAY	115	2.0	18	15	-	-	2.4	8.5	33	2.55	15	2.51	51.2
41.18	16.5	12.7	-	16.7	0.5	8.7	3.6	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.6	56	3.01	15	-	-
41.34	9.2	7.1	-	9.3	0.3	7.2	4.1	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.6	1.7	82	3.31	15	-	-
41.50	8.9	6.8	-	9.1	0.1	7.3	1.5	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.6	66	3.10	15	-	-
41.67	8.5	6.5	-	8.6	0.1	7.4	1.5	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.5	1.5	68	3.13	15	-	-
41.83	8.4	6.4	-	8.6	0.1	7.5	1.3	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.5	1.5	67	3.12	15	-	-
42.00	8.5	6.4	-	8.6	0.1	7.5	1.3	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.5	1.5	67	3.12	15	-	-
42.16	7.9	5.9	-	8.0	0.1	7.6	1.3	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.5	1.3	71	3.18	15	-	-
42.32	7.9	6.0	-	8.1	0.1	7.6	1.5	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.5	1.3	73	3.20	15	-	-
42.49	8.2	6.1	-	8.3	0.1	7.7	2.6	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.5	1.4	79	3.27	15	-	-
42.65	8.8	6.6	-	8.9	0.2	7.7	3.0	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.5	1.5	79	3.29	15	-	-
42.82	9.1	6.8	-	9.3	0.2	7.7	3.7	3	silty CLAY to CLAY	115	1.5	6	5	-	-	0.5	1.6	82	3.31	15	-	-
42.98	10.2	7.6	-	10.4	0.3	7.7	3.9	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.6	1.9	78	3.26	15	-	-
43.15	10.7	7.9	-	10.9	0.4	7.7	4.9	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.7	2.0	81	3.30	15	-	-
43.31	11.3	8.3	-	11.4	0.4	7.7	5.1	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.7	2.1	80	3.29	15	-	-
43.47	11.8	8.7	-	11.9	0.5	7.7	5.6	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.7	2.2	80	3.29	15	-	-
43.64	12.6	9.2	-	12.7	0.6	7.8	5.7	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.4	79	3.27	15	-	-
43.80	12.9	9.5	-	13.1	0.7	7.8	6.6	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.5	81	3.30	15	-	-
43.97	13.0	9.5	-	13.2	0.6	7.8	5.5	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.5	77	3.25	15	-	-
44.13	12.9	9.3	-	13.0	0.5	7.8	4.8	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.5	74	3.22	15	-	-
44.29	13.2	9.6	-	13.4	0.5	7.8	4.8	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.5	73	3.21	15	-	-
44.46	14.3	10.4	-	14.5	0.5	7.9	4.6	3	silty CLAY to CLAY	115	1.5	10	7	-	-	0.9	2.8	70	3.18	15	-	-
44.62	16.3	11.7	-	16.4	0.5	8.1	4.0	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.2	64	3.08	15	-	-
44.79	15.3	11.0	-	15.5	0.5	8.1	4.3	3	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	3.0	67	3.12	15	-	-
44.95	15.9	11.4	-	16.1	0.5	8.1	4.1	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.0	3.1	65	3.09	15	-	-
45.11	17.0	12.1	-	17.2	0.6	8.2	4.1	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.4	63	3.06	15	-	-
45.28	18.6	13.2	-	18.8	0.8	8.2	4.6	3	silty CLAY to CLAY	115	1.5	12	9	-	-	1.2	3.7	64	3.07	15	-	-
45.44	19.1	13.5	-	19.3	0.8	8.2	5.1	3	silty CLAY to CLAY	115	1.5	13	9	-	-	1.3	3.8	64	3.08	15	-	-
45.61	18.5	13.1	-	18.7	1.0	8.1	6.3	3	silty CLAY to CLAY	115	1.5	12	9	-	-	1.2	3.7	70	3.16	15	-	-
45.77	17.8	12.6	-	18.0	1.1	7.9	7.6	3	silty CLAY to CLAY	115	1.5	12	8	-	-	1.2	3.5	75	3.22	15	-	-
45.93	15.9	11.2	-	16.1	1.0	7.9	7.3	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.0	3.1	77	3.25	15	-	-
46.10	14.3	10.0	-	14.4	0.7	7.9	6.0	3	silty CLAY to CLAY	115	1.5	10	7	-	-	0.9	2.7	77	3.25	15	-	-
46.26	12.6	8.8	-	12.7	0.5	7.9	5.2	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.3	78	3.27	15	-	-

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

SEJPA Operations Building

Project ID: Stoney Miller
Data File: SBT(165).cpt
CPT Date: 10/11/2016 9:22:49 AM
GW During Test: 5 ft

Sounding ID: CPT-02
Project No: 80095-00
Cone/Rig: DDG1201

Depth ft	qc PS tsf	qcln PS -	qlncs PS -	qt PS tsf	Slv Slss tsf	pore pres (psi)	Rfnt Ratio %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Fin Ang deg	Und Shr tsf	OCR -	Fin To %	Ic SBT Indx	Nk -	Vol Strn %	Cycl SStn %
46.43	11.3	8.3	-	12.1	0.5	7.9	5.2	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.7	2.1	81	3.30	15	-	-
46.59	11.0	7.6	-	11.2	0.4	7.9	5.0	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.7	1.9	84	3.34	15	-	-
46.75	11.3	7.8	-	11.5	0.4	8.0	4.8	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.7	2.0	81	3.30	15	-	-
46.92	11.8	8.1	-	12.0	0.4	8.0	4.5	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.7	2.1	78	3.27	15	-	-
47.08	12.1	8.3	-	12.2	0.4	8.0	4.6	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.7	2.1	75	3.23	15	-	-
47.25	12.1	8.3	-	12.2	0.4	8.0	4.6	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.7	2.1	78	3.26	15	-	-
47.41	13.7	9.4	-	13.8	0.5	8.0	5.3	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.9	2.5	77	3.25	15	-	-
47.57	14.5	9.9	-	14.6	0.7	8.0	6.0	3	silty CLAY to CLAY	115	1.5	10	7	-	-	0.9	2.6	77	3.28	15	-	-
47.74	14.5	9.9	-	14.7	0.7	7.9	6.3	3	silty CLAY to CLAY	115	1.5	10	7	-	-	0.9	2.6	78	3.27	15	-	-
47.90	13.8	9.4	-	14.0	0.7	7.3	5.9	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.9	2.5	79	3.27	15	-	-
48.07	14.0	9.5	-	14.2	0.8	8.0	5.8	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.9	2.5	75	3.23	15	-	-
48.23	15.5	10.4	-	15.6	0.5	8.0	4.2	3	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	2.8	69	3.14	15	-	-
48.39	16.5	11.1	-	16.6	0.6	8.1	4.4	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.1	3.0	67	3.12	15	-	-
46.56	15.3	10.2	-	15.4	0.7	8.1	5.5	3	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	2.7	74	3.22	15	-	-
48.72	13.6	9.1	-	13.8	0.7	8.0	6.9	3	silty CLAY to CLAY	115	1.5	9	5	-	-	0.9	2.4	83	3.33	15	-	-
48.89	12.3	8.2	-	12.5	0.6	8.0	6.3	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.8	2.1	85	3.35	15	-	-
49.05	11.6	7.7	-	11.8	0.6	8.0	6.3	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.7	1.9	88	3.38	15	-	-
49.22	11.5	7.6	-	11.6	0.5	8.0	5.8	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.7	1.9	86	3.36	15	-	-
49.39	10.5	6.9	-	10.6	0.5	8.0	6.1	3	silty CLAY to CLAY	115	1.5	7	5	-	-	0.6	1.6	91	3.42	15	-	-
49.54	9.5	6.3	-	9.7	0.4	8.0	6.1	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.5	1.4	95	3.47	15	-	-
49.71	9.6	6.3	-	9.7	0.3	8.0	5.2	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.6	1.4	92	3.43	15	-	-
49.87	8.8	5.8	-	9.0	0.3	8.0	5.0	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.5	1.3	95	3.46	15	-	-
50.04	8.6	5.6	-	8.7	0.3	8.0	4.7	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.5	1.2	96	3.47	15	-	-
50.20	8.6	5.6	-	8.7	0.3	8.1	4.6	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.5	1.2	95	3.46	15	-	-
50.36	8.8	5.7	-	8.9	0.3	8.1	5.4	3	silty CLAY to CLAY	115	1.5	6	4	-	-	0.5	1.2	95	3.49	15	-	-
50.53	9.8	6.3	-	10.0	0.4	8.1	5.5	3	silty CLAY to CLAY	115	1.5	7	4	-	-	0.6	1.3	93	3.44	15	-	-
50.69	11.7	7.5	-	11.8	0.4	8.2	4.8	3	silty CLAY to CLAY	115	1.5	8	5	-	-	0.7	1.9	83	3.32	15	-	-
50.86	12.3	7.9	-	12.5	0.6	8.2	6.4	3	silty CLAY to CLAY	115	1.5	9	5	-	-	0.8	2.0	87	3.37	15	-	-
51.02	15.4	9.8	-	15.6	0.8	8.2	6.4	3	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	2.6	79	3.27	15	-	-
51.18	16.3	10.4	-	16.5	1.0	7.8	7.3	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.0	2.8	80	3.28	15	-	-
51.35	14.5	9.3	-	14.6	0.8	6.7	7.1	3	silty CLAY to CLAY	115	1.5	10	6	-	-	0.9	2.4	83	3.33	15	-	-
51.51	14.7	9.4	-	14.9	0.7	6.4	6.1	3	silty CLAY to CLAY	115	1.5	10	6	-	-	0.9	2.5	79	3.28	15	-	-
51.68	13.0	8.3	-	13.1	0.7	6.2	6.6	3	silty CLAY to CLAY	115	1.5	9	6	-	-	0.8	2.2	86	3.38	15	-	-
51.84	14.4	9.1	-	14.5	0.8	6.3	6.7	3	silty CLAY to CLAY	115	1.5	10	6	-	-	0.9	2.4	83	3.32	15	-	-
52.00	16.9	10.6	-	16.9	0.8	5.8	6.1	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.1	2.9	78	3.23	15	-	-
52.17	17.4	11.0	-	17.5	0.9	5.5	6.2	3	silty CLAY to CLAY	115	1.5	12	7	-	-	1.1	3.0	75	3.22	15	-	-
52.33	19.4	12.2	-	19.5	0.9	3.7	5.7	3	silty CLAY to CLAY	115	1.5	13	8	-	-	1.3	3.4	69	3.15	15	-	-
52.50	19.0	11.9	-	19.1	1.1	2.0	6.8	3	silty CLAY to CLAY	115	1.5	13	8	-	-	1.2	3.3	74	3.21	15	-	-
52.66	17.1	10.7	-	17.1	1.1	-1.1	7.6	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.1	2.9	80	3.29	15	-	-
52.82	16.7	10.4	-	16.6	0.9	-2.0	6.7	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.1	2.8	78	3.26	15	-	-
52.99	16.2	10.1	-	16.2	0.7	-1.9	5.5	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.0	2.7	75	3.23	15	-	-
53.15	16.0	9.9	-	16.0	0.6	-1.9	4.5	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.0	2.6	71	3.18	15	-	-
53.32	16.2	10.0	-	16.2	0.6	-1.8	4.3	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.0	2.7	70	3.16	15	-	-
53.48	20.4	12.6	-	20.4	1.0	-1.8	5.8	3	silty CLAY to CLAY	115	1.5	14	8	-	-	1.3	3.5	69	3.15	15	-	-
53.64	27.7	17.0	-	27.7	1.6	-2.2	6.5	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.8	5.0	63	3.06	15	-	-
53.81	28.3	17.4	-	28.3	1.9	-2.6	7.3	3	silty CLAY to CLAY	115	1.5	19	12	-	-	1.9	5.1	65	3.09	15	-	-
53.97	26.3	16.1	-	26.3	1.6	-2.7	7.1	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.7	4.7	66	3.11	15	-	-
54.14	26.1	15.9	-	26.3	1.6	-2.6	6.8	3	silty CLAY to CLAY	115	1.5	17	11	-	-	1.7	4.6	65	3.10	15	-	-
54.30	27.2	16.5	-	27.1	1.6	-2.6	6.7	3	silty CLAY to CLAY	115	1.5	18	11	-	-	1.8	4.8	64	3.08	15	-	-
54.46	31.3	19.0	-	31.2	1.9	-2.3	6.6	3	silty CLAY to CLAY	115	1.5	21	13	-	-	2.1	5.6	60	3.03	15	-	-
54.63	35.5	21.5	-	35.4	2.3	-2.4	7.3	3	silty CLAY to CLAY	115	1.5	24	14	-	-	2.4	6.4	58	3.01	15	-	-
54.79	34.9	21.1	-	34.8	2.7	-3.1	8.7	3	silty CLAY to CLAY	115	1.5	23	14	-	-	2.3	6.3	62	3.07	15	-	-
54.96	34.4	20.7	-	34.3	2.2	-1.5	7.2	3	silty CLAY to CLAY	115	1.5	23	14	-	-	2.3	6.2	60	3.02	15	-	-
55.12	30.1	18.1	-	30.1	1.9	-1.4	7.1	3	silty CLAY to CLAY	115	1.5	20	12	-	-	2.0	5.3	62	3.07	15	-	-
55.28	28.1	16.9	-	28.1	1.8	-1.3	7.4	3	silty CLAY to CLAY	115	1.5	19	11	-	-	1.9	4.9	66	3.11	15	-	-
55.45	33.6	20.0	-	33.5	2.0	-1.0	6.6	3	silty CLAY to CLAY	115	1.5	22	13	-	-	2.3	6.0	59	3.01	15	-	-
55.61	35.5	21.1	-	35.5	2.4	-1.6	7.5	3	silty CLAY to CLAY	115	1.5	24	14	-	-	2.4	6.3	60	3.03	15	-	-
55.78	43.2	25.7	-	43.2	2.7	-1.3	6.8	5	silty CLAY to CLAY	115	1.5	29	17	-	-	2.9	7.8	54	2.93	15	-	-
55.94	40.9	24.2	-	40.9	2.7	-1.7	7.2	3	silty CLAY to CLAY	115	1.5	27	16	-	-	2.8	7.4	57	2.97	15	-	-
56.11	38.5	22.9	-	38.5	2.3	-1.2	6.5	5	silty CLAY to CLAY	115	1.5	26	15	-	-	2.6	6.9	56	2.96	15	-	-
56.27	34.4	20.8	-	34.4	2.1	-0.7	6.8	3	silty CLAY to CLAY	115	1.5	23	14	-	-	2.3	6.1	59	3.01	15	-	-
56.43	28.9	17.0	-	28.8	1.9	-0.8	7.2	3	silty CLAY to CLAY	115	1.5	19	11	-	-	1.9	5.0	65	3.10	15	-	-
56.60	31.9	18.7	-	31.9	1.8	-0.8	6.9	3	silty CLAY to CLAY	115	1.5	21	12	-	-	2.1	5.5	60	3.02	15	-	-
56.76	35.5	20.8	-	35.5	2.0	-0.8	6.2	3	silty CLAY to CLAY	115	1.5	24	14	-	-	2.4	6.2	57	2.98	15	-	-
56.93	36.8	21.5	-	36.8	2.1	-0.8	6.4	3	silty CLAY to CLAY	115	1.5	25	14	-	-	2.5	6.4	57	2.97	15	-	-
57.09	39.2	22.8	-	39.2	2.3	-0.9	6.4	3	silty CLAY to CLAY	115	1.5	26	15	-	-	2.6	6.9	55	2.95	15	-	-
57.25	39.6	23.0	-	39.6	2.2	-0.9	6.0	3	silty CLAY to CLAY	115	1.5	26	15	-	-	2.7	7.0	54	2.93	15	-	-
57.42	37.3	21.6	-	37.2	2.3	-0.9	6.9	3	silty CLAY to CLAY	115	1.5	25	14	-	-	2.5	6.5	58	3.00	15	-	-
57.58	35.0	20.2	-	35.0	2.4	-1.1	7.7	3	silty CLAY to CLAY	115	1.5	23	13	-	-	2.4	6.0	62	3.05	15	-	-
57.75	37.3	21.5	-	37.3	2.3	-1.0	6.9	3	silty CLAY to CLAY	115	1.5	25	14	-	-	2.5	6.5	58	3.00	15	-	-
57.91	41.5	25.9	-	41.5	2.5	-1.1	6.5	3	silty CLAY to CLAY	115	1.5	28	16	-	-	2.9	7.2	55	2.94	15	-	-
58.07	36.5	21.0	-	36.5	2.5	-1.9	7.6	3	silty CLAY to CLAY	115	1.5	24	14	-	-	2.5	6.3	61	3.03	15	-	-
58.24	53.1	18.9	-	53.1	2.2	-0.9	7.6	3	silty CLAY to CLAY	115	1.5	22	13	-	-	2.2	5.6	63	3.07	15	-	-
58.40	32.5	18.6	-	32.5	1.8	-0.8	6.2	3	silty CLAY to CLAY	115	1.5	22	12	-	-	2.2	5.5	60	3.02	15	-	-
58.57	32.8	18.7	-	32.8	1.8	-0.7	6.1	3	silty CLAY to CLAY	115	1.5	22	12	-	-	2.2	5.5	59	3.01	15	-	-
58.73	35.9	20.4	-	35.9	1.9	-0.7	5.9	3	silty CLAY to CLAY	115	1.5	24	14	-	-	2.4	6.1	57	2.97	15	-	-
58.89	36.8	20.8	-	36.8	1.9	-0.7	5.7	3	silty CLAY to CLAY	115	1.5	25	14	-	-	2.5	6.2	55	2.95	15	-	-
59.06	36.0	20.3	-	36.0	1.9	-0.6	5.9	3	silty CLAY to CLAY	115	1.5	24	14	-	-	2.4	6.1	57	2.97	15	-	-
59.22	38.3	21.5	-	38.3	2.0	-0.6	5.7	3	silty CLAY to CLAY	115	1.5	26	14	-	-	2.6	6.5	55	2.94	15	-	-
59.39	36.0	20.3	-	36.0	2.1	-0.8	6.5	3	silty CLAY to CLAY	115	1.5	24	14	-	-	2.4	6.0	58	3.00	15	-	-
59.55	32.5	18.2	-	32.5	1.8	-0.8	6.4	3	silty CLAY to CLAY	115	1.5	22	12	-	-	2.2	5.4	61	3.03	15	-	-
59.71	28.7	16.0	-	28.6	1.8	-0.8	7.0	3	silty CLAY to CLAY	115	1.5	19	11	-	-	1.9	4.6	66	3.11	15	-	-
59.88	25.8	14.4	-	25.8	1.6	-0.8	7.0	3	silty CLAY to CLAY	115	1.5	17	10	-	-	1.7	4.1	69	3.15	15	-	-
60.04	27.6	15.4	-	27.6	1.8	-0.8	6.7	3	silty CLAY to CLAY	115	1.5	18	10	-	-	1.8	4.4	66	3.11	15	-	-
60.21	31.9	17.7	-	31.9	1.9	-0.9	6.5	3	silty CLAY to CLAY	115	1.5	21	12	-	-	2.1	5.2	62	3.05	15	-	-
60.37	33.3	18.5	-	33.3	2.1	-1.0	7.2	3	silty CLAY to CLAY	115	1.5	22	12	-	-	2.2	5.4	63	3.06	15	-	-
60.53	35.7	19.7	-	35.6	2.0	-1.0	6.1	3	silty CLAY to CLAY	115	1.5	24	13	-	-	2.4	5.9	58	2.99	15	-	-
60.70	33.5	18.5	-	33.5	1.9	-1.0	6.0	3	silty CLAY to CLAY	115	1.5	22	12	-	-	2.2	5.4	59	3.01	15	-	-
60.86	34.8	19.1	-	34.8	2.1	-0.5	6.7	3	silty CLAY to CLAY	115	1.5	23	13	-	-	2.3	5.7	61	3.03	15	-	-
61.03	39.1	21.5	-	39.1	2.5	-0.6	7.0	5	silty CLAY to CLAY	115	1.5	25	14	-	-	2.6	6.4	59	3.00	15	-	-
61.19	43.6	23.9	-	43.6	3.4	-1.1	8.5	3	silty CLAY to CLAY	115	1.5	29	16	-	-	3.0	7.2	60	3.03	15	-	-
61.35	36.7	20.1	-	36.7	3.2	-1.7	9.8	3	silty CLAY to CLAY	115	1.5	24	13	-	-	2.5	6.0	67	3.13	15	-	-
61.52	43.5	23.7	-	43.5	3.0	-1.1	7.5	3	silty CLAY to CLAY	115	1.5	29	16	-	-	2.9	7.2	58	2.99	15	-	-
61.68	42.7	23.2	-	42.7	3.1	-0.6	7.9	3	silty CLAY to CLAY	115	1.5	28	15	-	-	2.9	7.0	59	3.01	15	-	-

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

Middle Earth Geo Testing

Project ID: Stoney Miller
Data File: SB3(165).cpt
CPT Date: 10/11/2016 9:22:49 AM
GW During Test: 5 ft

Sounding ID: CPT-02
Project No: 50093-03
Cone/Rig: DDG1291

Depth ft	qc PS tsf	qcln PS -	qInes PS -	qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Ratio %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Ft- Ang deg	Und Shr tsf	OCR -	Fin Ic %	Ic SBT Indx	Nk -	Vel Strn %	Cycl Strn %
61.80	39.1	21.2	-	39.0	3.2	-0.8	8.2	3	silty CLAY to CLAY	115	1.5	26	14	-	-	2.6	6.5	65	3.09	15	-	-
62.01	37.2	20.1	-	37.2	3.4	-0.9	9.3	3	silty CLAY to CLAY	115	1.5	25	13	-	-	2.5	6.0	68	3.13	15	-	-
62.17	37.4	20.2	-	37.3	3.3	-1.2	8.8	3	silty CLAY to CLAY	115	1.5	25	13	-	-	2.5	6.0	68	3.13	15	-	-
62.34	35.3	19.6	-	36.3	3.2	-0.9	9.3	3	silty CLAY to CLAY	115	1.5	24	13	-	-	2.4	5.8	69	3.14	15	-	-
62.50	40.5	21.8	-	40.6	3.5	-0.6	9.5	3	silty CLAY to CLAY	115	1.5	27	15	-	-	2.7	6.5	65	3.09	15	-	-
62.67	49.8	26.7	-	49.8	4.3	-1.2	9.2	3	silty CLAY to CLAY	115	1.5	33	18	-	-	3.4	8.2	59	3.01	15	-	-
62.83	54.3	29.1	-	54.3	4.8	-1.1	8.9	3	silty CLAY to CLAY	115	1.5	36	19	-	-	3.7	8.9	57	2.98	15	-	-
63.00	48.7	26.0	-	48.7	4.3	-0.8	9.5	3	silty CLAY to CLAY	115	1.5	32	17	-	-	3.3	7.9	61	3.05	15	-	-
63.16	41.7	22.2	-	41.7	3.8	-2.0	9.8	3	silty CLAY to CLAY	115	1.5	28	15	-	-	2.8	6.7	65	3.10	15	-	-
63.32	38.3	20.4	-	38.3	3.3	-2.1	9.4	3	silty CLAY to CLAY	115	1.5	26	14	-	-	2.6	6.1	66	3.11	15	-	-
63.49	31.2	16.5	-	31.1	2.9	-2.0	9.9	3	silty CLAY to CLAY	115	1.5	21	11	-	-	2.1	4.8	73	3.20	15	-	-
63.65	28.6	15.1	-	28.5	3.0	-1.8	9.9	5	silty CLAY to CLAY	115	1.5	19	10	-	-	1.9	4.3	75	3.23	15	-	-
63.82	42.2	22.3	-	42.2	3.2	-1.6	8.3	3	silty CLAY to CLAY	115	1.5	28	15	-	-	2.8	6.7	61	3.04	15	-	-
63.98	45.1	23.7	-	45.0	3.3	-3.0	7.9	5	silty CLAY to CLAY	115	1.5	30	16	-	-	3.0	7.2	59	3.01	15	-	-
64.14	45.2	23.7	-	45.1	3.6	-3.1	8.6	3	silty CLAY to CLAY	115	1.5	30	16	-	-	3.1	7.2	61	3.03	15	-	-
64.31	52.3	27.4	-	52.3	3.7	-2.6	7.6	3	silty CLAY to CLAY	115	1.5	35	18	-	-	3.6	8.4	55	2.95	15	-	-
64.47	61.2	32.0	-	61.2	4.3	-2.3	7.5	3	silty CLAY to CLAY	115	1.5	41	21	-	-	4.2	9.9	51	2.89	15	-	-
64.64	58.8	30.7	-	58.7	4.7	-2.5	8.5	3	silty CLAY to CLAY	115	1.5	39	20	-	-	4.0	9.5	53	2.92	15	-	-
64.80	49.1	25.6	-	49.1	4.2	-2.7	9.2	3	silty CLAY to CLAY	115	1.5	33	17	-	-	3.3	7.8	60	3.03	15	-	-
64.96	51.6	26.8	-	51.5	3.8	-2.7	7.9	3	silty CLAY to CLAY	115	1.5	34	18	-	-	3.5	8.2	56	2.97	15	-	-
65.13	56.5	29.3	-	56.5	4.2	-2.3	8.0	3	silty CLAY to CLAY	115	1.5	38	20	-	-	3.9	9.0	54	2.94	15	-	-
65.29	58.1	30.6	-	58.1	4.7	-2.3	8.5	3	silty CLAY to CLAY	115	1.5	39	20	-	-	4.0	9.4	52	2.91	15	-	-
65.46	56.4	29.1	-	56.4	5.4	-2.3	6.4	3	silty CLAY to CLAY	115	1.5	38	19	-	-	3.9	9.0	50	2.87	15	-	-
65.62	54.4	28.0	-	54.3	2.8	-2.3	5.6	3	silty CLAY to CLAY	115	1.5	36	18	-	-	3.7	8.6	49	2.85	15	-	-
65.78	55.0	28.3	-	55.0	2.7	-1.9	5.3	3	silty CLAY to CLAY	115	1.5	37	19	-	-	3.8	8.7	47	2.82	15	-	-
65.95	53.8	26.0	-	50.8	2.1	-1.8	4.4	3	silty CLAY to CLAY	115	1.5	34	17	-	-	3.5	7.9	46	2.80	15	-	-
66.11	45.6	25.4	-	49.6	2.4	-1.7	5.5	3	silty CLAY to CLAY	115	1.5	33	17	-	-	3.4	7.7	50	2.86	15	-	-
66.28	96.0	66.6	165.8	96.3	3.4	-2.0	3.7	4	clayy SILT to silty CLAY	115	2.0	48	33	-	-	6.6	9.9	26	2.44	15	0.00	0.0
66.44	89.2	45.4	-	89.1	4.5	-5.8	5.3	3	silty CLAY to CLAY	115	1.5	59	30	-	-	6.2	9.9	39	2.67	15	-	-
66.60	82.2	41.6	-	82.1	5.5	-6.9	6.8	3	silty CLAY to CLAY	115	1.5	55	28	-	-	5.7	9.9	45	2.78	15	-	-
66.77	80.0	40.6	-	79.9	4.8	-7.4	6.4	3	silty CLAY to CLAY	115	1.5	53	27	-	-	5.5	9.9	44	2.76	15	-	-
66.93	88.7	44.9	-	88.5	4.3	-6.1	5.1	3	silty CLAY to CLAY	115	1.5	59	30	-	-	6.1	9.9	39	2.66	15	-	-
67.10	87.9	44.4	-	87.8	4.9	-4.8	5.9	3	silty CLAY to CLAY	115	1.5	59	30	-	-	6.1	9.9	41	2.71	15	-	-
67.26	89.2	44.9	-	89.1	5.6	-4.4	6.6	3	silty CLAY to CLAY	115	1.5	59	30	-	-	6.2	9.9	43	2.74	15	-	-
67.42	105.9	53.2	-	105.8	6.0	-3.3	5.9	3	silty CLAY to CLAY	115	1.5	71	35	-	-	7.3	9.9	38	2.65	15	-	-
67.59	104.5	52.4	-	104.4	6.5	-4.3	6.4	3	silty CLAY to CLAY	115	1.5	70	35	-	-	7.2	9.9	40	2.69	15	-	-
67.75	99.6	49.9	-	99.5	6.5	-4.2	6.8	3	silty CLAY to CLAY	115	1.5	66	33	-	-	6.9	9.9	42	2.72	15	-	-
67.92	106.8	53.4	-	106.8	6.4	-4.3	6.2	3	silty CLAY to CLAY	115	1.5	71	36	-	-	7.4	9.9	38	2.67	15	-	-
68.08	109.4	54.5	-	109.3	6.7	-4.1	6.3	3	silty CLAY to CLAY	115	1.5	73	36	-	-	7.6	9.9	39	2.67	15	-	-
68.24	130.6	89.4	219.6	130.5	5.7	-3.8	4.5	4	clayy SILT to silty CLAY	115	2.0	65	45	-	-	9.1	9.9	27	2.42	15	0.00	0.0
68.41	146.3	100.1	225.1	146.2	6.3	-3.8	4.4	9	very stiff fine SOIL	120	1.0	100	100	-	-	5.1	9.9	26	2.38	30	0.00	0.0
68.57	146.5	100.1	235.6	146.4	6.8	-5.6	4.8	9	very stiff fine SOIL	120	1.0	100	100	-	-	5.1	9.9	27	2.41	30	0.00	0.0
68.74	151.0	103.1	232.5	151.0	6.7	-3.4	4.6	9	very stiff fine SOIL	120	1.0	100	100	-	-	5.3	9.9	26	2.39	30	0.00	0.0
68.90	141.0	96.1	233.5	140.9	6.7	-3.6	4.9	9	very stiff fine SOIL	120	1.0	100	96	-	-	4.9	9.9	28	2.43	30	0.00	0.0
69.07	122.8	83.6	225.6	122.7	6.1	-3.5	5.2	9	very stiff fine SOIL	120	1.0	100	84	-	-	4.3	9.9	32	2.49	30	0.00	0.0
69.23	100.5	49.3	-	100.4	5.0	-3.5	5.2	4	clayy SILT to silty CLAY	115	2.0	50	25	-	-	7.0	9.9	37	2.64	15	-	-
69.39	84.3	41.3	-	84.3	4.7	-3.7	5.8	3	silty CLAY to CLAY	115	1.5	56	28	-	-	5.8	9.9	42	2.74	15	-	-
69.56	147.8	130.4	214.0	147.0	5.8	-3.5	4.1	4	clayy SILT to silty CLAY	115	2.0	74	50	-	-	10.3	9.9	25	2.35	15	0.00	0.0
69.72	173.8	117.9	227.2	173.7	6.6	-4.1	3.8	8	stiff SAND to clayy SAND	115	5.0	35	24	72	40	-	-	22	2.29	16	0.00	0.0
69.89	171.6	116.2	227.0	171.5	6.6	-3.6	3.9	8	stiff SAND to clayy SAND	115	5.0	34	23	72	40	-	-	23	2.30	16	0.00	0.0
70.05	171.9	116.3	223.1	171.8	6.4	-3.1	3.8	8	stiff SAND to clayy SAND	115	5.0	34	23	72	40	-	-	22	2.29	16	0.00	0.0
70.21	180.5	122.0	228.1	180.5	6.7	-2.7	3.8	8	stiff SAND to clayy SAND	115	5.0	36	24	74	40	-	-	22	2.27	16	0.00	0.0
70.38	189.6	128.0	232.5	189.6	6.8	-2.8	3.7	8	stiff SAND to clayy SAND	115	5.0	38	26	75	40	-	-	21	2.26	16	0.00	0.0
70.54	168.4	113.6	229.5	168.3	6.7	-2.9	4.1	9	very stiff fine SOIL	120	1.0	100	100	-	-	5.9	9.9	23	2.32	30	0.00	0.0
70.71	150.1	101.1	219.4	150.0	6.2	-2.9	4.2	9	very stiff fine SOIL	120	1.0	100	100	-	-	5.2	9.9	25	2.36	30	0.00	0.0
70.87	162.7	109.5	216.9	162.7	6.1	-2.1	3.8	8	silty SAND to sandy SILT	120	3.0	54	37	70	39	-	-	23	2.31	16	0.00	0.0

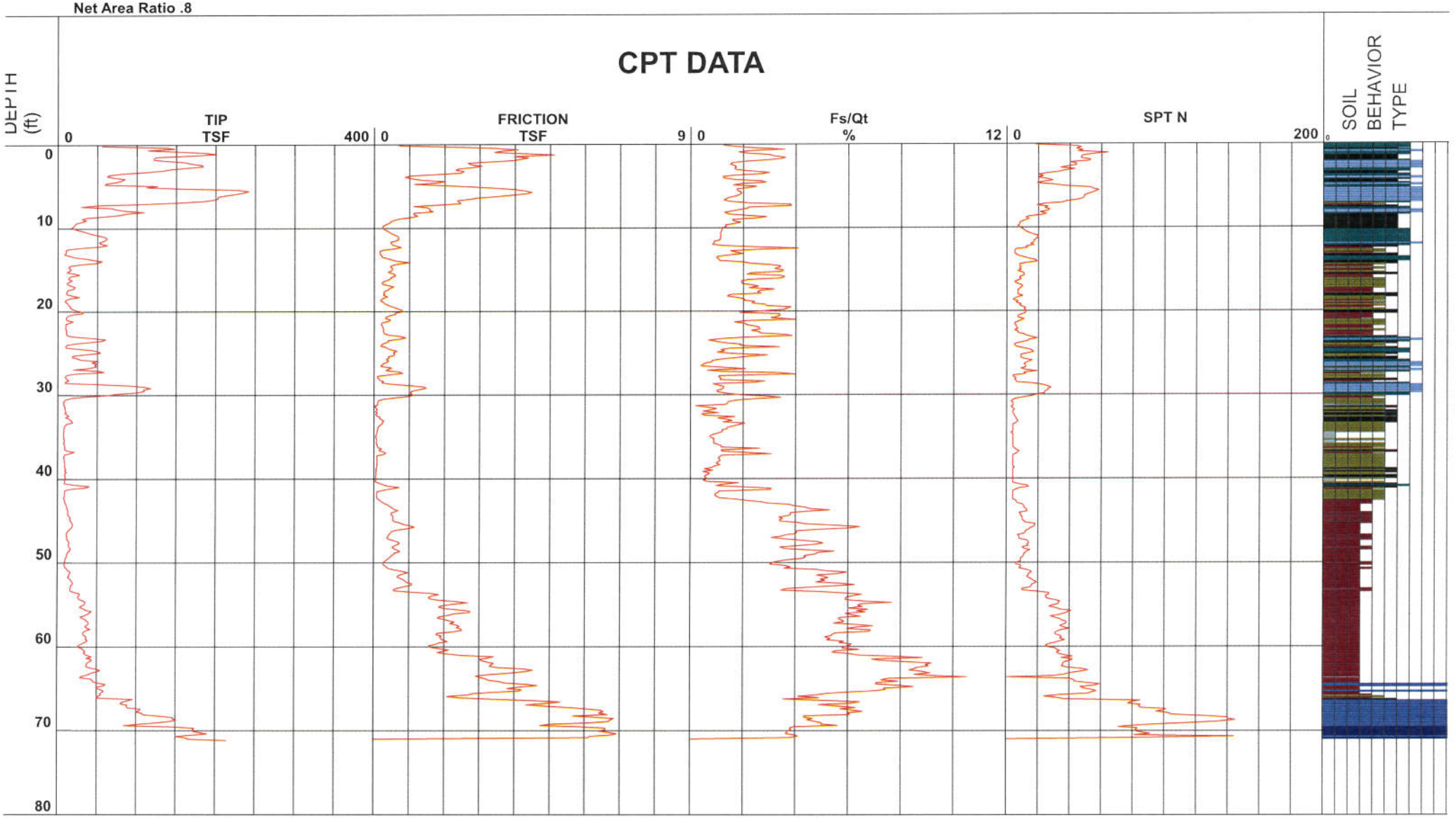
* Indicates the parameter was calculated using the normalized point stress.
The parameters listed above were determined using empirical correlations.
A Professional Engineer must determine their suitability for analysis and design.

Stoney-Miller Consultants, Inc.

Project	SEJPA Operations Building	Operator	DG-RC	Filename	SDF(165).cpt
Job Number	50093-00	Cone Number	DDG1281	GPS	
Hole Number	CPT-02	Date and Time	10/11/2016 9:22:49 AM	Maximum Depth	71.19 ft
EST GW Depth During Test		5.00 ft			

Net Area Ratio .8

CPT DATA



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

SEJPA Operations Building

Project ID: Stoney Miller
Data File: SDF(166).cpt
CPT Date: 10/11/2016 10:25:52 AM
GW During Test: 5 ft

Sounding ID: CPT-03
Project No: 50093-00
Cone/Rig: DDG1288

Depth ft	qc PS tsf	qcln PS -	qlncs PS -	qt PS tsf	Slv Stss tsf	pore prss (psi)	Frct Ratio %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-N 60%	Rel Den %	Fltr Ang deg	Und Str tsf	OCR -	Fin Ic %	Ic SBT Indx -	Nk -	Vol Strn %	Cycl Strn %
0.33	138.9	222.7	230.7	138.9	1.6	-0.6	1.1	6	clean SAND to silty SAND	125	5.0	28	45	93	48	-	-	5	1.70	16	N/A	N/A
0.49	177.6	284.8	292.4	177.6	2.4	-1.0	1.3	6	clean SAND to silty SAND	125	5.0	35	57	95	48	-	-	6	1.68	16	N/A	N/A
0.66	261.6	419.5	413.5	261.6	2.3	-1.6	0.9	6	clean SAND to silty SAND	125	5.0	52	84	95	48	-	-	5	1.44	16	N/A	N/A
0.82	359.6	576.8	576.8	359.6	2.7	-2.5	0.8	7	gravly SAND to dense SAND	130	6.0	60	96	95	48	-	-	5	1.31	16	N/A	N/A
0.98	305.3	489.2	489.2	305.6	2.9	-1.7	0.9	6	clean SAND to silty SAND	125	5.0	61	98	95	48	-	-	5	1.42	16	N/A	N/A
1.15	280.8	450.4	450.4	280.8	2.9	-2.7	1.0	6	clean SAND to silty SAND	125	5.0	56	90	95	48	-	-	5	1.47	16	N/A	N/A
1.31	253.6	406.8	406.8	253.6	3.2	-2.4	1.3	6	clean SAND to silty SAND	125	5.0	51	81	95	48	-	-	5	1.58	16	N/A	N/A
1.48	191.2	306.6	335.8	191.1	3.5	-1.8	1.9	6	clean SAND to silty SAND	125	5.0	38	61	95	48	-	-	8	1.78	16	N/A	N/A
1.64	146.0	234.2	292.0	146.0	3.6	-1.4	2.5	6	clean SAND to silty SAND	125	5.0	29	47	95	48	-	-	12	1.96	16	N/A	N/A
1.80	162.2	260.2	290.8	162.2	2.9	-1.9	1.8	6	clean SAND to silty SAND	125	5.0	32	52	95	48	-	-	8	1.81	16	N/A	N/A
1.97	184.4	295.8	299.3	184.4	2.4	-2.0	1.3	6	clean SAND to silty SAND	125	5.0	37	59	95	48	-	-	5	1.66	16	N/A	N/A
2.13	208.1	335.7	333.7	208.0	2.5	-2.3	1.2	6	clean SAND to silty SAND	125	5.0	42	67	95	48	-	-	5	1.61	16	N/A	N/A
2.30	212.0	340.0	340.0	212.0	2.6	-2.1	1.2	6	clean SAND to silty SAND	125	5.0	42	68	95	48	-	-	5	1.61	16	N/A	N/A
2.46	197.9	317.3	317.6	197.8	2.6	-2.2	1.3	6	clean SAND to silty SAND	125	5.0	40	63	95	48	-	-	5	1.65	16	N/A	N/A
2.62	201.4	323.0	323.0	201.4	2.6	-2.3	1.3	6	clean SAND to silty SAND	125	5.0	40	65	95	48	-	-	5	1.64	16	N/A	N/A
2.79	178.6	286.5	300.5	178.6	2.6	-2.3	1.5	6	clean SAND to silty SAND	125	5.0	36	57	95	48	-	-	6	1.72	16	N/A	N/A
2.95	132.4	212.3	253.0	132.3	2.6	-2.0	2.0	6	clean SAND to silty SAND	125	5.0	26	42	92	48	-	-	10	1.90	16	N/A	N/A
3.12	97.9	157.0	213.4	97.9	2.3	-1.9	2.4	5	silty SAND to sandy SILT	120	3.0	32	52	92	48	-	-	14	2.04	16	N/A	N/A
3.28	86.3	138.3	193.0	86.2	2.1	-1.8	2.5	5	silty SAND to sandy SILT	120	3.0	29	46	78	47	-	-	16	2.09	16	N/A	N/A
3.45	94.3	151.2	193.6	94.2	1.8	-2.4	1.9	6	clean SAND to silty SAND	125	5.0	19	30	91	49	-	-	13	1.98	16	N/A	N/A
3.61	168.7	270.5	274.7	168.6	2.0	-2.7	1.2	6	clean SAND to silty SAND	125	5.0	34	54	95	48	-	-	8	1.67	16	N/A	N/A
3.77	206.3	330.9	330.9	206.3	2.7	-2.6	1.3	6	clean SAND to silty SAND	125	5.0	41	66	95	48	-	-	5	1.64	16	N/A	N/A
3.94	221.5	355.2	361.1	221.4	3.3	-2.8	1.5	6	clean SAND to silty SAND	125	5.0	44	71	95	48	-	-	8	1.67	16	N/A	N/A
4.10	210.7	337.9	357.3	210.6	3.6	-2.8	1.7	6	clean SAND to silty SAND	125	5.0	42	68	95	48	-	-	7	1.73	16	N/A	N/A
4.27	219.9	352.6	368.9	219.8	3.7	-2.9	1.7	6	clean SAND to silty SAND	125	5.0	44	71	95	48	-	-	8	1.71	16	N/A	N/A
4.43	218.3	350.0	374.9	218.2	4.0	-3.5	1.8	6	clean SAND to silty SAND	125	5.0	44	70	95	48	-	-	7	1.75	16	N/A	N/A
4.59	201.1	322.5	350.9	201.0	3.7	-3.4	1.9	6	clean SAND to silty SAND	125	5.0	40	64	95	48	-	-	8	1.77	16	N/A	N/A
4.76	183.1	293.6	319.9	183.0	3.2	-3.9	1.8	6	clean SAND to silty SAND	125	5.0	37	59	95	48	-	-	9	1.78	16	N/A	N/A
4.92	172.5	276.7	291.4	172.5	2.5	-4.3	1.5	6	clean SAND to silty SAND	125	5.0	35	55	95	48	-	-	7	1.72	16	N/A	N/A
5.09	167.0	251.8	267.9	166.9	2.2	-4.6	1.4	6	clean SAND to silty SAND	125	5.0	31	50	95	48	-	-	7	1.74	16	0.00	0.0
5.25	136.0	218.1	230.2	135.9	1.6	-4.5	1.2	6	clean SAND to silty SAND	125	5.0	27	44	93	47	-	-	7	1.73	16	0.00	0.0
5.41	105.0	168.3	168.6	104.9	1.3	-4.4	1.3	6	clean SAND to silty SAND	125	5.0	21	34	84	46	-	-	9	1.82	16	0.00	0.0
5.58	80.3	128.7	150.4	80.2	0.9	-4.2	1.2	6	clean SAND to silty SAND	125	5.0	16	26	75	45	-	-	10	1.88	16	0.17	1.3
5.74	78.7	126.2	133.5	78.5	0.5	-4.7	0.7	6	clean SAND to silty SAND	125	5.0	16	25	75	45	-	-	7	1.79	16	0.48	2.6
5.91	83.7	134.2	133.5	83.5	0.4	-10.0	0.5	6	clean SAND to silty SAND	125	5.0	17	27	77	45	-	-	5	1.64	16	0.50	2.7
6.07	82.1	131.7	136.1	81.9	0.5	-10.4	0.6	6	clean SAND to silty SAND	125	5.0	16	26	76	45	-	-	6	1.69	16	0.44	2.5
6.23	80.9	129.8	138.6	80.7	0.6	-10.4	0.7	6	clean SAND to silty SAND	125	5.0	16	26	76	45	-	-	7	1.74	16	0.39	2.3
6.40	80.9	129.7	141.1	80.7	0.7	-10.4	0.8	6	clean SAND to silty SAND	125	5.0	16	26	76	45	-	-	8	1.77	16	0.35	2.2
6.56	77.7	124.6	138.7	77.5	0.7	-10.4	0.9	6	clean SAND to silty SAND	125	5.0	16	25	74	44	-	-	8	1.81	16	0.42	2.4
6.73	66.7	106.9	131.8	66.5	0.8	-10.3	1.2	6	clean SAND to silty SAND	125	5.0	13	21	69	44	-	-	11	1.94	16	0.71	2.3
6.89	49.4	79.1	111.2	49.2	0.7	-10.2	1.3	5	silty SAND to sandy SILT	120	3.0	16	26	59	42	-	-	15	2.07	16	2.12	19.0
7.05	50.8	80.9	102.2	50.6	0.5	-10.1	0.9	6	clean SAND to silty SAND	125	5.0	10	16	60	42	-	-	12	1.97	16	2.30	22.7
7.22	57.3	90.5	95.9	57.1	0.2	-10.2	0.4	6	clean SAND to silty SAND	125	5.0	11	18	64	43	-	-	7	1.73	16	2.42	19.7
7.38	55.2	86.6	95.3	55.0	0.3	-10.2	0.5	6	clean SAND to silty SAND	125	5.0	11	17	62	42	-	-	8	1.75	16	2.43	20.8
7.55	44.7	69.7	90.5	44.5	0.4	-10.1	0.9	6	clean SAND to silty SAND	125	5.0	9	14	55	41	-	-	13	2.00	16	2.53	28.3
7.71	35.1	54.4	80.0	34.9	0.3	-10.1	0.9	5	silty SAND to sandy SILT	120	3.0	12	18	47	42	-	-	16	2.17	16	2.81	39.4
7.87	32.7	50.5	75.1	32.5	0.3	-10.0	0.9	5	silty SAND to sandy SILT	120	3.0	11	17	44	39	-	-	18	2.12	16	2.96	45.8
8.04	31.0	47.8	63.1	30.8	0.2	-9.9	0.5	6	clean SAND to silty SAND	125	5.0	6	9	42	39	-	-	14	2.02	16	3.47	47.2
8.20	35.1	53.4	61.4	34.9	0.1	-10.0	0.3	6	clean SAND to silty SAND	125	5.0	7	11	46	40	-	-	9	1.85	16	3.49	40.4
8.37	45.4	68.6	78.3	45.2	0.2	-10.1	0.4	6	clean SAND to silty SAND	125	5.0	9	14	55	41	-	-	9	1.86	16	2.84	28.9
8.53	51.6	77.5	91.5	51.4	0.3	-10.1	0.6	6	clean SAND to silty SAND	125	5.0	10	16	59	42	-	-	10	1.89	16	2.51	24.3
8.69	50.4	75.2	95.3	50.2	0.4	-10.1	0.9	6	clean SAND to silty SAND	125	5.0	10	15	58	41	-	-	12	1.97	16	2.43	25.4
8.86	47.1	69.9	91.6	46.9	0.4	-9.7	0.9	6	clean SAND to silty SAND	125	5.0	9	14	55	41	-	-	13	2.01	16	2.51	28.2
9.02	47.6	70.2	91.9	47.4	0.4	-9.6	0.9	6	clean SAND to silty SAND	125	5.0	10	14	55	41	-	-	13	2.01	16	2.51	28.0
9.19	47.7	70.0	92.8	47.5	0.4	-9.5	0.9	6	clean SAND to silty SAND	125	5.0	10	14	55	41	-	-	13	2.00	16	2.53	28.1
9.35	46.6	68.0	88.8	46.4	0.4	-9.5	0.8	6	clean SAND to silty SAND	125	5.0	9	14	54	41	-	-	13	2.00	16	2.58	28.3
9.51	46.7	67.7	86.9	46.5	0.4	-9.4	0.8	6	clean SAND to silty SAND	125	5.0	9	14	54	41	-	-	13	1.99	16	2.62	28.4
9.68	50.0	72.1	88.3	49.8	0.3	-9.3	0.7	6	clean SAND to silty SAND	125	5.0	10	14	56	41	-	-	11	1.94	16	2.58	27.0
9.84	51.6	74.0	88.3	51.4	0.3	-9.3	0.6	6	clean SAND to silty SAND	125	5.0	10	15	57	41	-	-	10	1.90	16	2.59	26.1
10.01	53.1	75.7	89.2	52.9	0.3	-9.2	0.6	6	clean SAND to silty SAND	125	5.0	11	15	58	41	-	-	10	1.89	16	2.57	25.2
10.17	52.8	74.9	89.7	52.7	0.3	-9.1	0.7	6	clean SAND to silty SAND	125	5.0	11	15	57	41	-	-	11	1.91	16	2.55	25.6
10.34	52.1	73.5	89.1	52.0	0.3	-9.1	0.6	6	clean SAND to silty SAND	125	5.0	10	15	57	41	-	-	11	1.91	16	2.59	26.3
10.50	48.6	68.2	85.2	48.4	0.3	-9.0	0.7	6	clean SAND to silty SAND	125	5.0	10	14	54	41	-	-	12	1.96	16	2.66	28.1
10.66	51.7	72.1	88.4	51.5	0.4	-8.9	0.7	6	clean SAND to silty SAND	125	5.0	10	14	56	41	-	-	11	1.94	16	2.58	27.0
10.83	47.4	65.8	83.4	47.2	0.5	-8.8	0.7	6	clean SAND to silty SAND	125	5.0	9	13	53	40	-	-	12	1.97	16	2.71	30.5
10.99	38.9	53.7	79.0	38.7	0.3	-8.7	0.9	5	silty SAND to sandy SILT	120	3.0	13	18	46	39	-	-	16	2.11	16	2.84	40.1
11.16	23.8	32.7	87.0	23.6	0.4	-8.6	1.9	5	silty SAND to sandy SILT	120	3.0	8	11	30	36	-	-	30	2.48	16	2.62	51.2
11.32	10.7	17.2	-	10.6	0.3	-8.4	2.8	4	clayy SILT to silty CLAY	115	2.0	5	9	-	-	0.7	6.6	46	2.79	15	-	-
11.48	9.3	13.3	-	9.1	0.1	-8.4	1.5	4	clayy SILT to silty CLAY	115	2.0	4	7	-	-	0.6	4.9	44	2.77	15	-	-
11.65	10.2	16.4	-	10.1	0.2	-8.2	2.0	4	clayy SILT to silty CLAY	115	2.0	5	8	-	-	0.7	6.1	44	2.77	15	-	-
11.81	10.9	25.6	83.8	10.9	0.4	-8.2	2.1	4	clayy SILT to silty CLAY	115	2.0	5	12	-	-	1.3	9.9	35	2.59	15	2.70	51.2
11.98	26.0	35.0	96.0	25.9	0.6	-8.2	2.2	4	clayy SILT to silty CLAY	115	2.0	13	18	-	-	1.8	9.9	30	2.49	15	2.42	51.2
12.14	24.3	32.5	100.1	24.2	0.6	-8.2	2.6	4	clayy SILT to silty CLAY	115	2.0	12	16	-	-	1.7	9.9	33	2.56	15	2.53	51.2
12.30	17.1	26.2	-	16.9	0.4	-6.4	2.3	4	clayy SILT to silty CLAY	115	2.0	9	13	-	-	1.2	9.9	36	2.61	15	-	-
12.47	12.2	19.8	-	12.1	0.3	-6.3	3.0	4	clayy SILT to silty CLAY	115	2.0	6	10	-	-	0.8	7.1	45	2.78	15	-	-
12.63	14.2	22.5	-	13.9	0.4	-6.3	2.7	4	clayy SILT to silty CLAY	115	2.0	7	11	-	-	1.0	8.1	41	2.70	15	-	-
12.80	16.4	26.3	-	16.3	0.5	-6.3	3.4	4	clayy SILT to silty CLAY	115	2.0	8	13	-	-	1.1	8.5	43	2.71	15	-	-
12.96	17.5	26.2	-	17.4	0.4	-6.1	2.4	4	clayy SILT to silty CLAY	115	2.0	9	13	-	-	1.2	9.9	36	2.62	15	-	-
13.12	14.3	22.9	-	14.2	0.5	-5.6	3.5	4	clayy SILT to silty CLAY	115	2.0	7	11	-	-	1.0	8.1	44	2.77	15	-	-
13.29	21.4	27.9	80.6	21.3	0.4	-5.3	1.8	4	clayy SILT to silty CLAY	115	2.0	11	14	-	-	1.5	9.9	32	2.52	15	2.79	51.2
13.45	34.5	44.7	77.1	34.3	0.4	-5.3	1.1	5	silty SAND to sandy SILT	120	3.0	11	15	40	38	-	-	20	2.22	16	2.99	50.5
13.62	22.3	28.9	82.3	22.5	0.4	-0.4	1.9	4	clayy SILT to silty CLAY	115	2.0	11	14	-	-	1.5	9.9	31	2.52	15	2.74	51.2
13.78	19.4	19.9	-	19.4	0.2	0.9	2.3	4	clayy SILT to silty CLAY	115	2.0	6	10	-	-	0.8	6.7	40	2.68	15	-	-
13.94	7.1	11.5	-	7.2	0.1	1.1	2.3	3	silty CLAY to CLAY	115	1.5	5	8	-	-	0.5	3.6	54	2.93	15	-	-
14.11	6.6	10.5	-	6.6	0.1	1.2	2.3	3	silty CLAY to CLAY	115	1.5	4	7	-	-	0.4	3.3	56	2.96	15	-	-
14.27	8.2	13.1	-	8.2	0.2	1.2	2.4	3	silty CLAY to CLAY	115	1.5	5	9	-	-	0.5	4.1	51	2.89	15	-	-
14.44	13.1	21.0	-	13.1	0.2	1.2	1.9	4	clayy SILT to silty CLAY	115	2.0	7	10	-	-	0.9	6.5	38	2.64	15	-	-
14.60	12.0	19.3	-	12.1	0.4	1.3	3.2	4	clayy SILT to silty CLAY	115	2.0	6	10	-	-	0.8	6.2	47	2.81	15	-	-
14.76	39.7	49.9	72.6	39.7	0.3	1.1	0.8	5	silty SAND to sandy SILT	120	3.0	13	17	44	38	-	-	16	2.10	16	3.03	44.2
14.93	44.1	55.2	75.8	44.1	0.3	-1.3	0.8	6	clean SAND to silty SAND	125	5.0	9	11	47	39	-	-	15	2.06	16	2.90	38.4
15.09	36.8	46.0	67.0	36.8	0.2	-1.4	0.7	5	silty SAND to sandy SILT	120	3.0	12	15	41	38	-	-	16	2.10	16	3.25	48.9
15.26	27.5	34.2	83.5	27.4	0.2	-5.3	0.9	5	silty SAND to sandy SILT	120	3.0	9	11	39	36	-	-	21	2.27	16	3.59	51.2
15.42	12.2	19.5	-	12.0	0.2	-6.6	1.7	4	clayy SILT to silty CLAY	115	2.0	6	10	-	-	0.8	5.0	38	2.64	15	-	-

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

Middle Earth Geo Testing

Project ID: Stoney Miller
Data File: SDI(166).cpt
CPT Date: 10/11/2016 10:25:52 AM
GW During Test: 5 ft

Sounding ID: CPT-03
Project No: 50093-00
Cone/Rig: DDG1281

Depth ft	qc SE tsf	qcln SE -	qlncs SE -	qt SE tsf	Slv Stss tsf	pore prss (psi)	Frct Ratio %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT N-N 60%	SPT N-N1 60%	Rel Den %	Fin Ang deg	Und Shr tsf	OCR -	Fin Ic %	Ic SBI Indx	Nk -	Vol Strn %	Cycl SStn %
15.58	8.0	12.9	-	7.8	0.1	-6.5	1.9	4	clayy SILT to silty CLAY	115	2.0	4	6	-	-	0.5	3.8	49	2.85	15	-	-
15.75	9.4	15.1	-	9.3	0.1	-6.4	1.6	4	clayy SILT to silty CLAY	115	2.0	5	8	-	-	0.6	4.5	41	2.71	15	-	-
15.91	10.5	16.7	-	10.4	0.2	-6.4	1.8	4	clayy SILT to silty CLAY	115	2.0	5	8	-	-	0.7	5.0	42	2.72	15	-	-
16.08	10.7	17.0	-	10.6	0.2	-6.4	2.0	4	clayy SILT to silty CLAY	115	2.0	5	8	-	-	0.7	5.1	45	2.79	15	-	-
16.24	13.6	21.5	-	13.5	0.4	-6.3	3.5	4	clayy SILT to silty CLAY	115	2.0	7	11	-	-	0.9	6.5	48	2.80	15	-	-
16.40	19.0	23.0	68.2	18.9	0.3	-6.6	1.4	5	silty SAND to sandy SILT	120	3.0	8	8	19	33	-	-	32	2.54	16	3.20	51.2
16.57	11.8	18.4	-	11.8	0.2	-6.6	2.2	4	clayy SILT to silty CLAY	115	2.0	6	9	-	-	0.8	5.6	42	2.73	15	-	-
16.73	10.0	15.4	-	9.9	0.2	-6.5	2.2	4	clayy SILT to silty CLAY	115	2.0	5	8	-	-	0.7	4.6	46	2.80	15	-	-
16.90	11.0	16.8	-	10.9	0.2	-6.5	2.1	4	clayy SILT to silty CLAY	115	2.0	6	8	-	-	0.7	5.0	44	2.78	15	-	-
17.06	10.9	16.5	-	10.7	0.3	-6.5	2.8	4	clayy SILT to silty CLAY	115	2.0	5	8	-	-	0.7	4.9	48	2.83	15	-	-
17.23	12.9	19.4	-	12.7	0.2	-6.5	2.0	4	clayy SILT to silty CLAY	115	2.0	6	10	-	-	0.9	5.9	40	2.69	15	-	-
17.39	28.3	31.3	57.6	26.2	0.2	-6.6	0.7	5	silty SAND to sandy SILT	120	3.0	9	10	29	35	-	-	21	2.26	16	3.58	51.2
17.55	31.3	37.1	68.0	31.2	0.3	-6.9	1.0	5	silty SAND to sandy SILT	120	3.0	10	12	34	36	-	-	21	2.26	16	3.21	51.2
17.72	37.8	44.7	76.3	37.7	0.4	-7.1	1.1	5	silty SAND to sandy SILT	120	3.0	13	15	40	37	-	-	20	2.23	16	2.86	50.5
17.88	60.9	71.5	95.0	60.6	0.6	-8.1	1.0	6	clean SAND to silty SAND	125	5.0	12	14	56	40	-	-	14	2.02	16	2.44	27.3
18.05	67.3	78.9	95.5	67.1	0.5	-8.1	0.7	6	clean SAND to silty SAND	125	5.0	13	15	59	40	-	-	11	1.92	16	2.43	25.6
18.21	76.8	89.7	102.0	76.6	0.5	-8.7	0.6	6	clean SAND to silty SAND	125	5.0	15	18	63	41	-	-	9	1.84	16	2.30	19.9
18.37	78.5	91.3	97.8	78.3	0.3	-8.8	0.3	6	clean SAND to silty SAND	125	5.0	16	18	64	41	-	-	7	1.75	16	2.38	19.4
18.54	79.2	90.7	103.8	78.0	0.5	-8.9	0.7	6	clean SAND to silty SAND	125	5.0	16	18	64	41	-	-	9	1.85	16	2.27	19.6
18.70	49.1	56.7	104.8	48.9	0.9	-9.8	1.8	5	silty SAND to sandy SILT	120	3.0	16	19	48	38	-	-	21	2.27	16	2.25	37.1
18.87	32.6	35.2	101.6	30.4	0.7	-9.5	2.5	4	clayy SILT to silty CLAY	115	2.0	16	18	-	-	2.1	9.6	32	2.52	15	2.31	51.2
19.03	34.2	39.3	88.5	34.0	0.6	-9.4	1.8	5	silty SAND to sandy SILT	120	3.0	11	13	36	36	-	-	28	2.39	16	2.56	51.2
19.19	21.5	24.6	74.6	21.5	0.3	-8.8	1.7	4	clayy SILT to silty CLAY	115	2.0	11	12	-	-	1.5	9.3	33	2.55	15	2.97	51.2
19.36	12.1	16.6	-	12.0	0.4	-8.3	3.6	3	silty CLAY to CLAY	115	1.5	8	11	-	-	0.8	5.0	52	2.90	15	-	-
19.52	12.2	16.7	-	12.2	0.4	-8.2	3.8	3	silty CLAY to CLAY	115	1.5	8	11	-	-	0.8	5.0	50	2.87	15	-	-
19.69	13.0	17.8	-	13.0	0.7	-8.2	3.6	3	silty CLAY to CLAY	115	1.5	9	12	-	-	0.9	5.5	51	2.88	15	-	-
19.85	16.2	21.9	-	16.2	0.9	-8.3	1.9	4	clayy SILT to silty CLAY	115	2.0	8	11	-	-	1.1	6.7	37	2.64	15	-	-
20.01	13.6	18.4	-	13.5	0.9	-8.3	2.1	4	clayy SILT to silty CLAY	115	2.0	7	9	-	-	0.9	5.5	42	2.73	15	-	-
20.18	12.7	17.1	-	12.7	0.5	-8.2	4.0	3	silty CLAY to CLAY	115	1.5	8	11	-	-	0.8	5.1	53	2.92	15	-	-
20.34	20.2	26.9	-	20.2	0.6	-8.3	2.9	4	clayy SILT to silty CLAY	115	2.0	10	13	-	-	1.4	8.3	39	2.67	15	-	-
20.51	30.6	34.2	86.4	30.6	0.8	-8.8	1.8	5	silty SAND to sandy SILT	120	3.0	10	11	32	35	-	-	28	2.45	16	2.63	51.2
20.67	41.1	45.8	92.1	41.1	0.5	-8.8	1.2	5	silty SAND to sandy SILT	120	3.0	14	15	41	37	-	-	21	2.25	16	2.75	49.1
20.83	36.0	40.0	71.6	35.9	0.4	-8.8	1.0	5	silty SAND to sandy SILT	120	3.0	12	13	37	36	-	-	21	2.25	16	2.37	51.2
21.00	21.8	24.1	71.1	21.7	0.3	-8.8	1.5	5	silty SAND to sandy SILT	120	3.0	7	8	22	33	-	-	32	2.53	16	3.09	51.2
21.16	9.8	12.7	-	9.7	0.5	-4.7	5.4	3	silty CLAY to CLAY	115	1.5	7	8	-	-	0.6	3.6	67	3.11	15	-	-
21.33	13.7	17.6	-	13.6	0.5	-4.6	3.9	3	silty CLAY to CLAY	115	1.5	9	12	-	-	0.9	5.3	52	2.90	15	-	-
21.49	29.9	32.8	84.2	29.8	0.5	-4.7	1.8	5	silty SAND to sandy SILT	120	3.0	10	11	30	35	-	-	28	2.46	16	2.69	51.2
21.65	46.3	50.7	70.2	46.2	0.3	-5.4	0.7	6	clean SAND to silty SAND	125	5.0	9	10	45	38	-	-	15	2.06	16	3.12	43.4
21.82	56.8	62.0	78.6	56.7	0.4	-5.9	0.6	6	clean SAND to silty SAND	125	5.0	11	12	51	39	-	-	12	1.97	16	2.85	32.7
21.98	64.6	70.2	87.0	64.6	0.4	-6.7	0.7	6	clean SAND to silty SAND	125	5.0	13	14	55	39	-	-	10	1.95	16	2.62	28.0
22.15	54.2	58.7	89.8	54.2	0.6	-1.0	1.2	5	silty SAND to sandy SILT	120	3.0	18	20	49	38	-	-	17	2.14	16	2.55	35.1
22.31	28.7	31.0	87.1	28.7	0.5	1.5	2.0	4	clayy SILT to silty CLAY	115	2.0	14	16	-	-	2.0	9.9	31	2.51	15	2.52	51.2
22.47	22.4	25.4	82.3	22.4	0.4	2.2	2.0	4	clayy SILT to silty CLAY	115	2.0	11	13	-	-	1.5	8.5	35	2.58	15	2.71	51.2
22.64	20.2	24.7	-	20.2	0.5	2.3	2.4	4	clayy SILT to silty CLAY	115	2.0	10	12	-	-	1.4	7.6	38	2.65	15	-	-
22.80	26.3	28.2	82.0	26.4	0.5	2.3	1.8	4	clayy SILT to silty CLAY	115	2.0	13	14	-	-	1.8	9.9	32	2.53	15	2.75	51.2
22.97	37.1	39.6	77.9	37.1	0.3	2.2	1.3	5	silty SAND to sandy SILT	120	3.0	12	13	36	36	-	-	23	2.31	16	2.87	51.2
23.13	42.0	44.7	71.7	42.0	0.4	2.1	0.9	5	silty SAND to sandy SILT	120	3.0	14	15	40	37	-	-	18	2.17	16	3.07	50.4
23.30	38.6	41.0	62.2	38.6	0.2	2.3	0.6	5	silty SAND to sandy SILT	120	3.0	13	14	38	36	-	-	17	2.13	16	3.45	51.2
23.46	26.4	28.0	63.0	26.4	0.3	2.6	1.0	5	silty SAND to sandy SILT	120	3.0	9	9	25	34	-	-	25	2.39	16	3.41	51.2
23.62	13.3	15.7	-	13.3	0.2	3.0	2.0	4	clayy SILT to silty CLAY	115	2.0	7	8	-	-	0.9	4.6	46	2.78	15	-	-
23.79	7.0	8.3	-	7.1	0.1	3.2	2.1	3	silty CLAY to CLAY	115	1.5	5	6	-	-	0.4	2.2	63	3.07	15	-	-
23.95	5.5	6.4	-	5.6	0.0	3.5	0.9	3	silty CLAY to CLAY	115	1.5	4	4	-	-	0.3	1.6	60	3.02	15	-	-
24.12	5.1	6.0	-	5.2	0.1	3.7	2.5	3	silty CLAY to CLAY	115	1.5	3	4	-	-	0.3	1.4	78	3.26	15	-	-
24.28	8.0	9.3	-	8.1	0.1	3.8	1.2	4	clayy SILT to silty CLAY	115	2.0	4	5	-	-	0.5	2.5	52	2.90	15	-	-
24.44	7.9	9.1	-	8.0	0.1	3.9	1.3	4	clayy SILT to silty CLAY	115	2.0	4	5	-	-	0.5	2.4	53	2.91	15	-	-
24.61	6.7	7.7	-	6.8	0.0	4.0	0.8	4	clayy SILT to silty CLAY	115	2.0	5	4	-	-	0.4	2.0	53	2.92	15	-	-
24.77	6.0	6.9	-	6.1	0.0	4.1	0.6	1	sensitive fine SOIL	115	2.0	3	3	-	-	0.4	1.7	54	2.94	15	-	-
24.94	5.7	6.8	-	5.8	0.0	4.3	0.9	1	sensitive fine SOIL	115	2.0	3	3	-	-	0.3	1.4	53	2.91	15	-	-
25.10	5.2	5.9	-	5.3	0.0	4.4	0.7	1	sensitive fine SOIL	115	2.0	3	3	-	-	0.3	1.4	62	3.04	15	-	-
25.26	5.5	6.2	-	5.6	0.0	5.2	1.1	3	silty CLAY to CLAY	115	1.5	4	4	-	-	0.3	1.5	65	3.09	15	-	-
25.43	6.1	6.8	-	6.2	0.1	5.2	1.7	3	silty CLAY to CLAY	115	1.5	4	5	-	-	0.4	1.7	67	3.12	15	-	-
25.59	7.6	8.5	-	7.7	0.1	5.3	2.4	3	silty CLAY to CLAY	115	1.5	5	6	-	-	0.5	2.2	64	3.08	15	-	-
25.76	17.7	18.2	60.9	17.8	0.2	5.4	1.2	4	clayy SILT to silty CLAY	115	2.0	9	9	-	-	1.2	5.8	38	2.60	15	3.54	51.2
25.92	58.6	59.9	78.4	58.7	0.4	5.0	0.7	6	clean SAND to silty SAND	125	5.0	12	12	52	38	-	-	13	2.01	16	2.95	34.0
26.08	70.3	71.6	95.2	70.4	0.7	6.6	1.0	6	clean SAND to silty SAND	125	5.0	14	14	56	39	-	-	14	2.02	16	2.43	27.3
26.25	54.1	55.0	102.3	54.3	0.9	8.6	1.7	5	silty SAND to sandy SILT	120	3.0	18	18	47	38	-	-	21	2.27	16	2.29	38.0
26.41	36.3	36.7	114.9	36.4	1.0	8.6	3.0	4	clayy SILT to silty CLAY	115	2.0	18	18	-	-	2.5	9.9	34	2.57	15	2.09	51.2
26.58	17.3	18.7	-	17.4	0.9	8.9	5.3	3	silty CLAY to CLAY	115	1.5	12	12	-	-	1.2	5.6	57	2.98	15	-	-
26.74	9.8	10.5	-	9.9	0.4	9.2	4.7	3	silty CLAY to CLAY	115	1.5	7	7	-	-	0.6	2.9	70	3.16	15	-	-
26.90	7.3	7.9	-	7.5	0.1	9.6	1.8	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	2.0	63	3.06	15	-	-
27.07	7.0	7.4	-	7.2	0.1	10.0	1.8	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.4	1.9	66	3.10	15	-	-
27.23	7.3	7.7	-	7.5	0.1	10.3	1.6	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.4	2.0	61	3.04	15	-	-
27.40	7.9	8.4	-	8.1	0.1	10.6	1.9	3	silty CLAY to CLAY	115	1.5	5	6	-	-	0.5	2.2	62	3.04	15	-	-
27.56	7.5	7.9	-	7.7	0.2	10.8	2.8	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	2.0	70	3.16	15	-	-
27.72	7.9	8.3	-	8.1	0.2	11.0	2.8	3	silty CLAY to CLAY	115	1.5	5	6	-	-	0.5	2.2	68	3.13	15	-	-
27.89	6.9	7.2	-	7.1	0.2	11.1	3.0	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.4	1.8	74	3.22	15	-	-
28.05	6.7	6.9	-	6.9	0.1	11.2	1.8	3	silty CLAY to CLAY	115	1.5	4	5	-	-	0.4	1.7	68	3.13	15	-	-
28.22	6.9	7.2	-	7.1	0.2	11.4	3.1	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.4	1.8	75	3.23	15	-	-
28.38	7.7	8.0	-	7.9	0.1	11.6	1.5	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	2.0	60	3.03	15	-	-
28.54	8.8	9.0	-	9.1	0.1	12.5	0.9	4	clayy SILT to silty CLAY	115	2.0	4	5	-	-	0.6	2.4	49	2.88	15	-	-
28.71	6.9	7.1	-	7.2	0.2	12.7	2.0	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.4	1.8	69	3.14	15	-	-
28.87	10.0	10.2	-	10.3	0.5	12.9	0.6	4	clayy SILT to silty CLAY	115	2.0	5	5	-	-	0.6	2.6	42	2.73	15	-	-
29.04	10.3	10.5	-	10.6	0.1	13.0	1.6	4	clayy SILT to silty CLAY	115	2.0	5	5	-	-	0.7	2.9	52	2.80	15	-	-
29.20	10.3	10.4	-	10.5	0.1	13.2	1.7	4	clayy SILT to silty CLAY	115	2.0	5	5	-	-	0.7	2.8	54	2.83	15	-	-
29.36	48.1	46.8	72.8	48.3	0.4	12.6	0.9	5	silty SAND to sandy SILT	120	3.0	16	16	42	36	-	-	17	2.15	16	3.03	47.9
29.53	62.8	61.0	92.2	63.1	0.7	10.9	1.2	5	silty SAND to sandy SILT	120	3.0	21	20	51	38	-	-	17	2.13	16	2.50	33.3
29.69	60.1	58.2	97.0	60.3	0.8	11.0	1.4	5	silty SAND to sandy SILT	120	3.0	20	19	49	38	-	-	19	2.20	16	2.40	35.6
29.86	49.8	48.1	93.2	50.0	0.8	11.1	1.6	5	silty SAND to sandy SILT	120	3.0	17	18	43	36	-	-	22	2.30	16	2.48	48.3
30.02	34.6	33.3	100.7	34.8	0.8	10.9	2.5	4	clayy SILT to silty CLAY	115	2.0	17	17	-	-	2.4	8.9	53	2.55	15	2.32	51.2
30.19	17.1	16.8	-	17.4	0.6	11.0	3.9	3	silty CLAY to CLAY	115	1.5	11	11	-	-	1.1	5.0	58	2.92	15	-	-
30.35	9.5	9.3	-	9.7	0.3	11.3	4.2	3	silty CLAY to CLAY	115	1.5	6	6	-	-	0.6	2.5	72	3.18	15	-	-
30.51	7.5	7.3	-	7.7	0.1	11.7	2.2	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	1.9	66	3.14	15	-	-
30.68	7.3	7.0	-	7.5	0.1	11.9	2.0	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.4	1.7	65	3.13	15	-	-
30.84	6.9	6.6	-	7.1	0.1	12.0	2.2	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.4	1.6	72	3.19	15	-	-

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

Project ID: Stoney Miller
Data File: SOP(166).cpt
CPT Date: 10/11/2016 10:25:52 AM
GW During Test: 5 ft

Sounding ID: CPT-05
Project No: 50053-00
Core/Rig: DDG1281

Depth ft	qc PS tsf	qcln PS -	qtrue PS -	qt PS tsf	Slv Stss tsf	pore pres (psi)	Frct Ratio %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc Lo N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Fric Ang deg	Und Shr tsf	OCR -	Fin Ic %	Ic SBT Indx	Nk -	Vol Strn %	Cycl SStn %
31.01	6.9	6.7	-	7.2	0.1	12.2	1.5	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.4	1.6	66	3.21	15	-	-
31.17	6.9	6.6	-	7.1	0.1	12.3	1.3	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.4	1.6	65	3.10	15	-	-
31.33	7.3	7.0	-	7.6	0.1	12.8	1.3	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.4	1.7	62	3.05	15	-	-
31.50	7.3	6.9	-	7.5	0.1	12.9	1.4	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.4	1.7	64	3.08	15	-	-
31.66	7.4	7.0	-	7.7	0.1	13.0	1.4	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.4	1.7	64	3.08	15	-	-
31.83	7.5	7.1	-	7.8	0.1	13.1	1.3	3	silty CLAY to CLAY	115	1.5	5	5	-	-	0.5	1.7	63	3.00	15	-	-
31.99	6.9	6.4	-	7.1	0.0	13.2	0.7	1	sensitive fine SOIL	115	2.0	3	3	-	-	0.4	1.5	58	2.98	15	-	-
32.15	7.2	6.8	-	7.5	0.0	13.3	0.5	1	sensitive fine SOIL	115	2.0	4	3	-	-	0.4	1.6	53	2.92	15	-	-
32.32	6.6	6.2	-	6.9	0.0	13.4	0.7	1	sensitive fine SOIL	115	2.0	3	3	-	-	0.4	1.4	60	3.02	15	-	-
32.48	6.6	6.1	-	6.9	0.0	13.5	0.8	3	silty CLAY to CLAY	115	1.5	4	4	-	-	0.4	1.4	63	3.06	15	-	-
32.65	6.7	6.2	-	7.0	0.1	13.7	1.2	3	silty CLAY to CLAY	115	1.5	4	4	-	-	0.4	1.4	66	3.11	15	-	-
32.81	6.7	6.1	-	7.0	0.1	13.8	1.5	3	silty CLAY to CLAY	115	1.5	4	4	-	-	0.4	1.4	70	3.16	15	-	-
32.97	6.9	6.3	-	7.1	0.1	13.9	1.5	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.4	1.5	69	3.14	15	-	-
33.14	7.3	6.7	-	7.6	0.1	14.0	1.6	3	silty CLAY to CLAY	115	1.5	5	4	-	-	0.4	1.6	67	3.12	15	-	-
33.30	9.8	8.9	-	10.1	0.2	14.1	2.2	3	silty CLAY to CLAY	115	1.5	7	6	-	-	0.6	2.3	62	3.05	15	-	-
33.47	11.0	10.0	-	11.3	0.3	14.1	2.7	3	silty CLAY to CLAY	115	1.5	7	7	-	-	0.7	2.7	64	3.08	15	-	-
33.63	26.5	24.4	68.4	26.7	0.3	14.2	1.3	5	silty SAND to sandy SILT	120	3.0	9	8	20	32	-	-	31	2.51	16	3.19	51.2
33.79	42.4	39.0	67.3	42.6	0.5	12.0	0.9	5	silty SAND to sandy SILT	120	3.0	14	15	38	35	-	-	20	2.22	16	3.23	51.2
33.96	35.2	32.3	51.8	35.4	0.2	10.2	0.5	5	silty SAND to sandy SILT	120	3.0	12	11	30	34	-	-	18	2.17	16	4.00	51.2
34.12	19.7	18.1	50.3	19.9	0.1	9.5	0.7	5	silty SAND to sandy SILT	120	3.0	7	6	11	30	-	-	31	2.50	16	4.11	51.2
34.29	9.8	8.7	-	10.0	0.2	9.7	2.5	3	silty CLAY to CLAY	115	1.5	7	6	-	-	0.6	2.3	65	3.09	15	-	-
34.45	11.8	10.7	-	12.0	0.2	9.9	2.2	3	silty CLAY to CLAY	115	1.5	8	7	-	-	0.8	2.8	67	2.98	15	-	-
34.61	13.1	11.5	-	13.3	0.1	9.9	0.9	4	clayy SILT to silty CLAY	115	2.0	7	6	-	-	0.8	3.2	49	2.75	15	-	-
34.78	11.8	10.4	-	12.0	0.1	10.0	1.0	4	clayy SILT to silty CLAY	115	2.0	6	5	-	-	0.8	2.8	47	2.81	15	-	-
34.94	12.5	10.8	-	12.7	0.2	10.5	2.4	3	silty CLAY to CLAY	115	1.5	8	7	-	-	0.8	3.0	57	2.98	15	-	-
35.11	26.2	23.7	69.7	26.4	0.3	10.6	1.4	5	silty SAND to sandy SILT	120	3.0	9	8	20	32	-	-	32	2.53	16	3.14	51.2
35.27	69.6	62.8	79.1	69.7	0.4	9.0	0.6	6	clean SAND to silty SAND	125	5.0	14	13	52	38	-	-	12	1.97	16	2.83	32.2
35.43	95.6	86.2	92.7	95.7	0.4	4.3	0.4	6	clean SAND to silty SAND	125	5.0	19	17	62	39	-	-	7	1.76	16	2.49	21.0
35.60	100.2	90.2	102.3	100.3	0.6	4.0	0.6	6	clean SAND to silty SAND	125	5.0	20	18	64	40	-	-	9	1.84	16	2.29	19.8
35.76	95.9	86.0	100.6	95.9	0.7	4.1	0.7	6	clean SAND to silty SAND	125	5.0	19	17	62	39	-	-	10	1.88	16	2.32	21.0
35.93	102.3	91.6	103.4	102.4	0.6	4.0	0.6	6	clean SAND to silty SAND	125	5.0	20	18	64	40	-	-	9	1.83	16	2.27	19.3
36.09	104.3	93.7	109.4	104.9	0.8	5.2	0.8	6	clean SAND to silty SAND	125	5.0	21	19	65	40	-	-	10	1.88	16	2.17	18.7
36.26	105.6	95.1	113.7	106.7	0.9	2.9	0.9	6	clean SAND to silty SAND	125	5.0	21	19	65	40	-	-	11	1.91	16	2.10	18.3
36.42	109.6	97.5	115.8	109.8	1.0	2.8	0.9	6	clean SAND to silty SAND	125	5.0	22	20	66	40	-	-	10	1.80	16	2.07	17.6
36.58	106.4	94.5	111.9	106.5	0.9	2.0	0.9	6	clean SAND to silty SAND	125	5.0	21	19	65	40	-	-	10	1.80	16	2.13	18.5
36.75	99.5	88.1	95.0	99.5	0.4	1.1	0.4	6	clean SAND to silty SAND	125	5.0	20	18	63	39	-	-	7	1.76	16	2.44	20.4
36.91	74.1	65.5	98.4	74.1	0.9	-0.9	1.3	5	silty SAND to sandy SILT	120	3.0	25	22	53	36	-	-	17	2.12	16	2.37	30.6
37.08	41.7	36.8	99.1	41.7	0.9	-0.5	2.2	4	clayy SILT to silty CLAY	115	2.0	21	18	-	-	2.9	9.9	30	2.48	15	2.35	51.2
37.24	43.3	38.1	81.2	43.3	0.6	-0.4	1.4	5	silty SAND to sandy SILT	120	3.0	14	13	35	34	-	-	25	2.35	16	2.77	51.2
37.40	41.5	36.5	90.2	41.5	0.7	-1.0	1.8	5	silty SAND to sandy SILT	120	3.0	14	12	34	34	-	-	28	2.44	16	2.84	51.2
37.57	43.4	38.1	73.3	43.4	0.5	-1.2	1.1	5	silty SAND to sandy SILT	120	3.0	14	13	35	34	-	-	22	2.29	16	3.01	51.2
37.73	46.5	40.7	74.9	46.4	0.5	-1.6	1.1	5	silty SAND to sandy SILT	120	3.0	15	14	37	35	-	-	21	2.26	16	2.96	51.2
37.90	32.4	28.3	60.5	32.3	0.3	-1.7	0.9	5	silty SAND to sandy SILT	120	3.0	11	9	25	33	-	-	25	2.36	16	3.55	51.2
38.06	28.7	25.0	50.1	28.7	0.1	-1.7	0.6	5	silty SAND to sandy SILT	120	3.0	10	8	21	32	-	-	23	2.32	16	4.12	51.2
38.22	20.9	18.2	43.1	20.9	0.1	-1.6	0.4	5	silty SAND to sandy SILT	120	3.0	7	6	11	29	-	-	27	2.41	16	4.66	51.2
38.38	13.6	10.9	-	13.6	0.1	-1.5	0.9	4	clayy SILT to silty CLAY	115	2.0	7	5	-	-	0.9	3.0	45	2.78	15	-	-
38.55	11.5	9.2	-	11.4	0.1	-1.5	1.3	4	clayy SILT to silty CLAY	115	2.0	6	5	-	-	0.7	2.4	54	2.93	15	-	-
38.72	13.8	10.9	-	13.7	0.2	-1.3	2.0	3	silty CLAY to CLAY	115	1.5	9	7	-	-	0.9	3.0	54	2.93	15	-	-
38.88	15.1	12.0	-	15.1	0.4	-1.5	3.4	3	silty CLAY to CLAY	115	1.5	10	8	-	-	1.0	3.3	60	3.03	15	-	-
39.04	22.7	17.9	-	22.6	0.3	-1.5	1.9	4	clayy SILT to silty CLAY	115	2.0	11	9	-	-	1.5	5.2	37	2.63	15	-	-
39.21	18.0	14.2	-	18.0	0.6	-1.5	3.7	3	silty CLAY to CLAY	115	1.5	12	9	-	-	1.2	4.1	57	2.97	15	-	-
39.37	27.5	21.6	-	27.5	0.9	-1.6	3.6	3	silty CLAY to CLAY	115	1.5	18	14	-	-	1.9	6.5	47	2.81	15	-	-
39.54	43.5	37.4	103.8	43.5	1.0	-1.7	2.4	4	clayy SILT to silty CLAY	115	2.0	22	19	-	-	3.0	9.9	31	2.50	15	2.27	51.2
39.70	59.5	51.0	84.6	59.4	0.9	-2.4	1.5	5	silty SAND to sandy SILT	120	3.0	23	17	45	36	-	-	21	2.27	16	2.45	42.0
39.86	57.0	48.7	80.4	56.9	0.6	-3.2	1.1	5	silty SAND to sandy SILT	120	3.0	22	16	43	36	-	-	19	2.19	16	2.79	48.6
40.03	51.7	43.9	85.1	51.3	0.5	-3.4	0.6	5	silty SAND to sandy SILT	120	3.0	17	15	40	35	-	-	16	2.12	16	3.32	51.2
40.19	45.5	38.6	83.2	45.4	0.6	-3.4	1.5	5	silty SAND to sandy SILT	120	3.0	15	13	36	34	-	-	25	2.36	16	2.72	51.2
40.36	35.4	27.2	-	35.3	0.9	-3.3	2.8	4	clayy SILT to silty CLAY	115	2.0	18	14	-	-	2.4	8.4	38	2.65	15	-	-
40.52	37.2	28.4	-	37.1	1.0	-3.3	2.9	4	clayy SILT to silty CLAY	115	2.0	19	14	-	-	2.5	8.8	38	2.65	15	-	-
40.68	48.9	41.5	104.6	48.8	1.1	-3.7	2.3	5	silty SAND to sandy SILT	120	3.0	16	14	38	35	-	-	28	2.46	16	2.25	51.2
40.85	67.1	58.3	103.1	67.0	1.1	-4.2	2.0	5	silty SAND to sandy SILT	120	3.0	19	16	43	38	-	-	25	2.35	16	2.26	46.1
41.01	50.2	42.5	83.0	50.2	0.5	-4.7	0.6	5	silty SAND to sandy SILT	120	3.0	17	14	39	35	-	-	16	2.11	16	3.42	51.2
41.18	35.5	30.0	55.7	35.4	0.2	-5.0	0.6	5	silty SAND to sandy SILT	120	3.0	12	10	27	33	-	-	21	2.27	16	3.78	51.2
41.34	16.5	14.1	-	16.7	0.1	-5.0	0.9	4	clayy SILT to silty CLAY	115	2.0	9	7	-	-	1.2	4.1	38	2.65	15	-	-
41.50	14.0	10.5	-	13.8	0.3	-4.9	2.6	3	silty CLAY to CLAY	115	1.5	9	7	-	-	0.9	2.8	60	3.02	15	-	-
41.67	12.5	9.0	-	11.9	0.5	-4.8	5.2	3	silty CLAY to CLAY	115	1.5	8	6	-	-	0.8	2.4	77	3.25	15	-	-
41.83	13.4	10.0	-	13.3	0.7	-4.8	6.9	3	silty CLAY to CLAY	115	1.5	9	7	-	-	0.9	2.7	80	3.29	15	-	-
42.00	13.2	9.8	-	13.1	0.8	-4.8	7.6	3	silty CLAY to CLAY	115	1.5	9	7	-	-	0.8	2.6	83	3.32	15	-	-
42.16	13.7	10.1	-	13.6	0.8	-4.8	6.8	3	silty CLAY to CLAY	115	1.5	9	7	-	-	0.9	2.7	79	3.28	15	-	-
42.32	14.1	10.4	-	14.0	0.7	-4.8	6.3	3	silty CLAY to CLAY	115	1.5	9	7	-	-	0.9	2.8	77	3.25	15	-	-
42.49	14.2	10.4	-	14.1	0.8	-4.8	6.6	3	silty CLAY to CLAY	115	1.5	9	7	-	-	0.9	2.8	77	3.25	15	-	-
42.65	14.7	10.8	-	14.6	0.8	-4.8	7.0	3	silty CLAY to CLAY	115	1.5	10	7	-	-	0.9	2.9	77	3.26	15	-	-
42.82	15.4	11.2	-	15.3	1.0	-4.8	7.6	3	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	3.1	78	3.26	15	-	-
42.98	15.0	10.9	-	14.9	0.9	-4.8	7.6	3	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	3.0	78	3.27	15	-	-
43.15	14.6	10.6	-	14.5	0.8	-4.7	6.8	3	silty CLAY to CLAY	115	1.5	10	7	-	-	0.9	2.9	77	3.25	15	-	-
43.31	15.0	10.8	-	14.9	0.8	-4.7	6.4	3	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	3.0	75	3.23	15	-	-
43.47	15.8	11.4	-	15.7	0.8	-4.7	6.8	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.0	3.2	75	3.23	15	-	-
43.64	16.5	11.9	-	16.4	1.0	-4.7	7.1	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.3	75	3.22	15	-	-
43.80	17.0	12.2	-	16.9	1.0	-4.7	7.2	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.4	74	3.22	15	-	-
43.97	17.0	12.2	-	16.9	1.1	-4.7	7.5	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.4	75	3.23	15	-	-
44.13	16.5	11.9	-	16.4	1.1	-4.7	7.6	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.3	77	3.25	15	-	-
44.29	16.2	11.5	-	16.1	1.0	-4.7	7.6	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.0	3.2	77	3.25	15	-	-
44.46	15.8	11.2	-	15.7	0.9	-4.7	8.5	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.0	3.1	75	3.22	15	-	-
44.62	16.1	11.4	-	16.0	0.8	-4.6	6.3	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.0	3.1	74	3.21	15	-	-
44.78	15.9	11.2	-	15.9	1.0	-4.6	7.9	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.0	3.2	77	3.25	15	-	-
44.95	16.2	11.4	-	16.1	1.0	-4.6	7.2	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.0	3.1	76	3.24	15	-	-
45.11	15.7	11.0	-	15.6	0.9	-4.6	7.2	3	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	3.0	78	3.26	15	-	-
45.28	16.2	11.3	-	16.1	0.9	-4.6	6.9	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.0	3.1	76	3.24	15	-	-
45.44	17.1	11.9	-	17.0	1.0	-4.6	6.6	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.3	73	3.20	15	-	-
45.61	16.4	11.4	-	16.3	0.9	-4.5	6.7	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.1	75	3.22	15	-	-
45.77	16.6	11.5	-	16.6	0.9	-4.5	6.5	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.2	74	3.21	15	-	-
45.93	17.7	12.2	-	17.6	1.0	-4.5	6.6	3	silty CLAY to CLAY	115	1.5	12	9	-	-	1.1	3.4	72	3.19	15	-	-
46.10	18.6	12.8	-	18.5	1.2	-4.5	7.7	3	silty CLAY to CLAY	115	1.5	12	9	-	-	1.2	3.6	74	3.22	15	-	-
46.26	18.4	12.6	-	18.3	1.3	-4.6	8.5	3	silty CLAY to CLAY	115	1.5	12	9	-	-	1.2	3.5	77	3.25	15	-	-

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

Project ID: Stoney Miller
Data file: SDF(168).cpt
CPT Date: 10/11/2016 10:25:52 AM
GW During Test: 5 ft

Sounding ID: CPT-03
Project No: 50099-00
Core/Rig: DOGI281

Depth ft	qc TS tsf	qcln TS -	Qtncs TS -	qt TS tsf	Slv Stss tsf	pore prss (psi)	Frct Ratio %	Mat Typ Mon	Material Behavior Description	Unit Wght pcf	Qc Ic N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Ftn Ang deg	Und Shr tsf	OCR -	Fin Ts %	Ic SBT Incx	Nk -	Vol Strn %	Cycl SStr %
46.43	17.8	12.2	-	17.7	1.3	-4.5	8.8	3	silty CLAY to CLAY	115	1.5	12	8	-	-	1.2	3.4	79	3.26	15	-	-
46.59	17.2	11.7	-	17.1	1.3	-4.6	8.8	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.2	80	3.29	15	-	-
46.75	16.5	11.2	-	16.4	1.3	-4.6	9.4	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.1	3.1	83	3.32	15	-	-
46.92	15.8	10.7	-	15.7	1.2	-4.5	9.2	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.0	2.9	85	3.34	15	-	-
47.08	15.0	10.2	-	14.9	0.9	-4.5	7.8	3	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	2.7	82	3.31	15	-	-
47.25	15.2	10.3	-	15.1	1.0	-4.5	8.2	3	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	2.8	83	3.32	15	-	-
47.41	15.7	10.6	-	15.6	1.0	-4.5	8.0	3	silty CLAY to CLAY	115	1.5	10	7	-	-	1.0	2.9	82	3.31	15	-	-
47.57	16.6	11.1	-	16.5	0.9	-4.5	6.9	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.1	3.0	76	3.24	15	-	-
47.74	17.0	11.5	-	16.9	0.9	-4.5	6.1	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.1	73	3.20	15	-	-
47.90	17.4	11.6	-	17.4	1.1	-4.5	7.5	3	silty CLAY to CLAY	115	1.5	12	8	-	-	1.2	3.2	77	3.25	15	-	-
48.07	17.1	11.5	-	17.0	1.2	-4.6	8.3	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.1	80	3.29	15	-	-
48.23	17.7	11.7	-	17.6	1.1	-4.7	7.6	3	silty CLAY to CLAY	115	1.5	12	8	-	-	1.1	3.2	77	3.25	15	-	-
48.39	17.0	11.2	-	16.9	1.1	-5.0	8.1	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.1	3.1	80	3.28	15	-	-
48.56	17.1	11.3	-	17.0	1.1	-5.1	7.7	3	silty CLAY to CLAY	115	1.5	11	8	-	-	1.1	3.1	79	3.27	15	-	-
48.72	17.5	11.5	-	17.4	1.1	-5.2	7.7	3	silty CLAY to CLAY	115	1.5	12	8	-	-	1.1	3.2	78	3.26	15	-	-
48.89	18.3	12.0	-	18.2	1.2	-5.2	7.9	3	silty CLAY to CLAY	115	1.5	12	8	-	-	1.2	3.3	77	3.25	15	-	-
49.05	17.7	11.5	-	17.6	1.3	-5.9	8.5	3	silty CLAY to CLAY	115	1.5	12	8	-	-	1.1	3.2	80	3.29	15	-	-
49.22	16.3	10.6	-	16.2	1.0	-6.1	7.6	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.0	2.8	80	3.29	15	-	-
49.38	16.5	10.7	-	16.4	1.1	-6.1	8.1	3	silty CLAY to CLAY	115	1.5	11	7	-	-	1.1	2.9	81	3.30	15	-	-
49.54	19.0	12.2	-	18.7	1.3	-6.2	8.2	3	silty CLAY to CLAY	115	1.5	15	8	-	-	1.2	3.4	77	3.25	15	-	-
49.71	18.7	12.1	-	18.6	1.5	-6.9	9.5	3	silty CLAY to CLAY	115	1.5	12	8	-	-	1.2	3.4	81	3.30	15	-	-
49.87	19.9	12.8	-	19.7	1.5	-7.0	8.7	3	silty CLAY to CLAY	115	1.5	15	9	-	-	1.3	3.6	77	3.25	15	-	-
50.04	20.0	12.9	-	19.9	1.5	-7.3	8.5	3	silty CLAY to CLAY	115	1.5	13	9	-	-	1.3	3.6	77	3.24	15	-	-
50.20	20.7	13.3	-	20.6	1.6	-7.5	8.9	3	silty CLAY to CLAY	115	1.5	14	9	-	-	1.4	3.7	77	3.25	15	-	-
50.36	22.1	14.1	-	22.0	1.6	-8.0	8.2	3	silty CLAY to CLAY	115	1.5	15	9	-	-	1.5	4.0	73	3.20	15	-	-
50.53	20.9	13.3	-	20.7	1.5	-8.4	8.6	3	silty CLAY to CLAY	115	1.5	14	9	-	-	1.4	3.8	76	3.24	15	-	-
50.69	20.8	13.2	-	20.7	1.5	-8.6	8.2	3	silty CLAY to CLAY	115	1.5	14	9	-	-	1.4	3.7	75	3.22	15	-	-
50.86	22.9	14.5	-	22.7	1.5	-8.6	7.4	3	silty CLAY to CLAY	115	1.5	15	10	-	-	1.5	4.1	70	3.16	15	-	-
51.02	25.1	15.8	-	24.9	2.2	-8.7	9.9	3	silty CLAY to CLAY	115	1.5	17	11	-	-	1.7	4.6	74	3.21	15	-	-
51.18	51.8	32.6	-	51.6	3.0	-9.5	6.1	3	silty CLAY to CLAY	115	1.5	35	22	-	-	3.5	9.9	47	2.82	15	-	-
51.35	62.6	39.4	-	62.6	4.2	-10.4	7.0	3	silty CLAY to CLAY	115	1.5	42	26	-	-	4.3	9.9	46	2.80	15	-	-
51.51	79.7	49.9	-	79.4	5.6	-11.0	7.1	3	silty CLAY to CLAY	115	1.5	53	33	-	-	5.5	9.9	42	2.74	15	-	-
51.68	77.1	48.2	-	76.9	5.5	-12.2	7.3	3	silty CLAY to CLAY	115	1.5	51	32	-	-	5.3	9.9	45	2.78	15	-	-
51.84	73.7	45.9	-	73.4	5.5	-13.0	7.7	3	silty CLAY to CLAY	115	1.5	49	31	-	-	5.1	9.9	45	2.79	15	-	-
52.00	89.2	55.1	-	88.9	5.3	-13.0	6.1	3	silty CLAY to CLAY	115	1.5	59	37	-	-	6.2	9.9	38	2.66	15	-	-
52.17	93.9	58.1	-	93.7	5.6	-13.1	6.2	3	silty CLAY to CLAY	115	1.5	63	39	-	-	6.5	9.9	38	2.65	15	-	-
52.33	97.0	59.9	-	96.7	5.1	-13.1	5.4	3	silty CLAY to CLAY	115	1.5	65	40	-	-	6.7	9.9	38	2.65	15	-	-
52.50	86.2	54.3	-	88.0	5.9	-13.1	7.0	3	silty CLAY to CLAY	115	1.5	59	36	-	-	6.1	9.9	41	2.71	15	-	-
52.66	88.5	54.3	-	88.2	6.1	-13.2	7.1	3	silty CLAY to CLAY	115	1.5	59	36	-	-	6.1	9.9	41	2.71	15	-	-
52.82	99.0	60.7	-	98.8	6.2	-13.1	6.5	3	silty CLAY to CLAY	115	1.5	66	40	-	-	6.9	9.9	38	2.65	15	-	-
52.99	74.2	45.3	-	74.0	5.8	-13.0	8.1	3	silty CLAY to CLAY	115	1.5	49	30	-	-	5.1	9.9	46	2.81	15	-	-
53.15	53.8	32.8	-	53.5	4.9	-12.8	9.6	3	silty CLAY to CLAY	115	1.5	36	22	-	-	3.7	9.9	56	2.96	15	-	-
53.32	55.3	33.6	-	55.0	4.8	-13.7	7.6	3	silty CLAY to CLAY	115	1.5	37	22	-	-	3.8	9.9	51	2.88	15	-	-
53.48	42.9	26.0	-	42.6	3.2	-13.6	8.0	3	silty CLAY to CLAY	115	1.5	29	17	-	-	2.9	8.0	57	2.98	15	-	-
53.64	52.1	31.5	-	51.9	3.6	-12.9	7.4	5	silty CLAY to CLAY	115	1.5	35	21	-	-	3.6	9.8	51	2.89	15	-	-
53.81	108.2	61.6	288.0	107.9	4.6	-14.0	4.3	4	clayy SILT to silty CLAY	115	2.0	34	41	-	-	7.5	9.9	28	2.43	15	0.00	0.0
53.97	108.4	61.7	231.2	108.1	5.8	-13.0	5.5	9	very stiff fine SOIL	120	1.0	100	82	-	-	3.8	9.9	31	2.51	30	0.00	0.0
54.14	101.6	60.9	-	101.3	6.0	-14.5	6.1	3	silty CLAY to CLAY	115	1.5	68	41	-	-	7.1	9.9	37	2.63	15	-	-
54.30	102.8	77.3	218.4	102.6	5.2	-14.5	5.2	4	clayy SILT to silty CLAY	115	2.0	51	39	-	-	7.2	9.9	31	2.51	15	0.00	0.0
54.46	84.9	50.7	-	84.7	4.8	-13.8	5.8	3	silty CLAY to CLAY	115	1.5	57	34	-	-	5.9	9.9	39	2.67	15	-	-
54.63	88.7	52.8	-	88.5	4.9	-14.1	5.7	3	silty CLAY to CLAY	115	1.5	59	35	-	-	6.2	9.9	38	2.65	15	-	-
54.79	119.2	89.2	191.8	119.0	4.3	-14.0	3.7	4	clayy SILT to silty CLAY	115	2.0	60	45	-	-	8.3	9.9	25	2.36	15	0.00	0.0
54.96	147.3	110.5	167.4	147.6	5.5	-14.6	2.3	5	silty SAND to sandy SILT	120	3.0	49	37	70	40	-	-	17	2.13	16	0.00	0.0
55.12	161.3	120.4	170.0	161.3	3.3	-14.9	2.0	5	silty SAND to sandy SILT	120	3.0	54	40	73	40	-	-	15	2.08	16	0.00	0.0
55.28	161.9	120.7	166.7	161.7	3.0	-14.9	1.9	5	silty SAND to sandy SILT	120	3.0	54	40	73	40	-	-	14	2.05	16	0.00	0.0
55.45	171.1	127.3	175.6	170.9	3.4	-14.9	2.0	5	silty SAND to sandy SILT	120	3.0	57	42	75	41	-	-	14	2.06	16	0.00	0.0
55.61	190.8	141.9	202.3	190.5	4.6	-14.9	2.4	5	silty SAND to sandy SILT	120	3.0	64	47	79	41	-	-	15	2.08	16	0.00	0.0
55.78	150.8	111.8	226.8	150.4	6.0	-14.5	4.1	9	very stiff fine SOIL	120	1.0	100	100	-	-	5.3	9.9	23	2.32	30	0.00	0.0
55.94	93.7	54.5	-	93.4	5.4	-14.5	5.1	3	silty CLAY to CLAY	115	1.5	62	36	-	-	6.5	9.9	41	2.71	15	-	-
56.11	77.9	45.3	-	77.7	5.1	-14.4	6.6	3	silty CLAY to CLAY	115	1.5	52	30	-	-	5.4	9.9	43	2.76	15	-	-
56.27	80.4	46.6	-	80.1	4.9	-14.0	6.4	3	silty CLAY to CLAY	115	1.5	54	31	-	-	5.6	9.9	42	2.72	15	-	-
56.43	67.3	38.9	-	67.0	4.3	-13.7	6.7	3	silty CLAY to CLAY	115	1.5	45	26	-	-	4.6	9.9	46	2.78	15	-	-
56.60	47.6	27.4	-	47.3	3.1	-13.6	7.1	3	silty CLAY to CLAY	115	1.5	32	18	-	-	3.2	8.4	53	2.92	15	-	-
56.76	41.7	24.0	-	41.5	2.8	-13.1	7.2	3	silty CLAY to CLAY	115	1.5	28	16	-	-	2.8	7.3	57	2.97	15	-	-
56.93	53.3	30.6	-	53.0	3.0	-14.0	6.1	3	silty CLAY to CLAY	115	1.5	36	20	-	-	3.6	9.4	48	2.84	15	-	-
57.09	55.1	31.5	-	54.8	3.2	-14.2	6.3	3	silty CLAY to CLAY	115	1.5	37	21	-	-	3.8	9.8	48	2.84	15	-	-
57.25	53.9	30.8	-	53.6	3.3	-14.1	6.6	3	silty CLAY to CLAY	115	1.5	36	21	-	-	3.7	9.5	50	2.87	15	-	-
57.42	66.3	37.6	-	66.0	3.9	-14.2	6.2	3	silty CLAY to CLAY	115	1.5	44	25	-	-	4.6	9.9	45	2.78	15	-	-
57.58	61.5	34.9	-	61.2	4.1	-14.1	7.1	3	silty CLAY to CLAY	115	1.5	41	23	-	-	4.2	9.9	49	2.85	15	-	-
57.75	54.6	31.1	-	54.5	4.0	-14.0	7.8	3	silty CLAY to CLAY	115	1.5	37	21	-	-	3.7	9.6	53	2.91	15	-	-
57.91	37.6	21.5	-	37.4	3.2	-13.7	9.3	3	silty CLAY to CLAY	115	1.5	25	14	-	-	2.5	6.4	65	3.09	15	-	-
58.07	38.3	21.6	-	38.1	2.7	-13.7	7.8	3	silty CLAY to CLAY	115	1.5	26	14	-	-	2.6	6.8	61	3.03	15	-	-
58.24	40.6	22.8	-	40.3	2.6	-14.0	6.3	3	silty CLAY to CLAY	115	1.5	27	15	-	-	2.7	6.8	55	2.95	15	-	-
58.40	39.4	22.1	-	39.2	2.4	-14.0	6.0	3	silty CLAY to CLAY	115	1.5	26	14	-	-	2.7	6.7	57	2.98	15	-	-
58.57	49.0	27.4	-	48.7	3.0	-14.2	6.6	3	silty CLAY to CLAY	115	1.5	33	18	-	-	3.3	8.4	52	2.90	15	-	-
58.73	56.1	31.3	-	55.8	3.5	-13.4	7.4	3	silty CLAY to CLAY	115	1.5	37	21	-	-	3.8	9.7	52	2.89	15	-	-
58.89	59.5	33.2	-	59.3	4.5	-14.1	8.1	3	silty CLAY to CLAY	115	1.5	40	22	-	-	4.1	9.9	52	2.90	15	-	-
59.06	59.3	32.9	-	59.0	4.6	-14.2	8.2	3	silty CLAY to CLAY	115	1.5	40	22	-	-	4.1	9.9	53	2.91	15	-	-
59.22	56.3	31.2	-	56.0	4.5	-14.1	8.2	3	silty CLAY to CLAY	115	1.5	38	21	-	-	3.8	9.7	54	2.93	15	-	-
59.39	54.2	30.0	-	54.0	3.7	-14.1	7.4	3	silty CLAY to CLAY	115	1.5	36	20	-	-	3.7	9.3	52	2.91	15	-	-
59.55	54.4	30.0	-	54.2	3.5	-14.1	6.9	3	silty CLAY to CLAY	115	1.5	36	20	-	-	3.7	9.3	51	2.88	15	-	-
59.71	47.6	26.2	-	47.3	3.6	-14.1	8.1	3	silty CLAY to CLAY	115	1.5	32	17	-	-	3.2	8.0	57	2.98	15	-	-
59.88	41.8	22.9	-	41.5	3.4	-14.0	8.9	3	silty CLAY to CLAY	115	1.5	28	15	-	-	2.8	6.9	62	3.05	15	-	-
60.04	41.8	22.8	-	41.3	3.3	-13.9	8.8	3	silty CLAY to CLAY	115	1.5	28	15	-	-	2.8	6.9	62	3.05	15	-	-
60.21	51.3	28.0	-	51.0	4.0	-13.8	8.3	3	silty CLAY to CLAY	115	1.5	34	19	-	-	3.5	8.6	56	2.97	15	-	-
60.37	64.6	35.2	-	64.3	5.0	-13.9	8.2	3	silty CLAY to CLAY	115	1.5	43	23	-	-	4.4	9.9	51	2.89	15	-	-
60.53	63.4	34.5	-	63.2	3.6	-13.9	6.0	3	silty CLAY to CLAY	115	1.5	42	23	-	-	4.4	9.9	46	2.80	15	-	-
60.70	56.2	30.8	-	55.9	3.6	-13.8	6.8	3	silty CLAY to CLAY	115	1.5	37	20	-	-	3.8	9.4	51	2.88	15	-	-
60.86	50.6	27.4	-	50.3	3.8	-15.1	8.0	3	silty CLAY to CLAY	115	1.5	34	18	-	-	3.4	8.4	56	2.96	15	-	-
61.03	55.3	29.9	-	55.0	4.0	-15.1	7.8	3	silty CLAY to CLAY	115	1.5	37	20	-	-	3.8	9.2	54	2.92	15	-	-
61.19	52.1	28.1	-	51.8	3.9	-14.8	8.1	3	silty CLAY to CLAY	115	1.5	35	19	-	-	3.5	8.6	56	2.96	15	-	-
61.35	53.6	28.8	-	53.3	3.7	-15.0	7.4	3	silty CLAY to CLAY	115	1.5	36	19	-	-	3.7	8.9	53	2.92	15	-	-
61.52	57.2	30.7	-	56.9	3.9	-15.1	7.3	3	silty CLAY to CLAY	115	1.5	38	20	-	-	3.9	9.5	52	2.90	15	-	-
61.68	53.9	28.9	-	53.6	4.1	-15.1	8.1	3	silty CLAY to CLAY	115	1.5	36	19	-	-	3.7	8.9	55	2.95	15	-	-

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

Middle Earth Geo Testing

Project ID: Stoney Miller
Data File: SEJ(186).cpt
CPT Date: 10/21/2016 10:25:52 AM
GW During Test: 5 ft

Sounding ID: CPT-03
Project No: S0093-03
Cone/Rig: DDGI28I

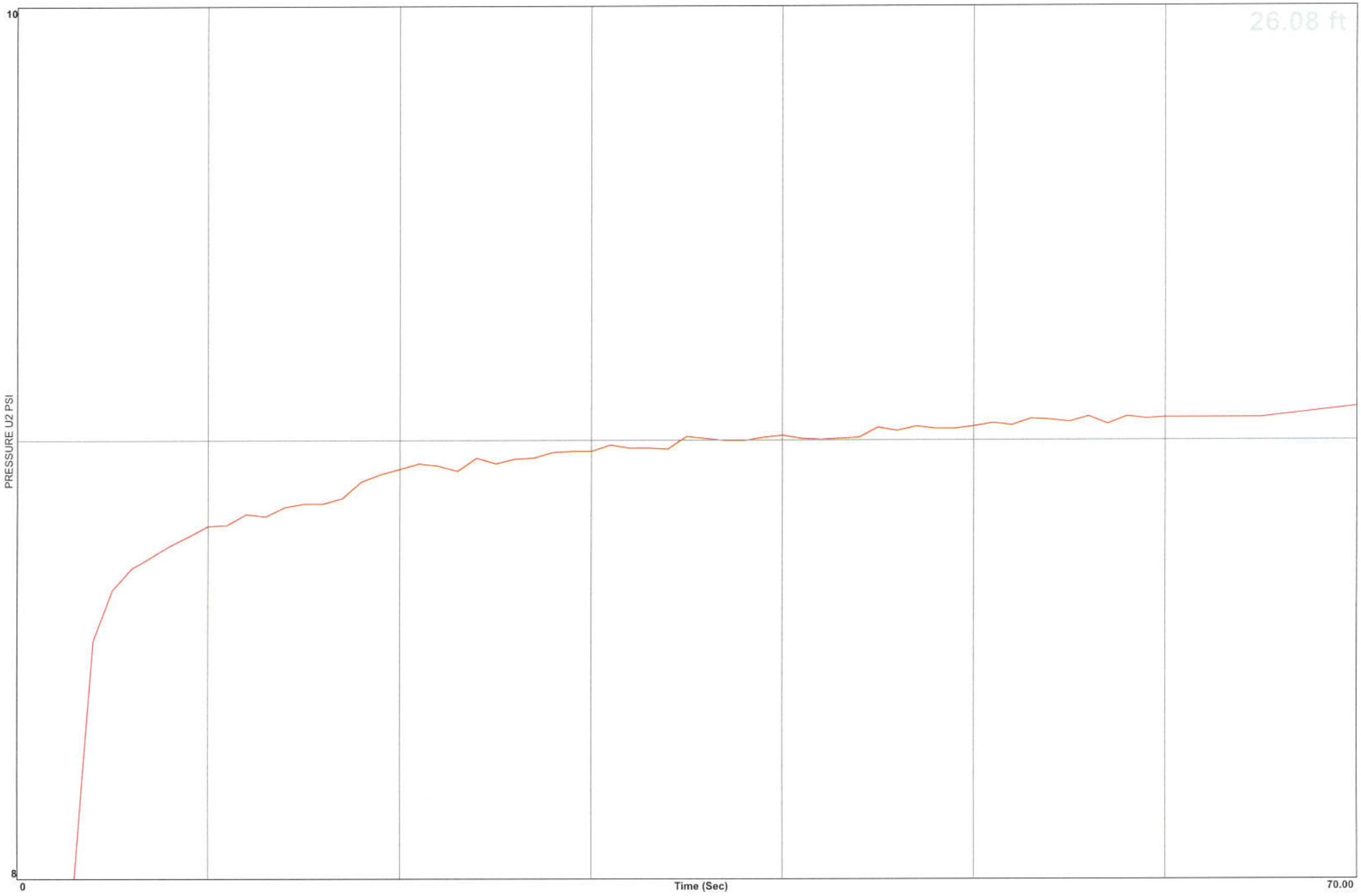
Depth ft	qc PS tsf	qcln PS -	qlncs PS -	qt PS tsf	Stress tsf	pore pres (psi)	Frct Ratio %	Mat Typ Zon	Material Behavior Description	Unit Wght pcf	Qc to N	SPT R-N 60%	SPT R-N1 60%	Rel Den %	Fric Ang deg	Und Shr tsf	OCR -	Fin Ic %	Ic SBT Indx	Nk -	Vel Stcn %	Cycl SStn %
62.85	52.0	27.2	-	50.7	3.9	-15.1	8.3	3	silty CLAY to CLAY	115	1.5	34	18	-	-	3.5	8.3	57	2.98	15	-	-
62.91	53.4	28.5	-	53.1	4.2	-15.0	8.4	3	silty CLAY to CLAY	115	1.5	36	19	-	-	3.6	8.8	56	2.95	15	-	-
62.17	45.9	24.4	-	45.7	3.9	-14.9	9.1	3	silty CLAY to CLAY	115	1.5	31	16	-	-	3.1	7.4	61	3.02	15	-	-
62.34	38.2	20.3	-	38.0	3.4	-14.9	9.7	3	silty CLAY to CLAY	115	1.5	25	14	-	-	2.5	6.1	67	3.12	15	-	-
62.50	34.4	18.2	-	34.1	2.9	-15.0	9.6	3	silty CLAY to CLAY	115	1.5	23	12	-	-	2.3	5.4	69	3.15	15	-	-
62.67	34.2	18.1	-	33.9	2.8	-15.0	9.1	3	silty CLAY to CLAY	115	1.5	23	12	-	-	2.3	5.5	69	3.14	15	-	-
62.83	34.6	18.2	-	34.3	2.8	-15.0	8.9	3	silty CLAY to CLAY	115	1.5	23	12	-	-	2.3	5.4	69	3.13	15	-	-
63.00	49.1	25.9	-	48.9	2.9	-15.0	6.5	3	silty CLAY to CLAY	115	1.5	33	17	-	-	3.3	7.9	53	2.92	15	-	-
63.16	49.4	25.9	-	49.1	2.9	-14.9	6.4	3	silty CLAY to CLAY	115	1.5	33	17	-	-	3.4	7.9	53	2.91	15	-	-
63.32	46.7	24.4	-	46.4	3.0	-14.9	6.9	3	silty CLAY to CLAY	115	1.5	31	16	-	-	3.2	7.4	55	2.95	15	-	-
63.49	47.4	24.8	-	47.2	2.8	-14.7	6.5	3	silty CLAY to CLAY	115	1.5	32	17	-	-	3.2	7.5	54	2.93	15	-	-
63.65	46.0	23.9	-	45.7	3.0	-14.9	7.2	3	silty CLAY to CLAY	115	1.5	31	16	-	-	3.1	7.3	57	2.97	15	-	-
63.82	41.1	21.4	-	40.8	3.1	-15.1	8.2	3	silty CLAY to CLAY	115	1.5	27	14	-	-	2.8	6.4	62	3.05	15	-	-
63.98	37.9	19.7	-	37.6	3.0	-14.9	8.7	3	silty CLAY to CLAY	115	1.5	25	13	-	-	2.5	5.8	65	3.10	15	-	-
64.14	48.5	25.1	-	48.2	3.5	-14.9	7.8	3	silty CLAY to CLAY	115	1.5	32	17	-	-	3.3	7.6	57	2.98	15	-	-
64.31	56.6	29.2	-	56.3	4.1	-15.0	7.7	3	silty CLAY to CLAY	115	1.5	38	19	-	-	3.9	9.0	54	2.93	15	-	-
64.47	54.9	28.3	-	54.6	4.6	-14.9	9.0	3	silty CLAY to CLAY	115	1.5	37	19	-	-	3.7	8.7	58	2.99	15	-	-
64.64	49.7	25.5	-	49.4	4.4	-14.9	9.5	3	silty CLAY to CLAY	115	1.5	33	17	-	-	3.4	7.9	61	3.04	15	-	-
64.80	50.0	25.6	-	49.7	4.1	-14.9	8.8	3	silty CLAY to CLAY	115	1.5	33	17	-	-	3.4	7.8	59	3.01	15	-	-
64.96	46.0	23.5	-	45.7	3.8	-14.8	8.0	3	silty CLAY to CLAY	115	1.5	31	16	-	-	3.1	7.1	62	3.05	15	-	-
65.13	41.7	21.3	-	41.4	3.3	-14.7	8.7	3	silty CLAY to CLAY	115	1.5	28	14	-	-	2.8	6.4	63	3.07	15	-	-
65.29	41.4	21.1	-	41.1	2.9	-14.7	7.8	3	silty CLAY to CLAY	115	1.5	28	14	-	-	2.8	6.3	61	3.04	15	-	-
65.46	43.1	21.9	-	42.8	2.8	-14.8	7.1	3	silty CLAY to CLAY	115	1.5	29	15	-	-	2.9	6.6	59	3.00	15	-	-
65.62	43.1	21.9	-	42.8	2.9	-14.8	7.3	3	silty CLAY to CLAY	115	1.5	29	15	-	-	2.9	6.6	59	3.01	15	-	-
65.78	43.3	21.9	-	43.0	3.4	-14.7	8.6	3	silty CLAY to CLAY	115	1.5	29	15	-	-	2.9	6.6	62	3.06	15	-	-
65.95	66.4	33.5	-	66.1	4.1	-14.9	6.6	3	silty CLAY to CLAY	115	1.5	44	22	-	-	4.6	9.9	48	2.84	15	-	-
66.11	62.7	31.6	-	62.4	4.4	-14.8	7.4	3	silty CLAY to CLAY	115	1.5	42	21	-	-	4.3	9.8	51	2.89	15	-	-
66.28	51.7	26.0	-	51.4	4.7	-14.5	9.2	3	silty CLAY to CLAY	115	1.5	34	17	-	-	3.5	7.9	60	3.02	15	-	-
66.44	42.1	21.1	-	41.8	3.8	-14.8	9.0	3	silty CLAY to CLAY	115	1.5	28	14	-	-	2.8	6.3	66	3.11	15	-	-
66.60	51.7	25.9	-	51.4	4.0	-14.8	8.3	3	silty CLAY to CLAY	115	1.5	34	17	-	-	3.5	7.9	58	2.99	15	-	-
66.77	46.5	23.2	-	46.2	3.7	-14.7	8.8	3	silty CLAY to CLAY	115	1.5	31	15	-	-	3.1	7.0	62	3.04	15	-	-
66.93	43.6	21.7	-	43.3	3.1	-14.7	7.8	3	silty CLAY to CLAY	115	1.5	29	14	-	-	2.9	6.5	60	3.03	15	-	-
67.10	43.2	21.5	-	42.9	2.7	-14.8	6.8	3	silty CLAY to CLAY	115	1.5	29	14	-	-	2.9	6.4	58	2.99	15	-	-
67.26	43.2	21.5	-	43.0	2.9	-14.8	7.5	3	silty CLAY to CLAY	115	1.5	29	14	-	-	2.9	6.4	60	3.02	15	-	-
67.42	55.6	27.5	-	55.3	3.7	-14.6	5.9	3	silty CLAY to CLAY	115	1.5	37	18	-	-	3.6	8.4	50	2.87	15	-	-
67.59	67.5	33.3	-	67.2	3.9	-15.2	6.1	3	silty CLAY to CLAY	115	1.5	45	22	-	-	4.6	9.9	47	2.81	15	-	-
67.75	74.3	36.7	-	74.1	4.7	-15.1	6.7	3	silty CLAY to CLAY	115	1.5	50	24	-	-	5.1	9.9	47	2.81	15	-	-
67.92	81.3	40.0	-	81.0	5.8	-15.3	7.5	3	silty CLAY to CLAY	115	1.5	54	27	-	-	5.6	9.9	47	2.82	15	-	-
68.08	89.0	43.7	-	88.7	6.3	-15.3	7.4	3	silty CLAY to CLAY	115	1.5	59	29	-	-	6.1	9.9	45	2.79	15	-	-
68.24	84.5	41.4	-	84.2	6.2	-15.1	7.7	3	silty CLAY to CLAY	115	1.5	56	28	-	-	5.8	9.9	47	2.82	15	-	-
68.41	68.7	33.6	-	68.4	5.2	-14.9	8.0	3	silty CLAY to CLAY	115	1.5	46	22	-	-	4.7	9.9	52	2.90	15	-	-
68.57	74.2	36.2	-	73.9	5.8	-15.0	8.3	3	silty CLAY to CLAY	115	1.5	49	24	-	-	5.1	9.9	51	2.89	15	-	-
68.74	134.5	65.8	-	133.2	7.9	-15.5	6.1	9	very stiff fine SOIL	120	1.0	100	65	-	-	4.6	9.9	36	2.61	30	-	-
68.90	183.3	124.1	270.6	183.0	8.9	-15.7	5.0	9	very stiff fine SOIL	120	1.0	100	100	-	-	6.4	9.9	25	2.37	30	0.00	0.0
69.07	187.3	126.7	264.1	187.0	8.6	-15.8	4.7	9	very stiff fine SOIL	120	1.0	100	100	-	-	6.5	9.9	24	2.34	30	0.00	0.0

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

Middle Earth Geo Testing

Stoney-Miller Consultants, Inc.

Location	SEJPA Operations Building	Operator	DG-RC	GPS
Job Number	50093-00	Cone Number	DDG1281	
Hole Number	CPT-03	Date and Time	10/11/2016 10:25:52 AM	
Equilized Pressure	9.0	EST GW Depth During Test	5.1	

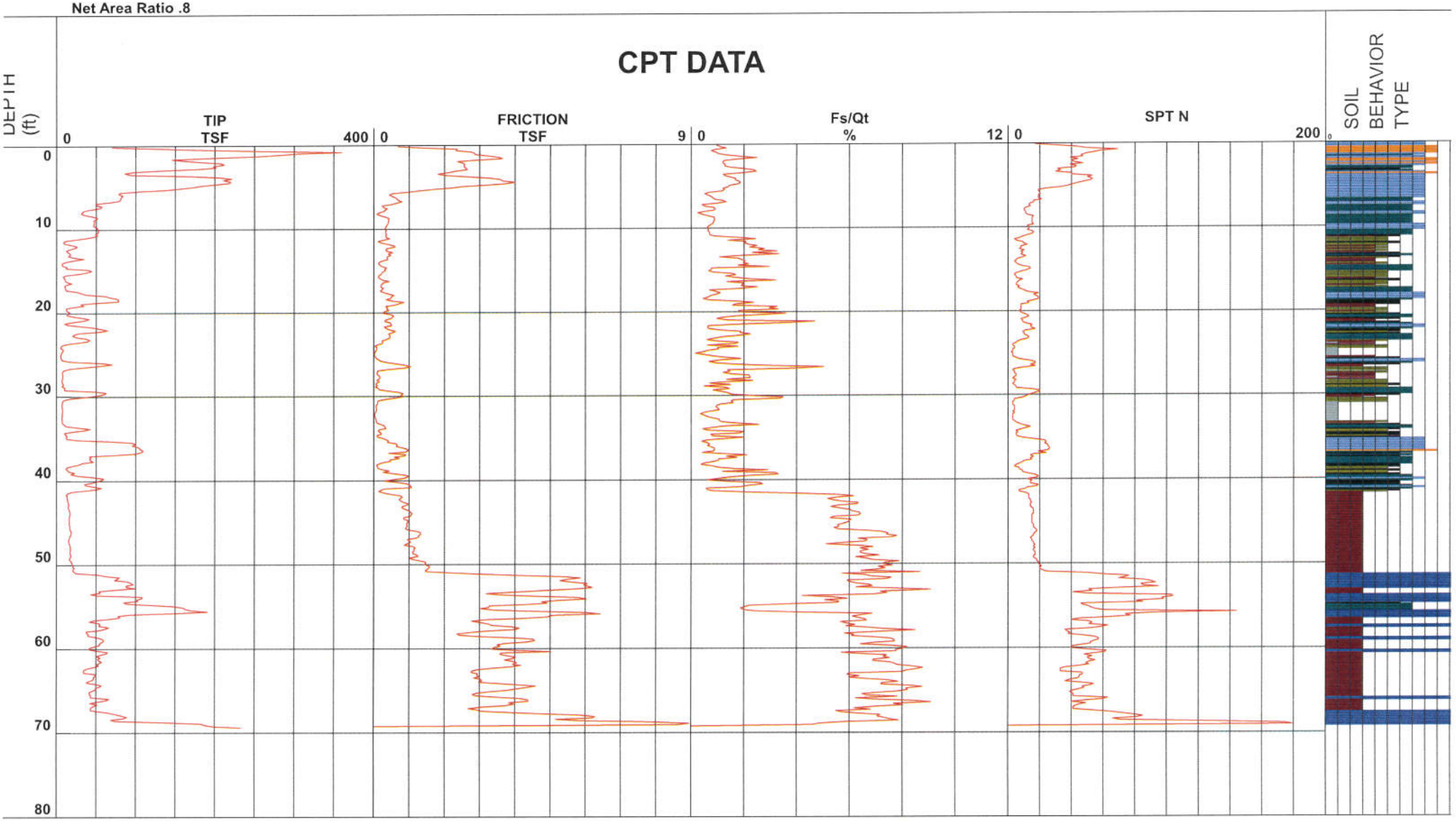


Stoney-Miller Consultants, Inc.

Project	SEJPA Operations Building	Operator	DG-RC	Filename	SDF(166).cpt
Job Number	50093-00	Cone Number	DDG1281	GPS	
Hole Number	CPT-03	Date and Time	10/11/2016 10:25:52 AM	Maximum Depth	69.39 ft
EST GW Depth During Test		5.10 ft			

Net Area Ratio .8

CPT DATA



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

APPENDIX C

FIELD EXPLORATION AND LABORATORY TEST RESULTS

APPENDIX C

FIELD EXPLORATION AND LABORATORY TEST RESULTS

I. Field Exploration Procedures

A. Field Exploration

A test excavation was hand excavated to expose subsurface soils adjacent to the Cone Penetration Test locations. Bulk or disaggregated samples were obtained.

B. Disaggregated Samples

Disaggregated soil samples were obtained from the excavations. These soils were bagged and transported to our laboratory.

II. Laboratory Testing Procedures

A. Moisture Content

The in-situ field moisture content was evaluated for soil specimens obtained from the test excavation. The moisture determination was made in accordance with ASTM test methods. The results are summarized on the boring logs in Appendix B.

B. Atterberg Limits Determination

Atterberg limits were evaluated in accordance with ASTM D 4318. The results are tabulated below.

Sample Location	Liquid Limit	Plastic Limit	Plasticity Index	Soil Classification
T-1 @ 0'-2'	26	19	7	CL

C. Particle Size Analyses

Particle size analyses were performed on samples in accordance with ASTM D422. The results of the tests are presented graphically on Figure C-1.

D. Expansion Index Test

An expansion index test was performed in accordance with UBC Standard No. 29-2. The results of the test are tabulated below:

Sample Designation	-	T-1 @ 0-2'
Expansion Index	-	15
Expansion Classification	-	Very Low

E. Corrosivity Series

Soluble sulfates, pH and minimum resistivity were determined in accordance with California Test Method 417, ASTM D 4972-89, and California Test Method 643, respectively. The results are presented below:

Sample Designation	-	T-1 @ 0-2'
pH	-	7.3
Soluble Sulfate per CA 417	-	1,680 mg/kg
Minimum Resistivity per CA 643	-	113 (ohm-cm, saturated)

F. Maximum Density and Optimum Moisture Content

Optimum moisture and maximum density were evaluated in accordance with Test Designation ASTM D 1557. The results are tabulated below:

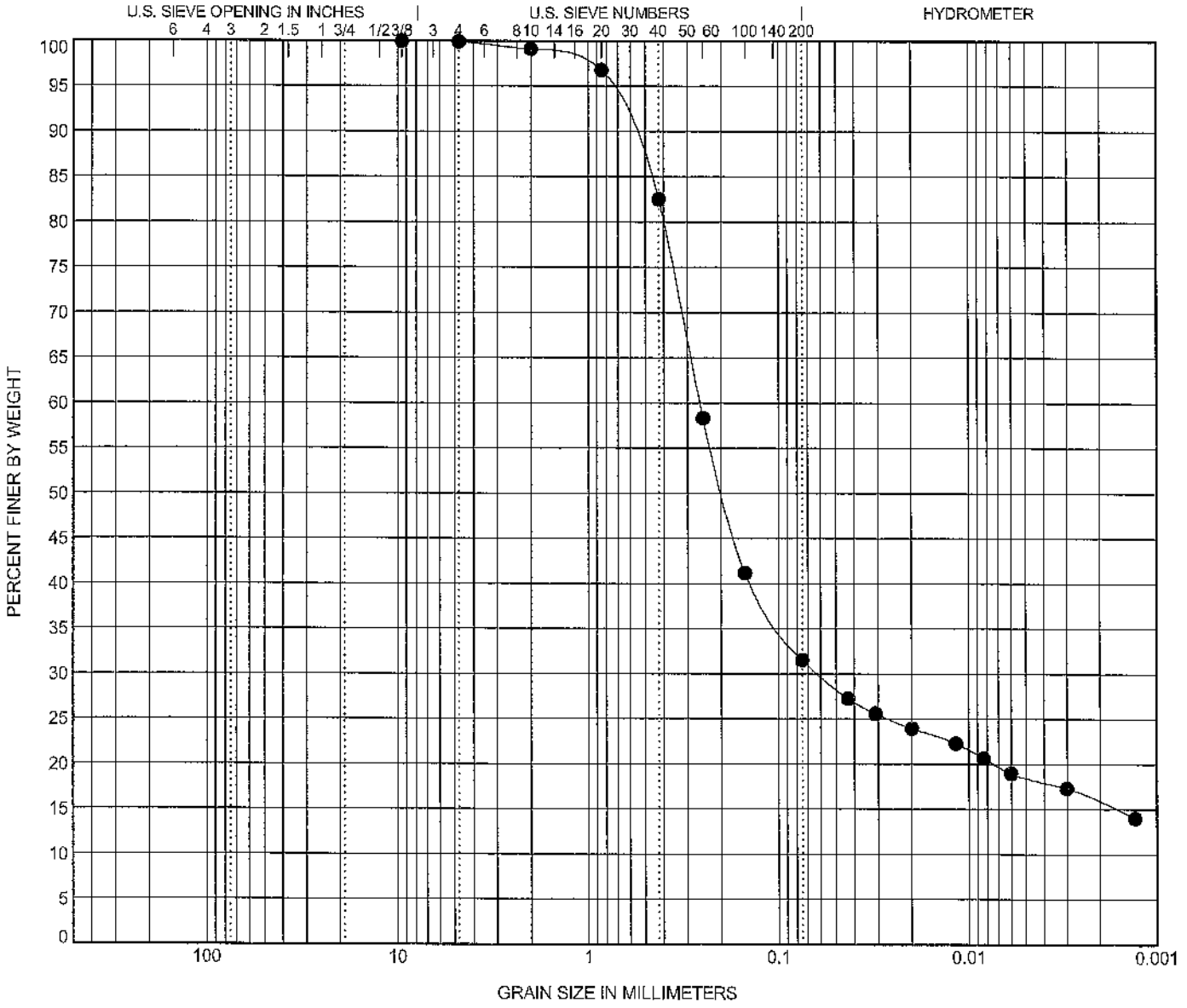
Sample Location	Moisture Content (%) Optimum	Dry Density (pcf) Maximum
T-2 @ 0-3'	11.0	120.6

STONEY-MILLER CONSULTANTS, INC.

GRAIN SIZE DISTRIBUTION

Client: San Elijo Joint Powers Authority
Project Number: 50093-00

Project Name: Operations Building
Address: 2695 Manchester Ave.; Cardiff, CA Cardiff, CA



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● T-1	0.0	SILTY, CLAYEY SAND(SC-SM)	26	19	7		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● T-1	0.0	9.5	0.259	0.062		0.1	68.4	13.0	18.6

Figure No. C-1

APPENDIX D

LIQUEFACTION ANALYSES

STONEY-MILLER CONSULTANTS, INC.
GEOTECHNICAL ENGINEERING AND ENGINEERING GEOLOGY
Geotechnical Engineers
14 Hughes, B-101, Irvine, CA

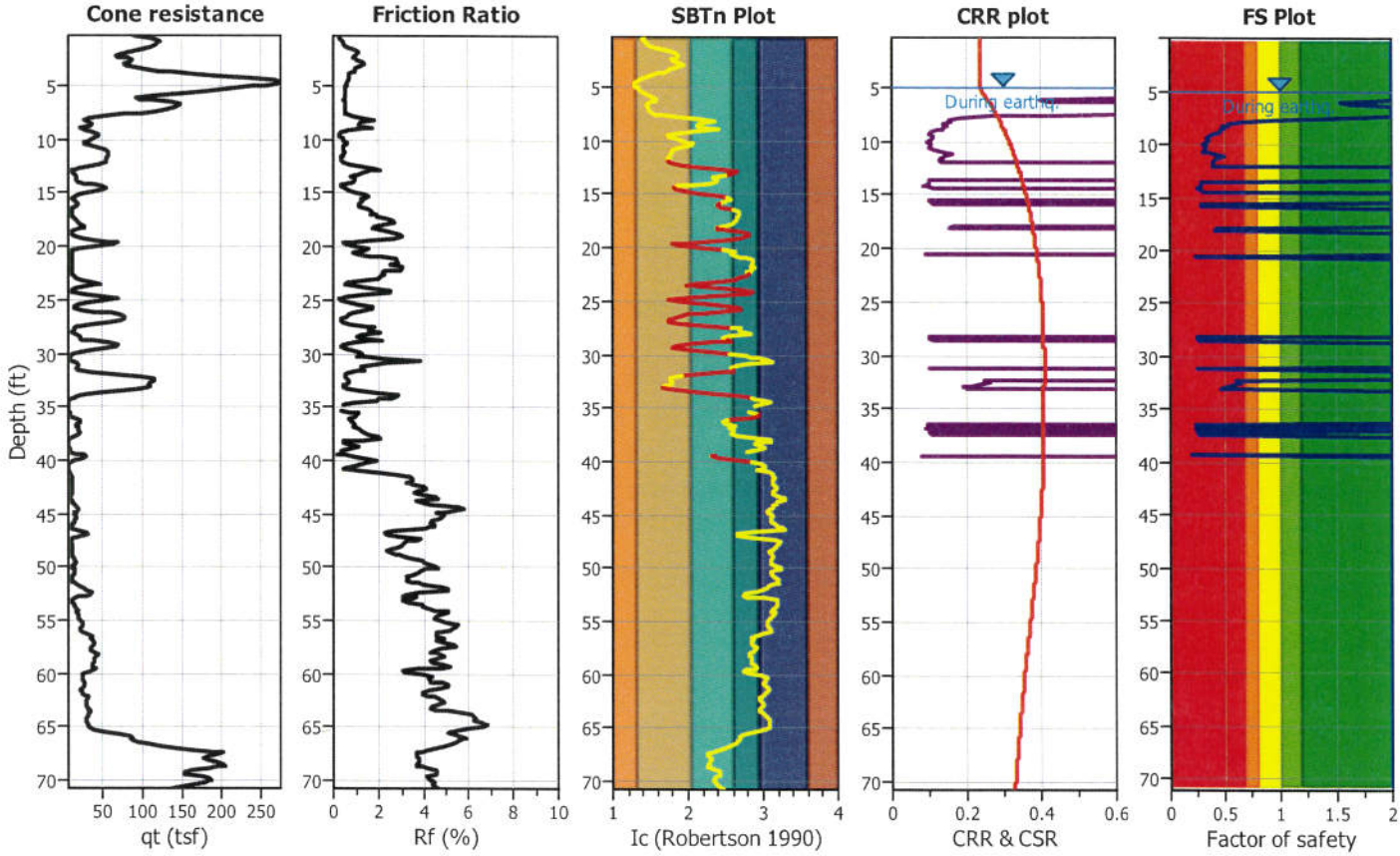
LIQUEFACTION ANALYSIS REPORT

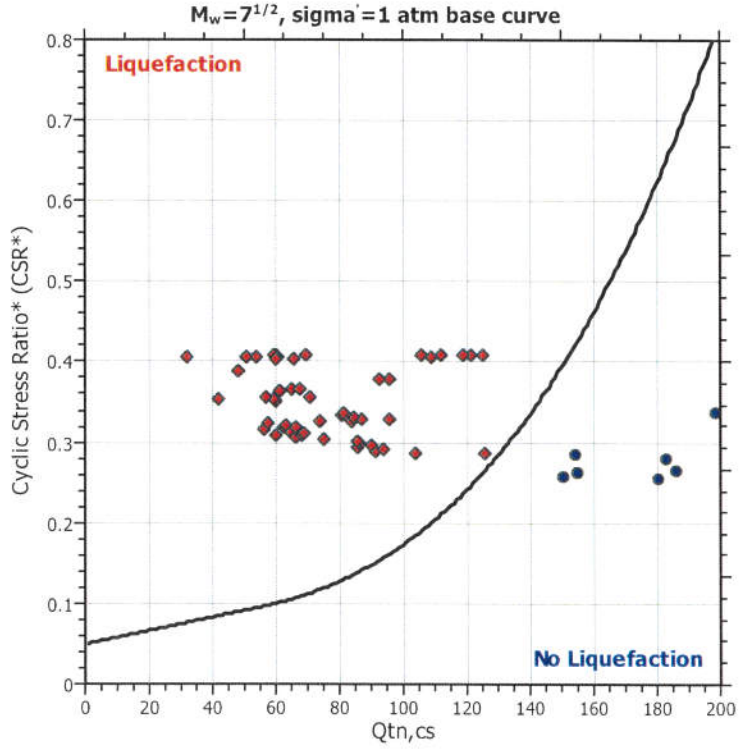
Project title : 50093-00 SEJPA Operation Building **Location : 2695 Manchester Avenue, Cardiff by the Sea, CA 92007**

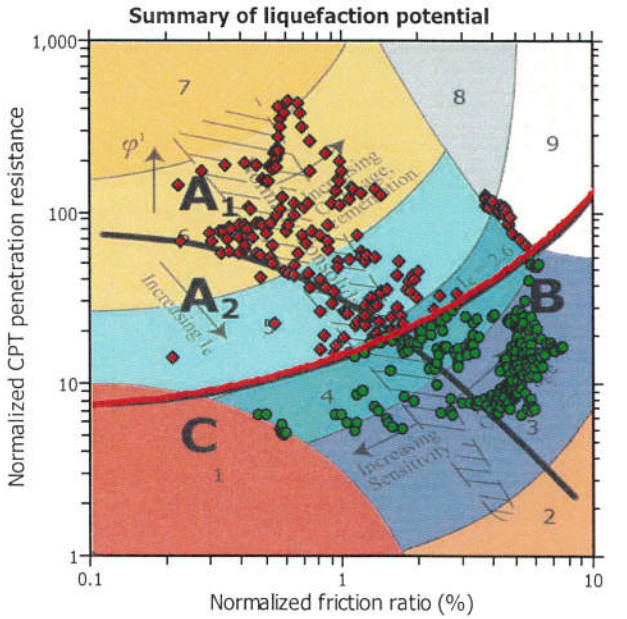
CPT file : CPT-01

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	5.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	5.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.63	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.50	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

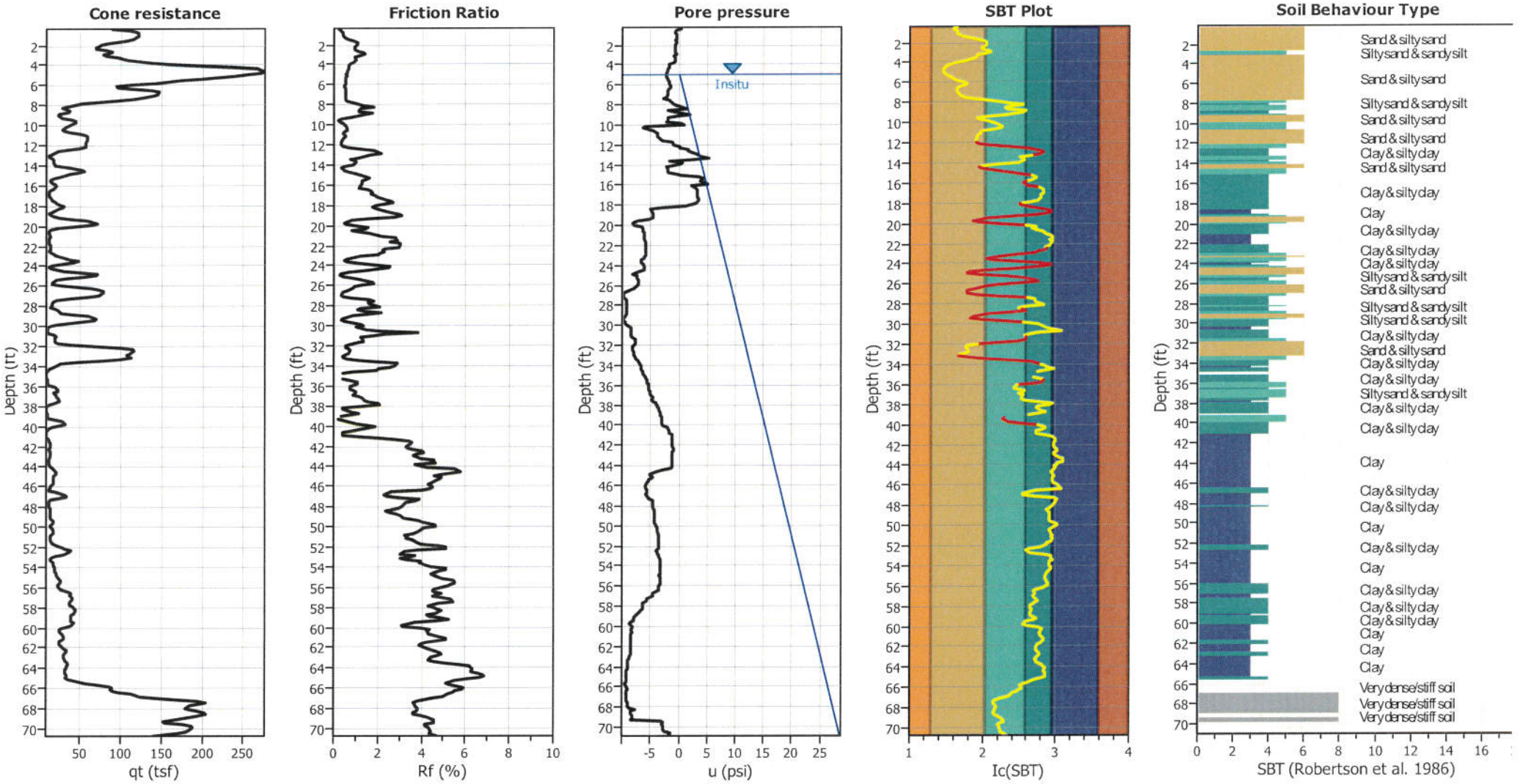






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



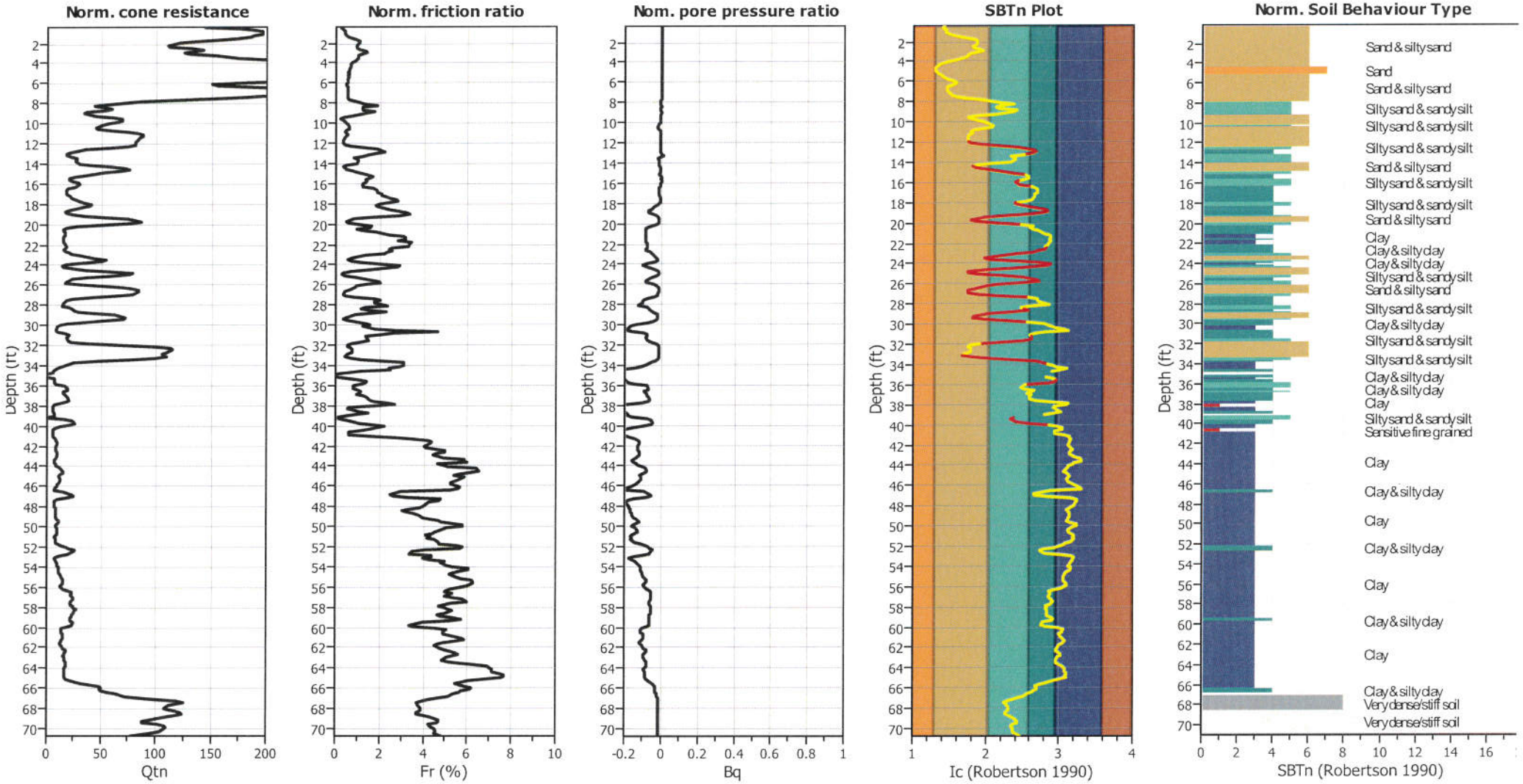
nput parameters and analysis data

nalysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
ines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
oints to test:	Based on Ic value	Ic cut-off value:	2.60	K_o applied:	Yes
arthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
eak ground acceleration:	0.50	Use fill:	No	Limit depth applied:	No
epth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT 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

CPT basic interpretation plots (normalized)



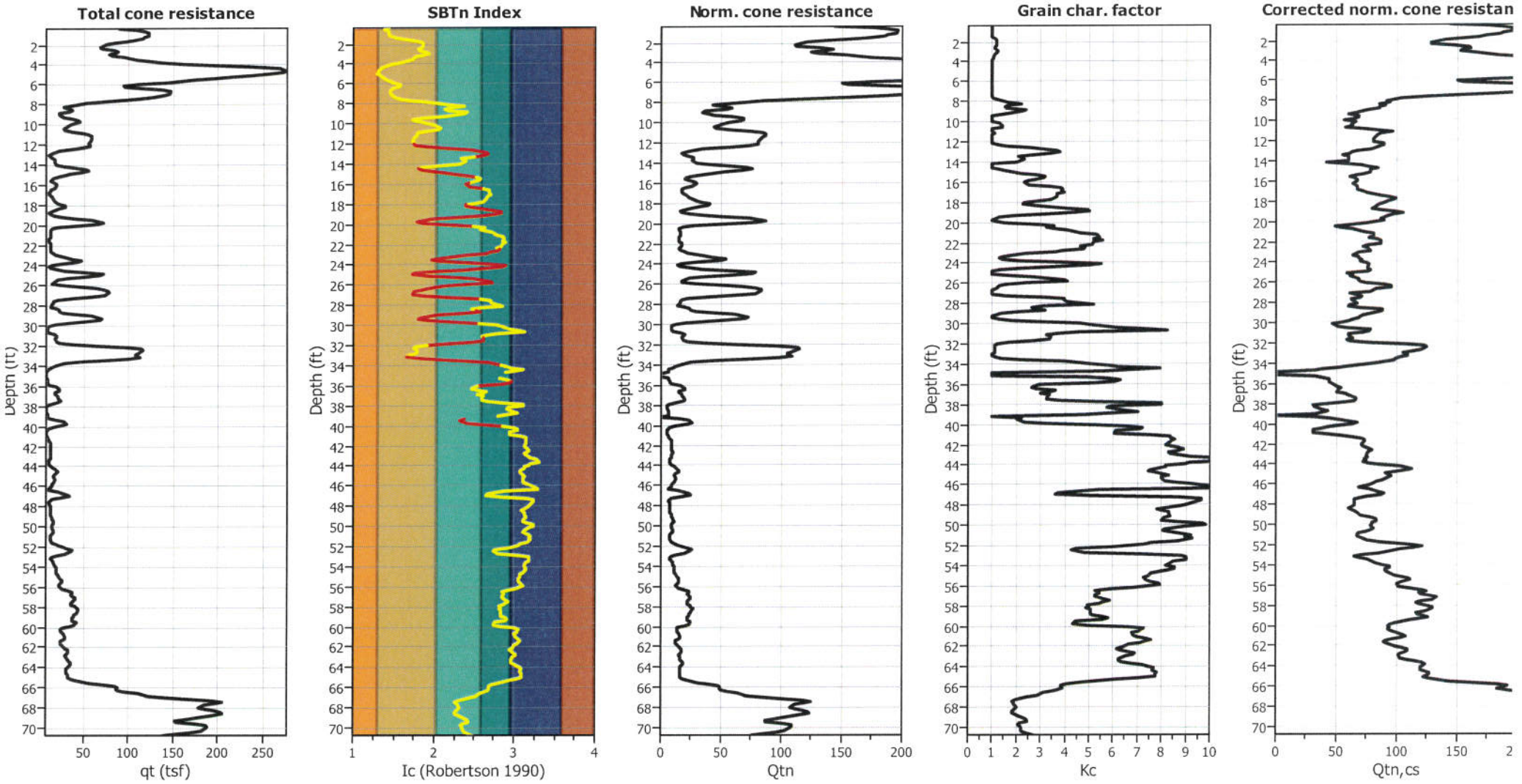
nput parameters and analysis data

nalysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
ines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
oints to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
arthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
eak ground acceleration:	0.50	Use fill:	No	Limit depth applied:	No
epth to water table (insitu):	5.00 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

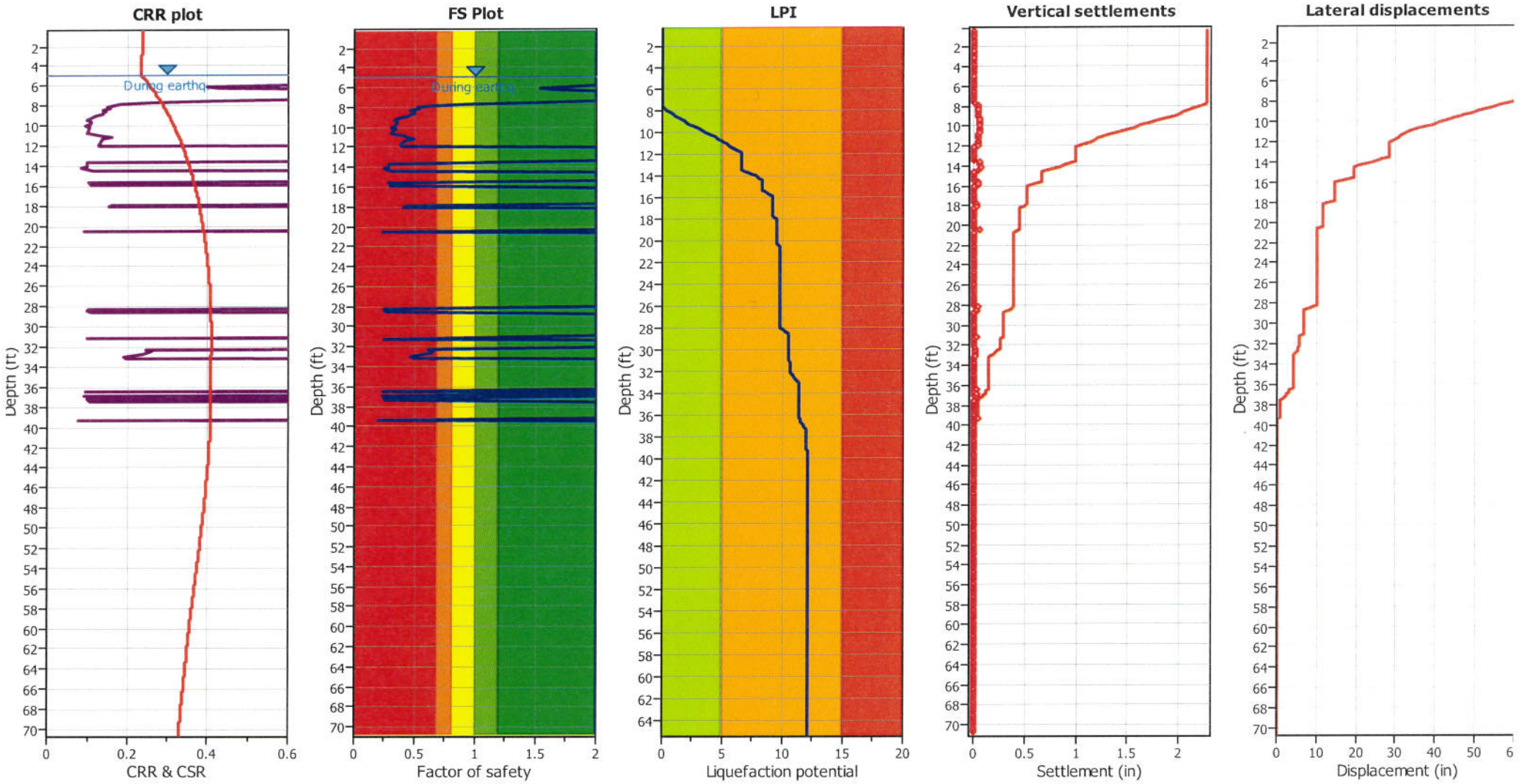
Liquefaction analysis overall plots (intermediate results)



nput parameters and analysis data

nalysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
ines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
oints to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
arthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
eak ground acceleration:	0.50	Use fill:	No	Limit depth applied:	No
epth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



nput parameters and analysis data

.nalysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
ines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
oints to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
arthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
eak ground acceleration:	0.50	Use fill:	No	Limit depth applied:	No
lepth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

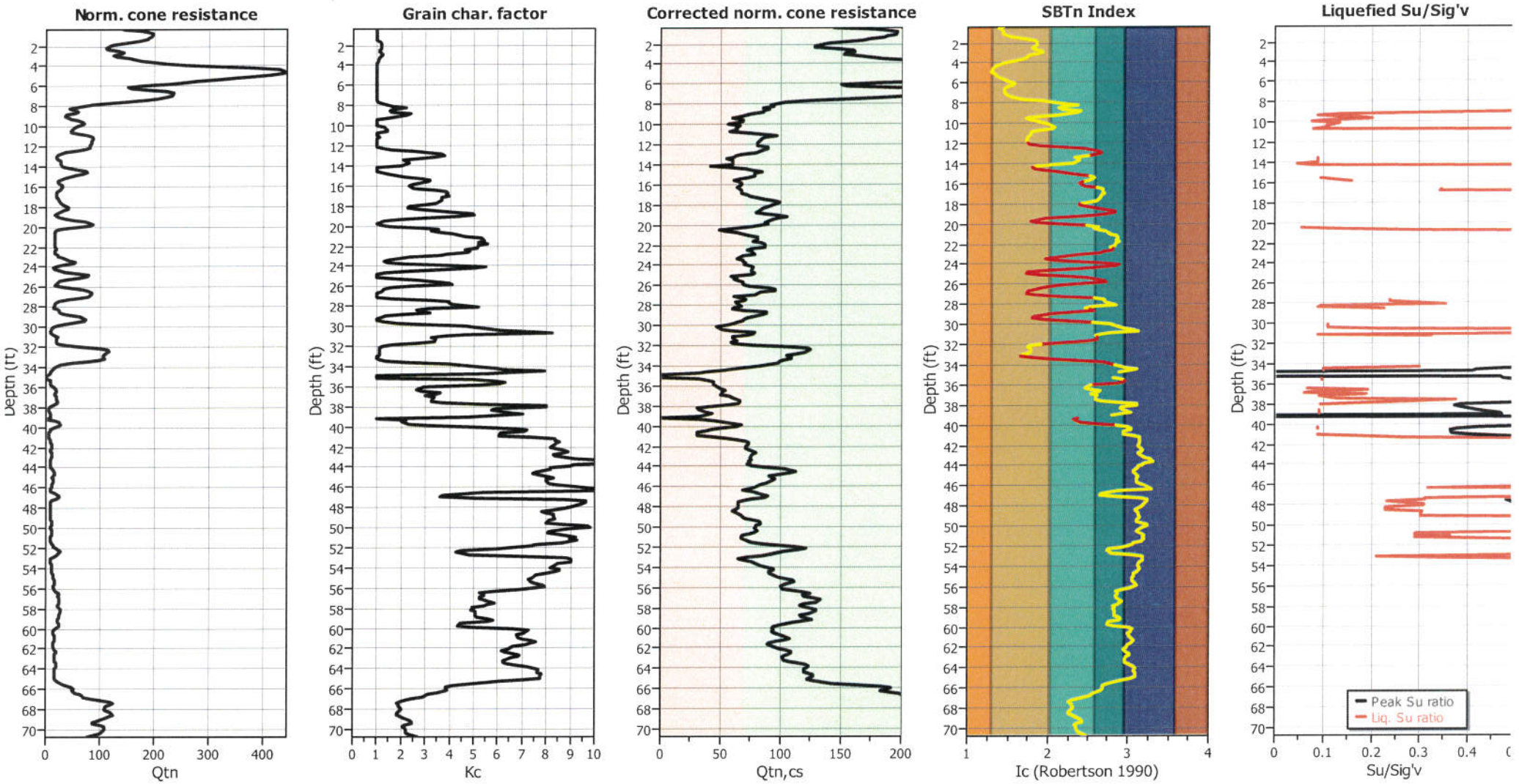
F.S. color scheme

- 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

Check for strength loss plots (Robertson (2010))



nput parameters and analysis data

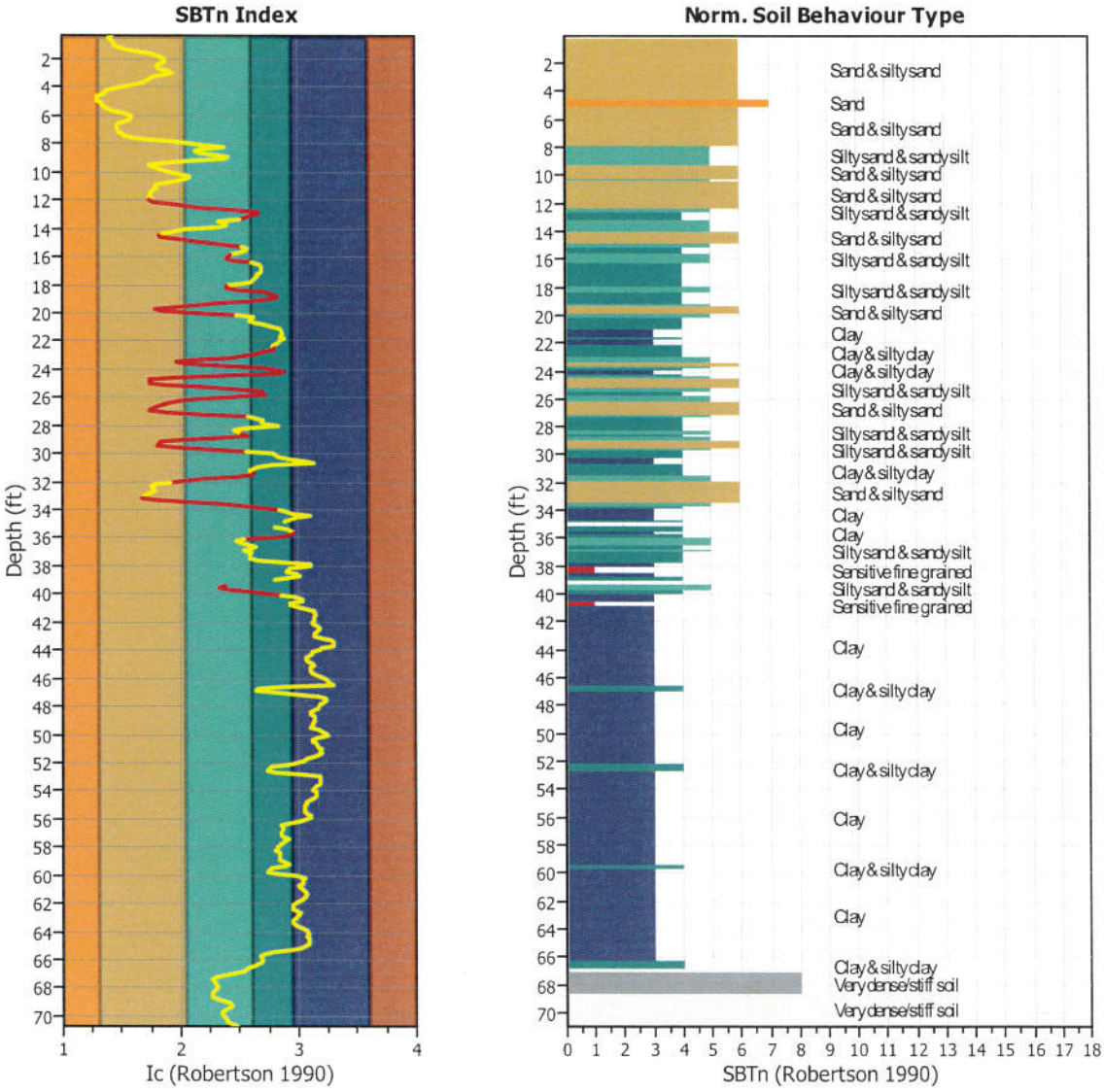
nalysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
ines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
oints to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
arthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
eak ground acceleration:	0.50	Use fill:	No	Limit depth applied:	No
epth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

TRANSITION LAYER DETECTION ALGORITHM REPORT
Summary Details & Plots

Short description

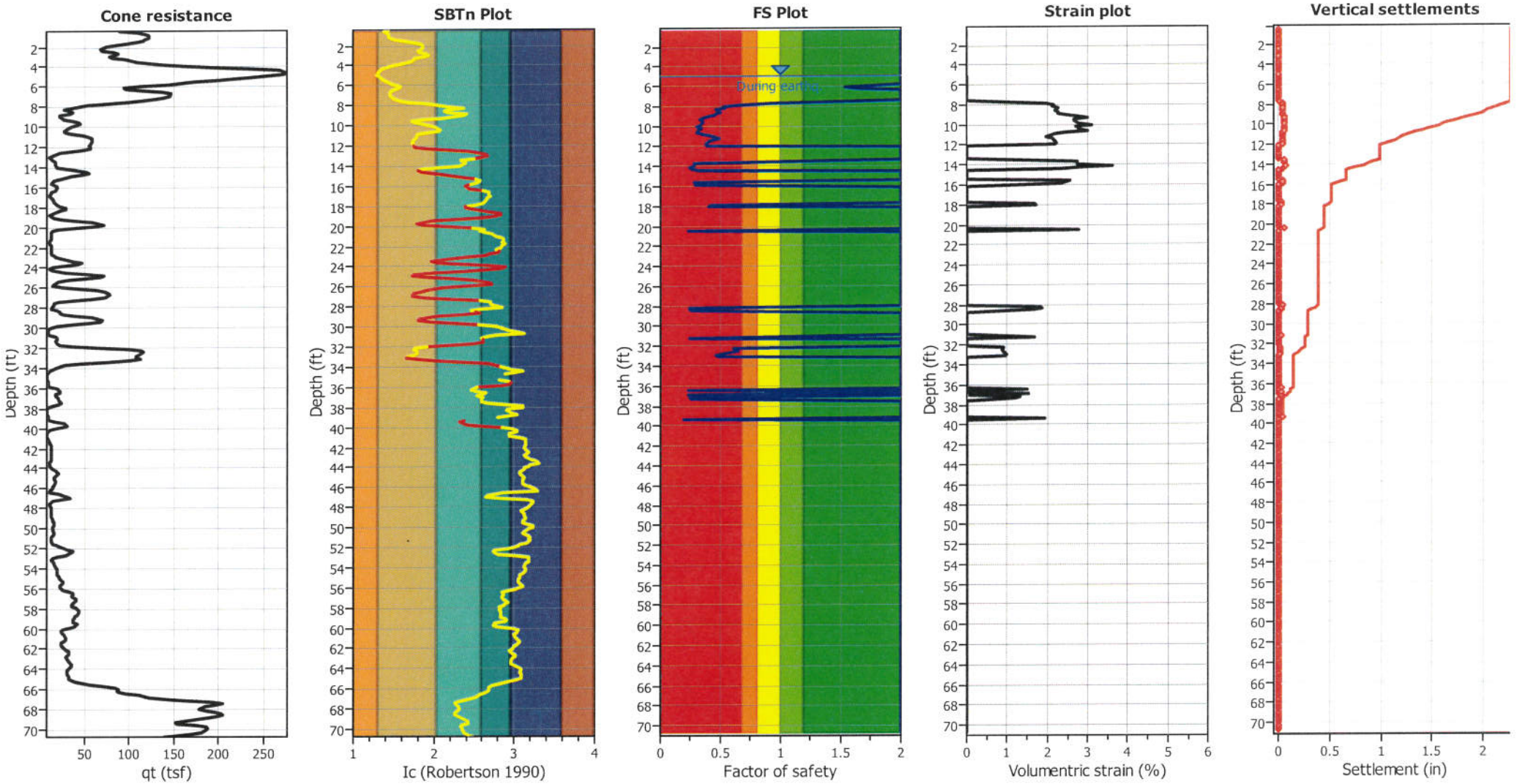
The software will delete data when the cone is in transition from either clay to sand or vise-versa. To do this the software requires a range of I_c values over which the transition will be defined (typically somewhere between $1.80 < I_c < 3.0$) and a rate of change of I_c. Transitions typically occur when the rate of change of I_c is fast (i.e. delta I_c is small).

The SBT_n plot below, displays in red the detected transition layers based on the parameters listed below the graphs.



Transition layer algorithm properties		General statistics	
I_c minimum check value:	1.70	Total points in CPT file:	430
I_c maximum check value:	3.00	Total points excluded:	96
I_c change ratio value:	0.0250	Exclusion percentage:	22.33%
Minimum number of points in layer:	4	Number of layers detected:	19

Estimation of post-earthquake settlements

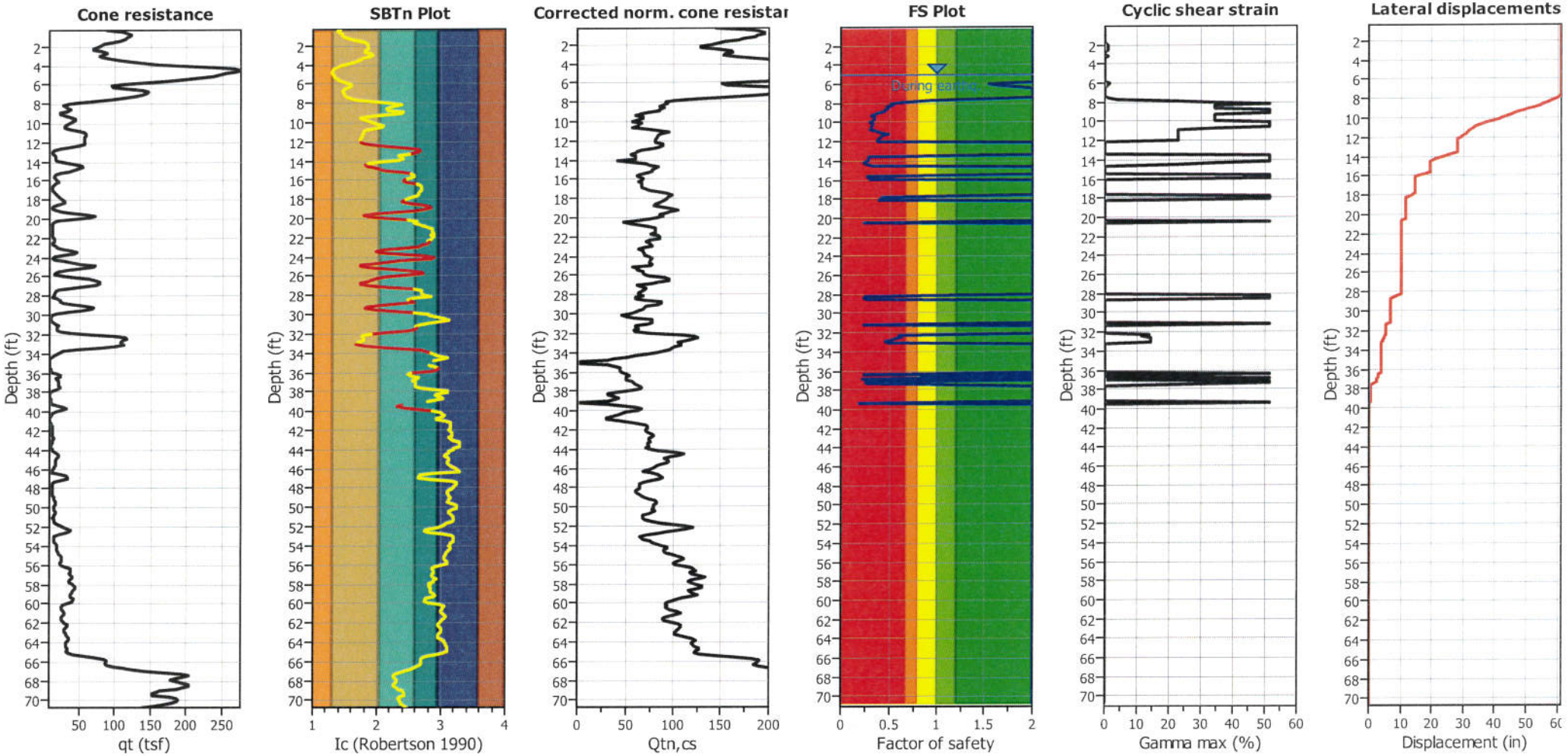


Abbreviations

Qt:	Total cone resistance (cone resistance q_c corrected for pore water effects)
Ic:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Estimation of post-earthquake lateral Displacements

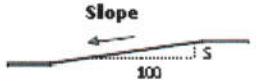
Geometric parameters: Gently sloping ground without free face (Slope 2.00 %)



Abbreviations

q_t: Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c: Soil Behaviour Type Index
$Q_{tn,cs}$: Equivalent clean sand normalized CPT total cone resistance
F.S.: Factor of safety
γ_{max}: Maximum cyclic shear strain
LDI: Lateral displacement index

Surface condition



STONEY-MILLER CONSULTANTS, INC.
GEOTECHNICAL ENGINEERING AND ENGINEERING GEOLOGY
Geotechnical Engineers
14 Hughes, B-101, Irvine, CA

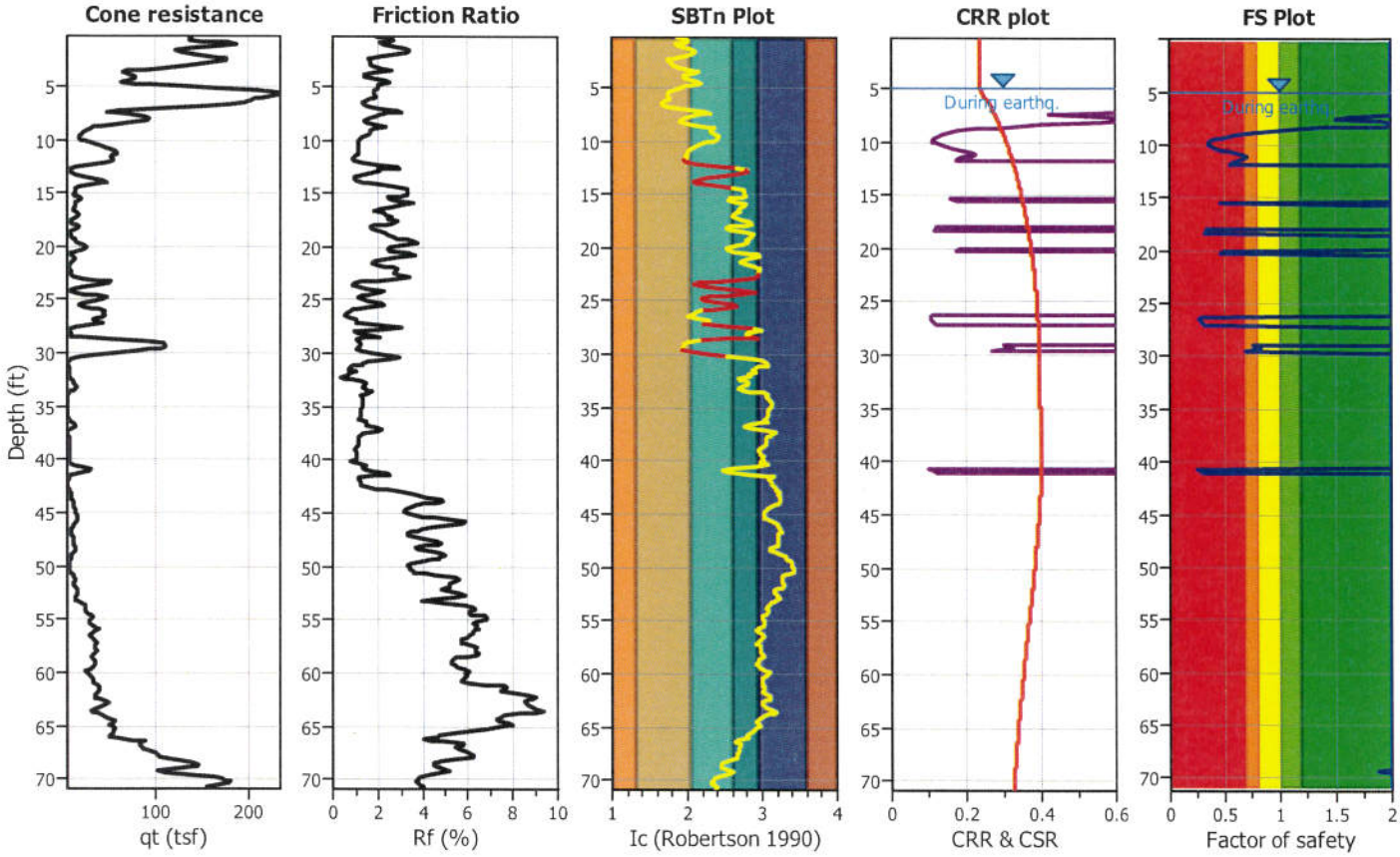
LIQUEFACTION ANALYSIS REPORT

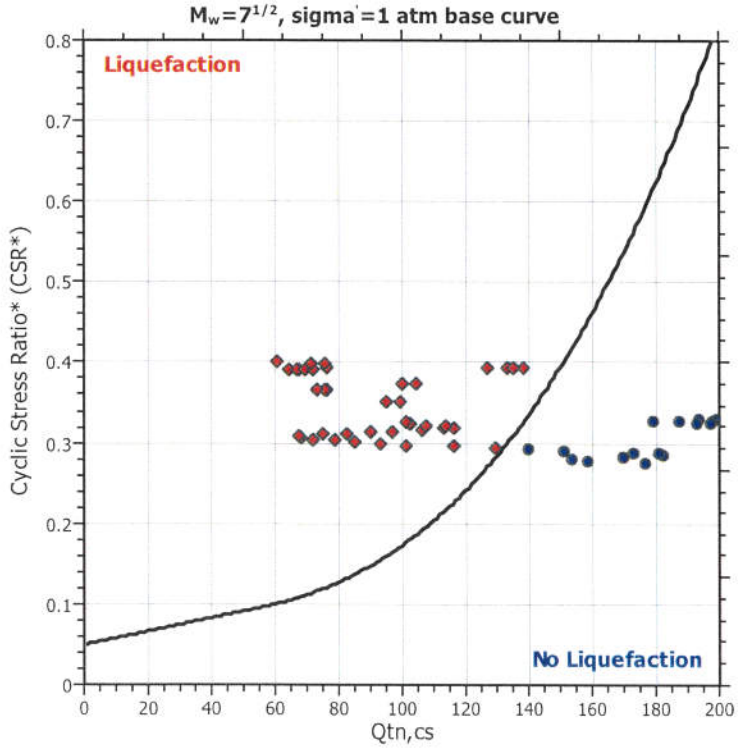
Project title : 50093-00 SEJPA Operation Building **Location : 2695 Manchester Avenue, Cardiff by the Sea, CA 92007**

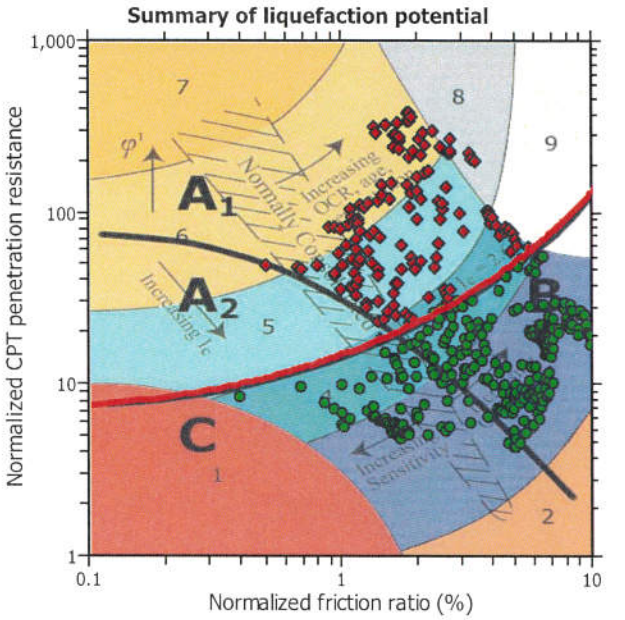
CPT file : CPT-02

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	5.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	5.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.63	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.50	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

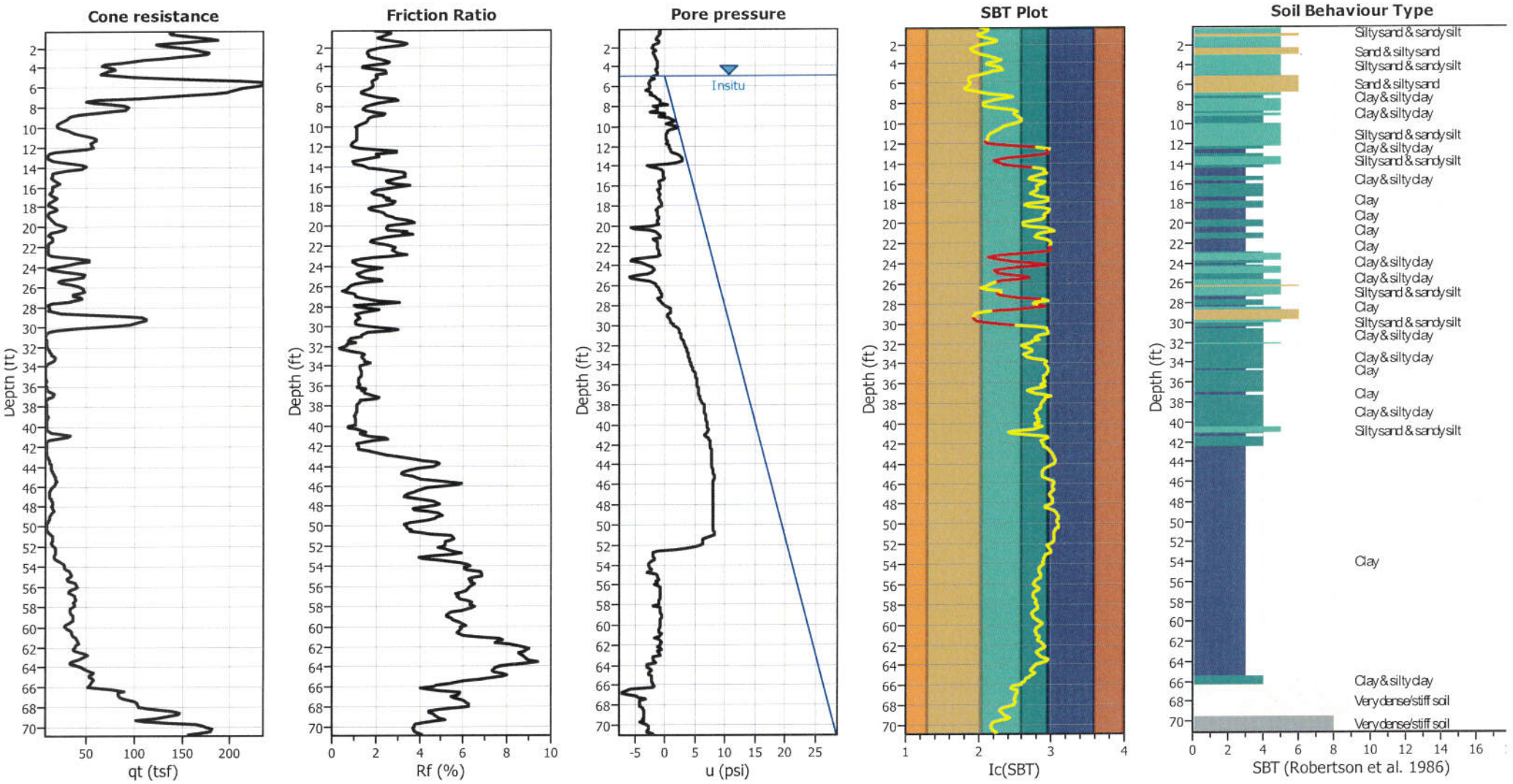






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



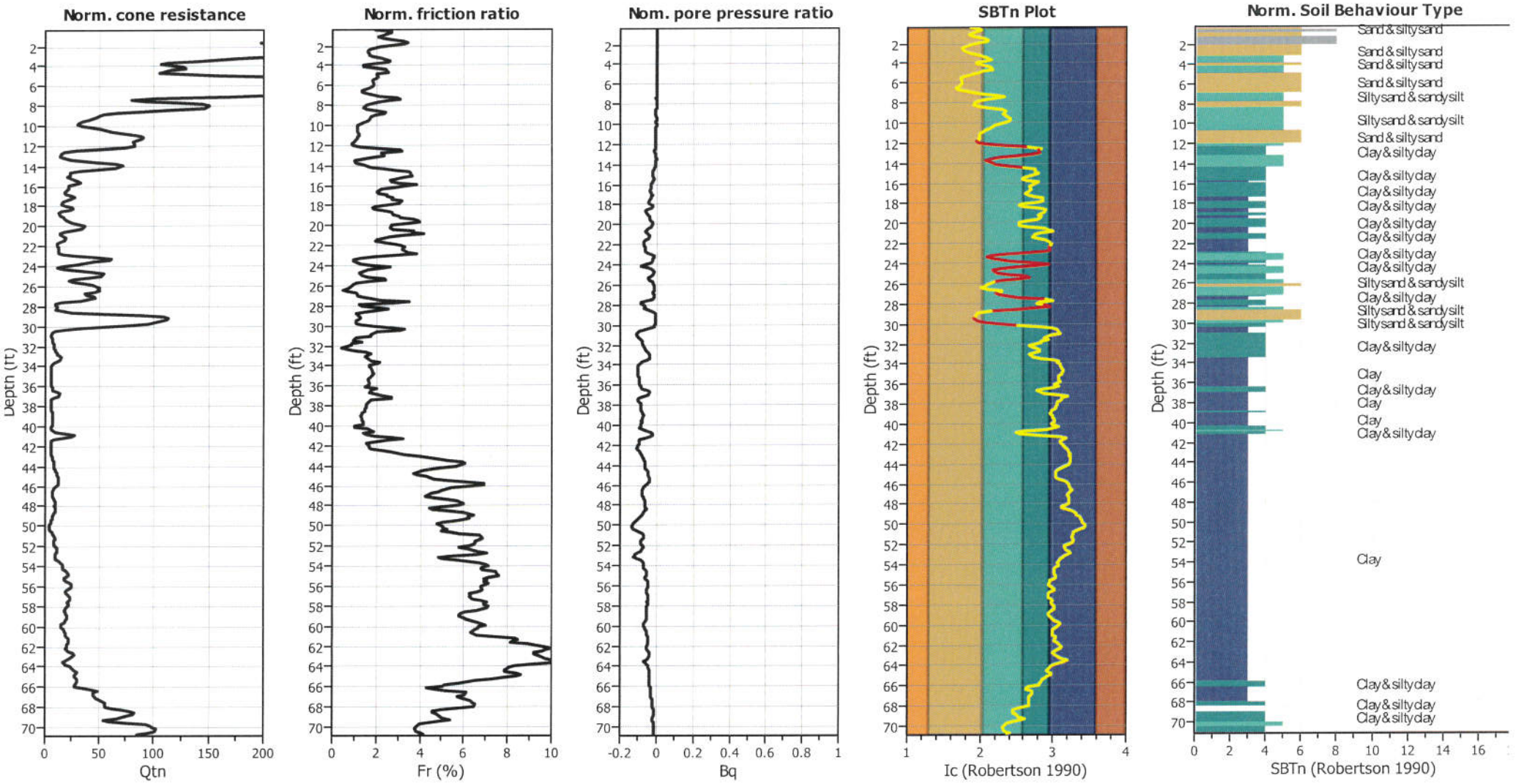
nput parameters and analysis data

nalysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
ines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
oints to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
arthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
eak ground acceleration:	0.50	Use fill:	No	Limit depth applied:	No
epth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT 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

CPT basic interpretation plots (normalized)



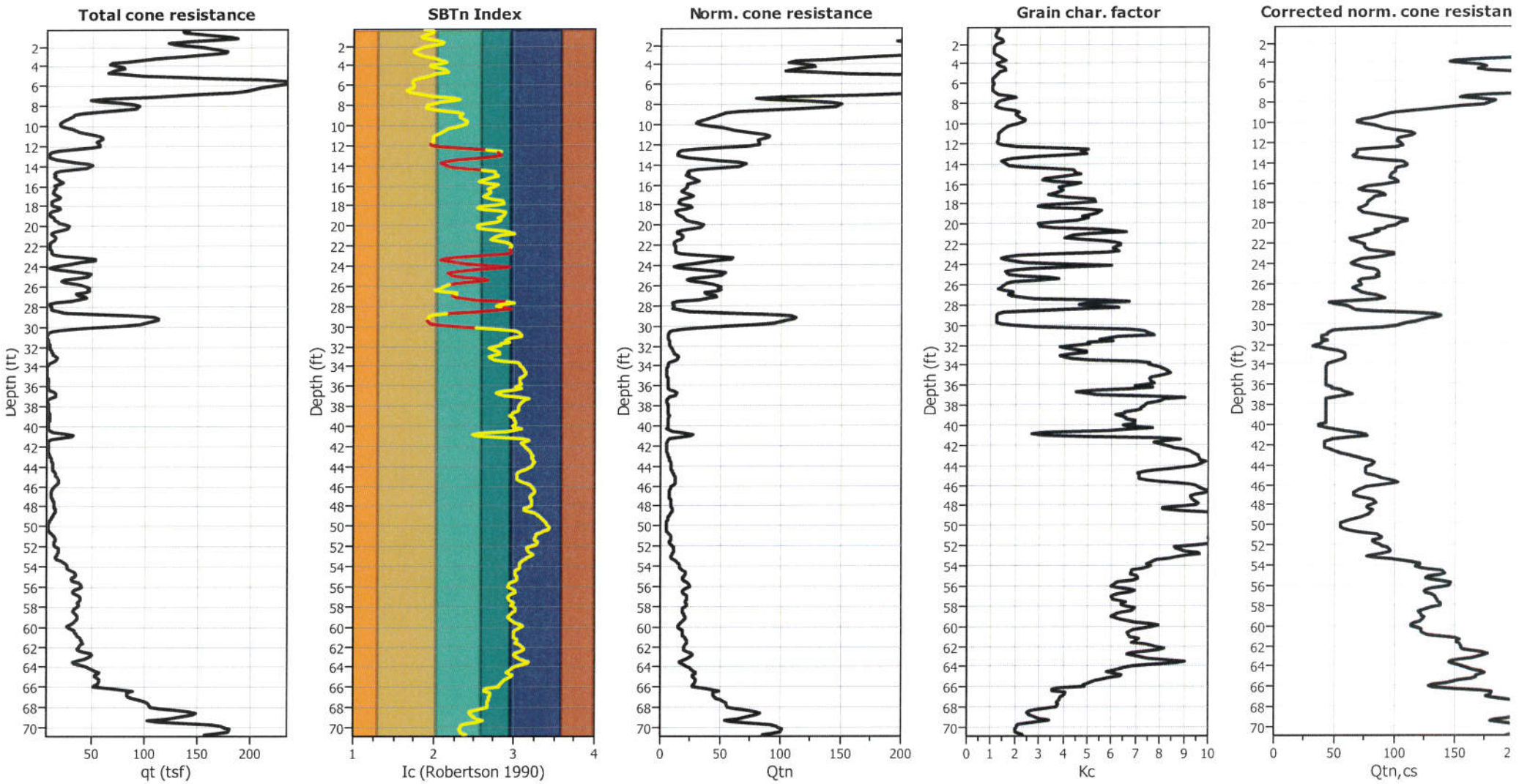
nput parameters and analysis data

nalysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
ines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
oints to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
arthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
eak ground acceleration:	0.50	Use fill:	No	Limit depth applied:	No
epth to water table (insitu):	5.00 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

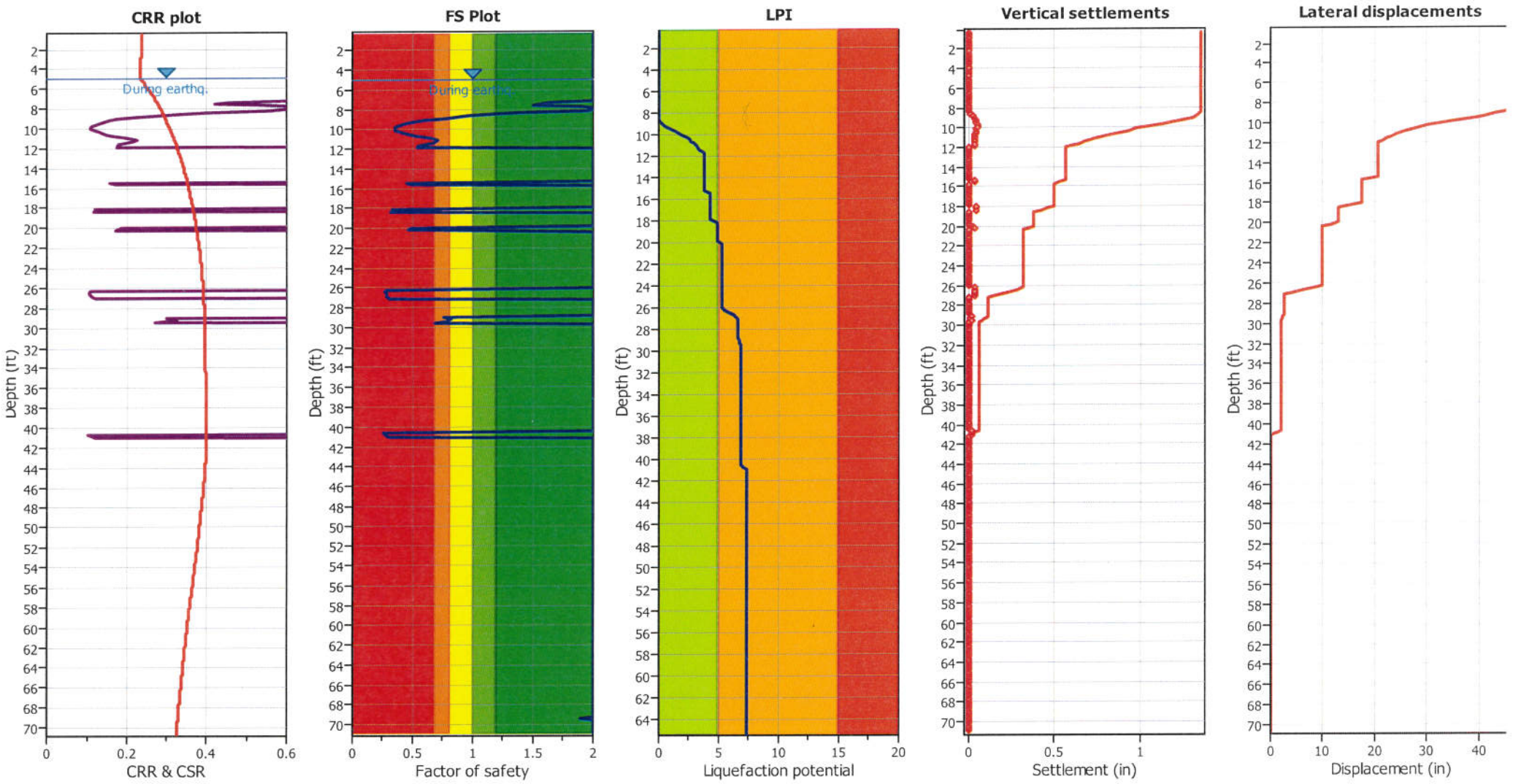
Liquefaction analysis overall plots (intermediate results)



nput parameters and analysis data

nalysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
ines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
oints to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
arthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
eak ground acceleration:	0.50	Use fill:	No	Limit depth applied:	No
epth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



nput parameters and analysis data

nalysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
ines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
oints to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
arthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
eak ground acceleration:	0.50	Use fill:	No	Limit depth applied:	No
epth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

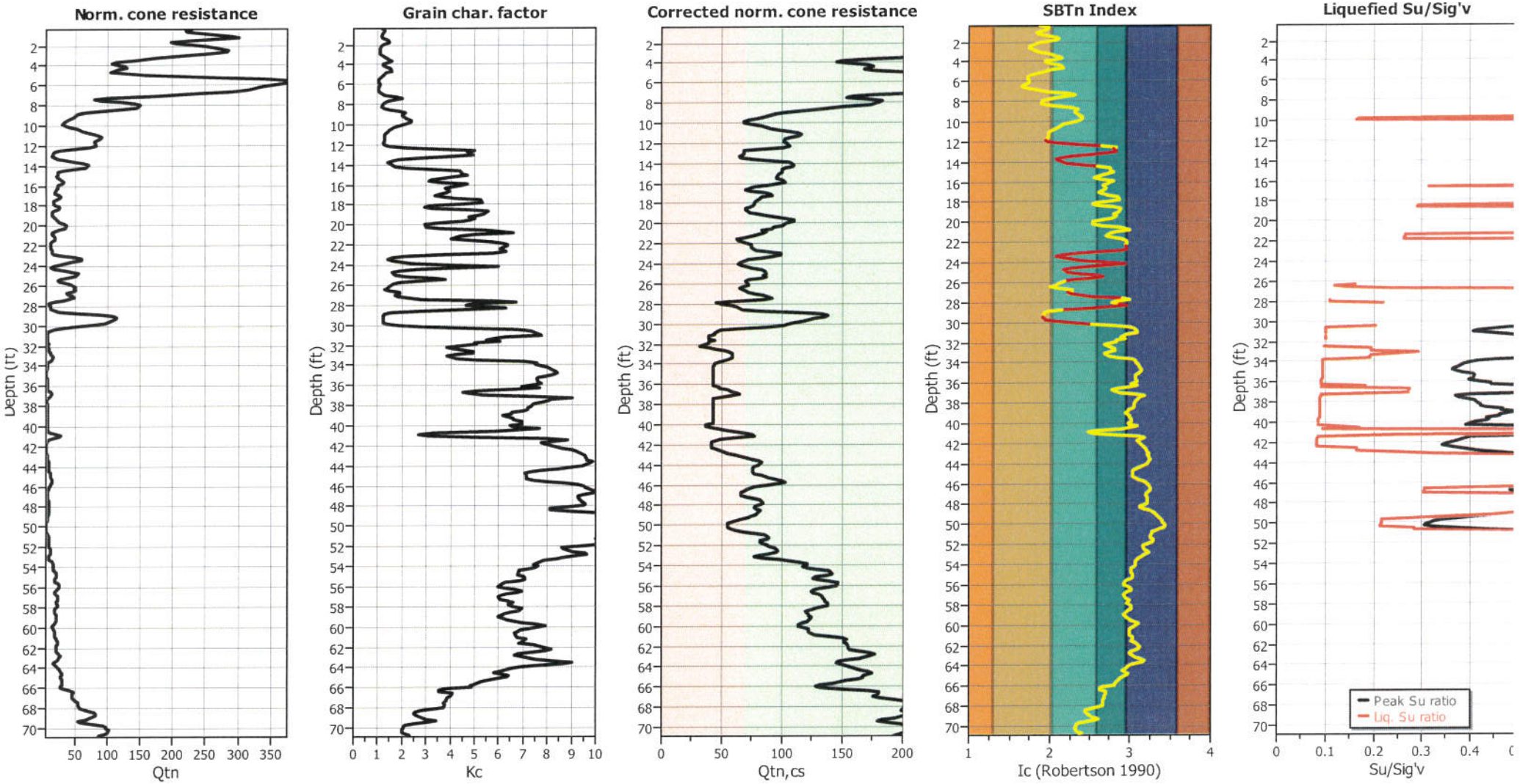
F.S. color scheme

- 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

Check for strength loss plots (Robertson (2010))



nput parameters and analysis data

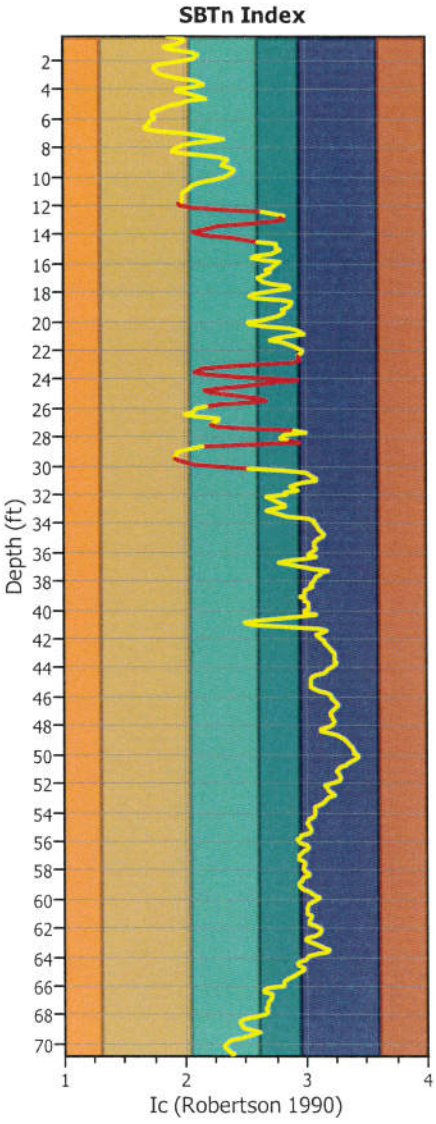
nalysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
ines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
oints to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
arthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
eak ground acceleration:	0.50	Use fill:	No	Limit depth applied:	No
epth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

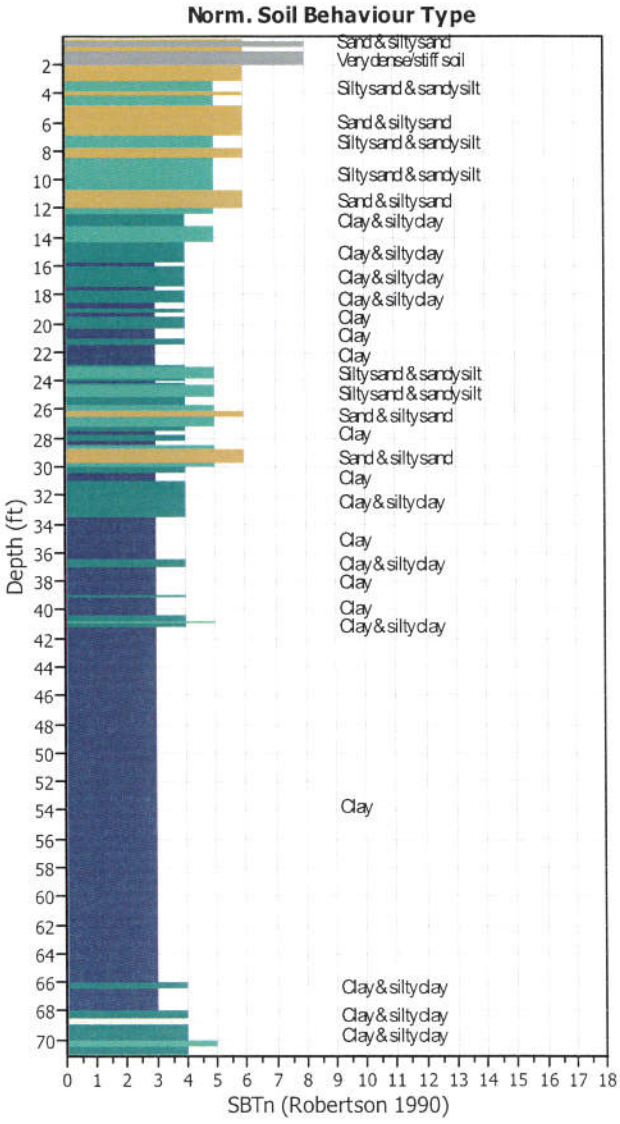
TRANSITION LAYER DETECTION ALGORITHM REPORT
Summary Details & Plots

Short description

The software will delete data when the cone is in transition from either clay to sand or vise-versa. To do this the software requires a range of I_c values over which the transition will be defined (typically somewhere between $1.80 < I_c < 3.0$) and a rate of change of I_c. Transitions typically occur when the rate of change of I_c is fast (i.e. delta I_c is small).

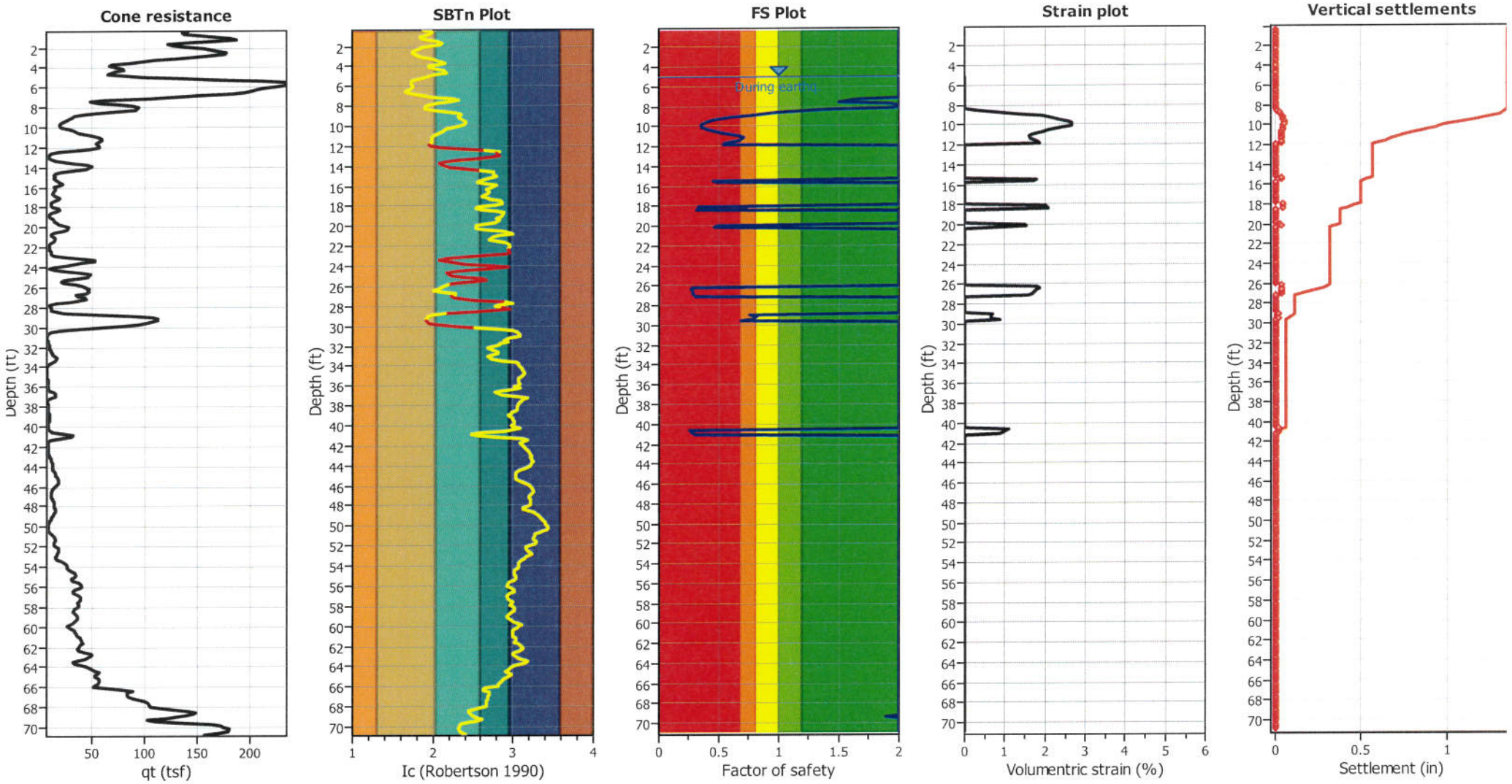
The SBT_n plot below, displays in red the detected transition layers based on the parameters listed below the graphs.





Transition layer algorithm properties		General statistics	
I_c minimum check value:	1.70	Total points in CPT file:	431
I_c maximum check value:	3.00	Total points excluded:	54
I_c change ratio value:	0.0250	Exclusion percentage:	12.53%
Minimum number of points in layer:	4	Number of layers detected:	11

Estimation of post-earthquake settlements

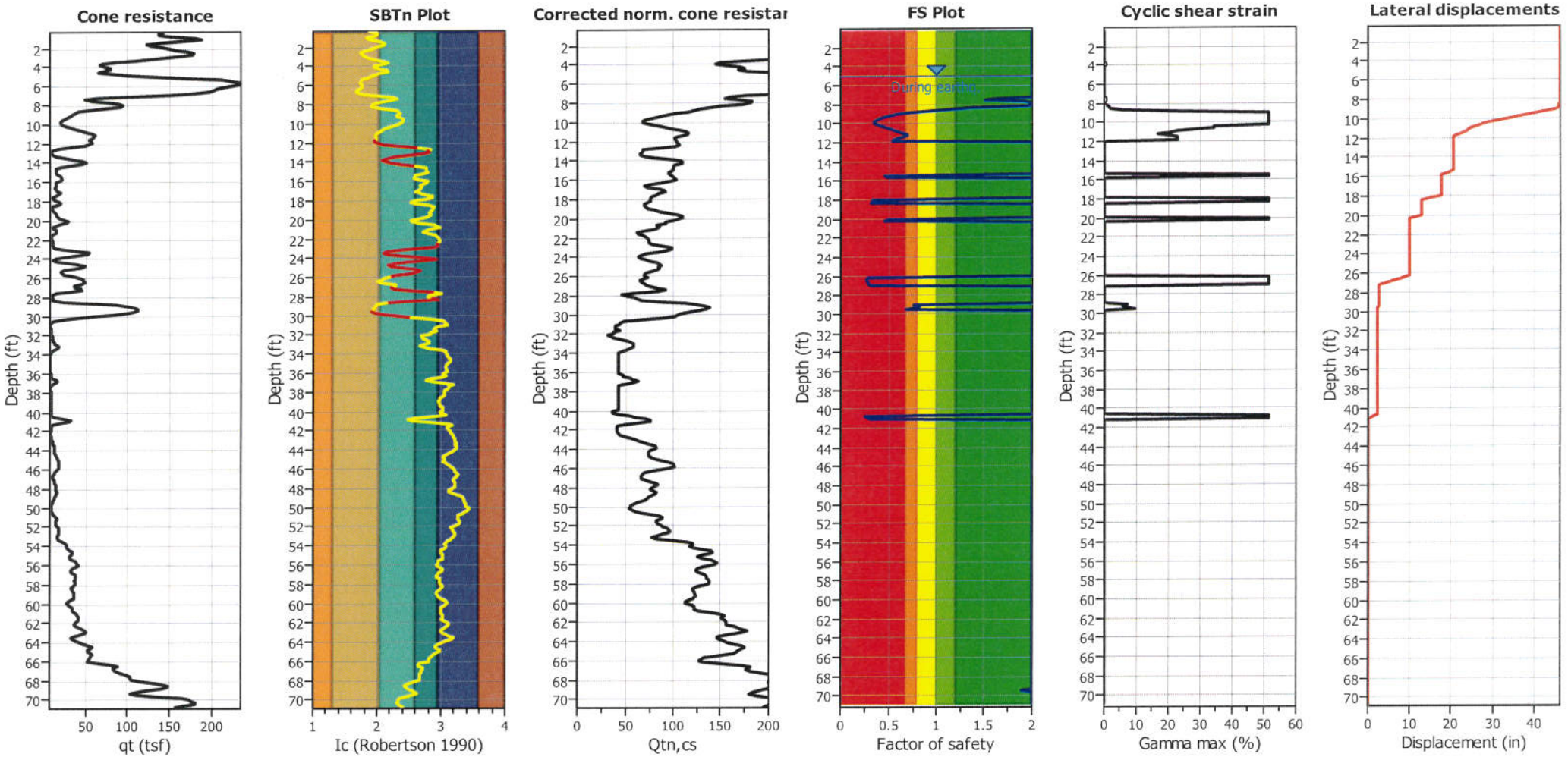


Abbreviations

qt:	Total cone resistance (cone resistance q_c corrected for pore water effects)
Ic:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Estimation of post-earthquake lateral Displacements

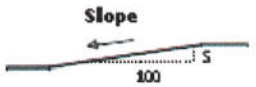
ɜeometric parameters: Gently sloping ground without free face (Slope 2.00 %)



ıbbreviations

ıt: Total cone resistance (cone resistance q_c corrected for pore water effects)
ɜ: Soil Behaviour Type Index
$Q_{tn,cs}$: Equivalent clean sand normalized CPT total cone resistance
F.S.: Factor of safety
γ_{max}: Maximum cyclic shear strain
LDI: Lateral displacement index

Surface condition



STONEY-MILLER CONSULTANTS, INC.
GEOTECHNICAL ENGINEERING AND ENGINEERING GEOLOGY
Geotechnical Engineers
14 Hughes, B-101, Irvine, CA

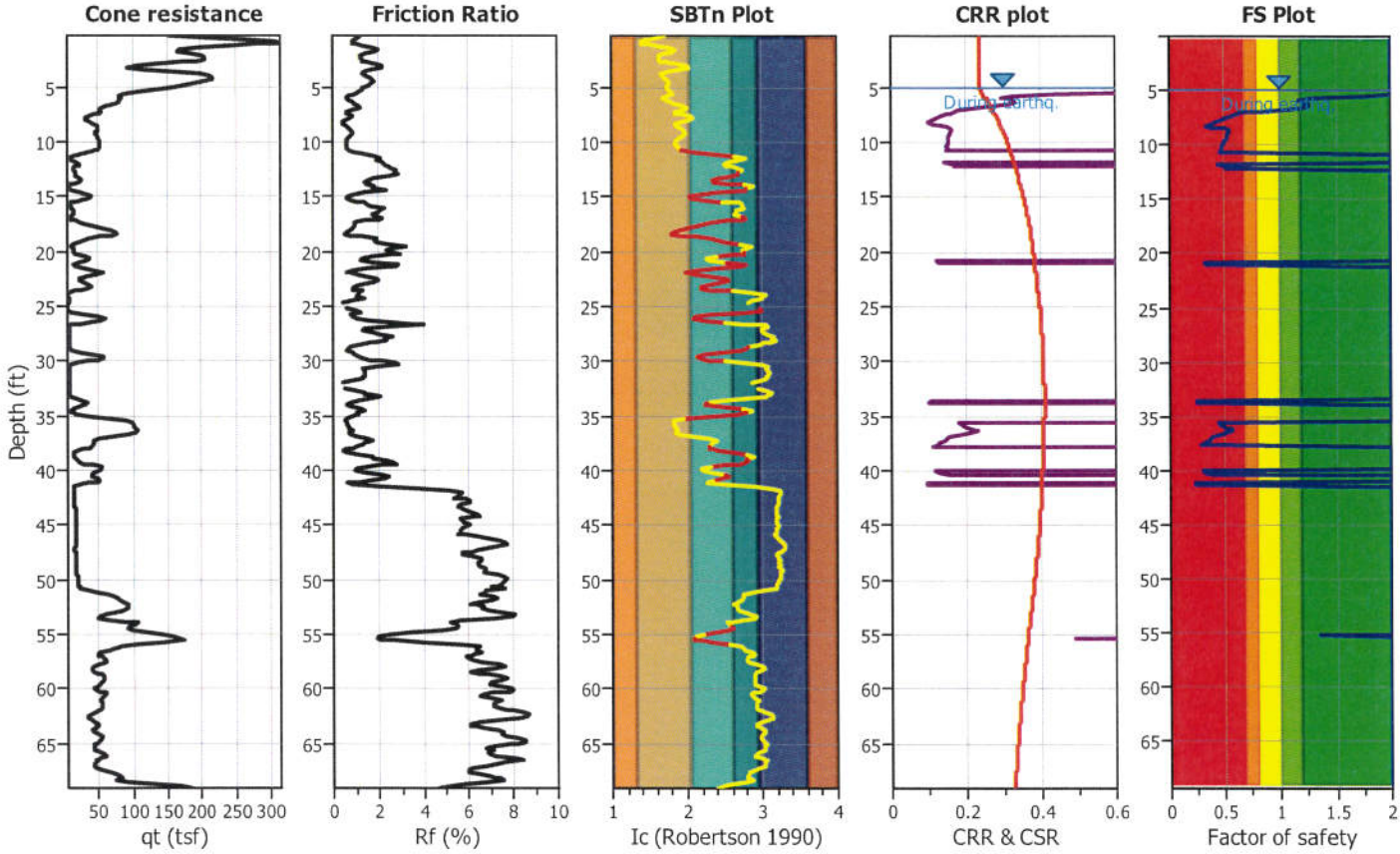
LIQUEFACTION ANALYSIS REPORT

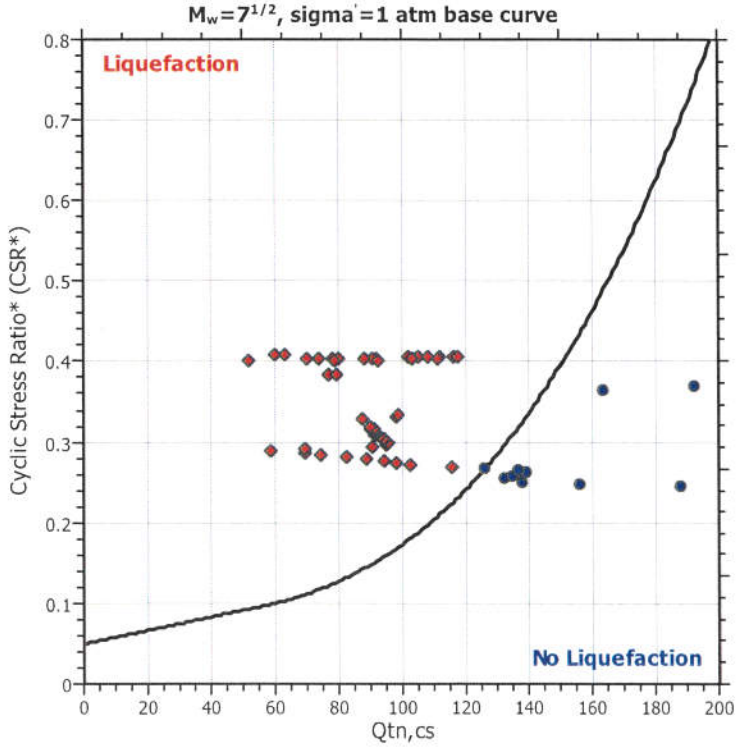
Project title : 50093-00 SEJPA Operation Building **Location : 2695 Manchester Avenue, Cardiff by the Sea, CA 92007**

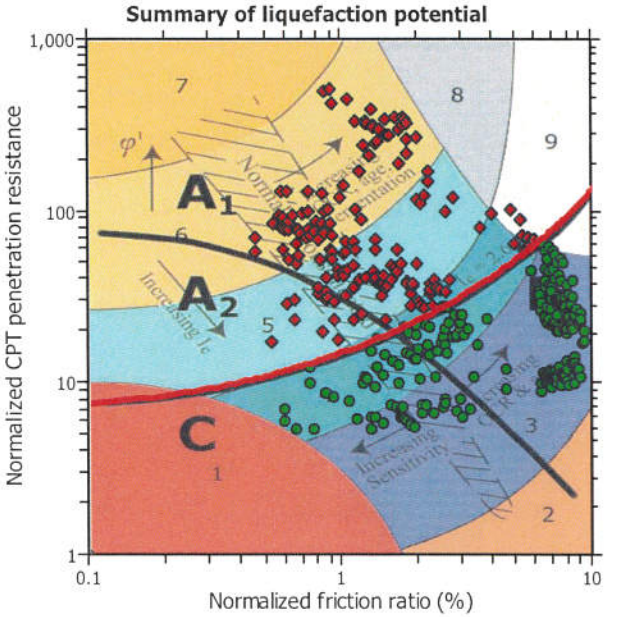
CPT file : CPT-03

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	5.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	5.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	6.63	Ic cut-off value:	2.60	Trans. detect. applied:	Yes	MSF method:	Method based
Peak ground acceleration:	0.50	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

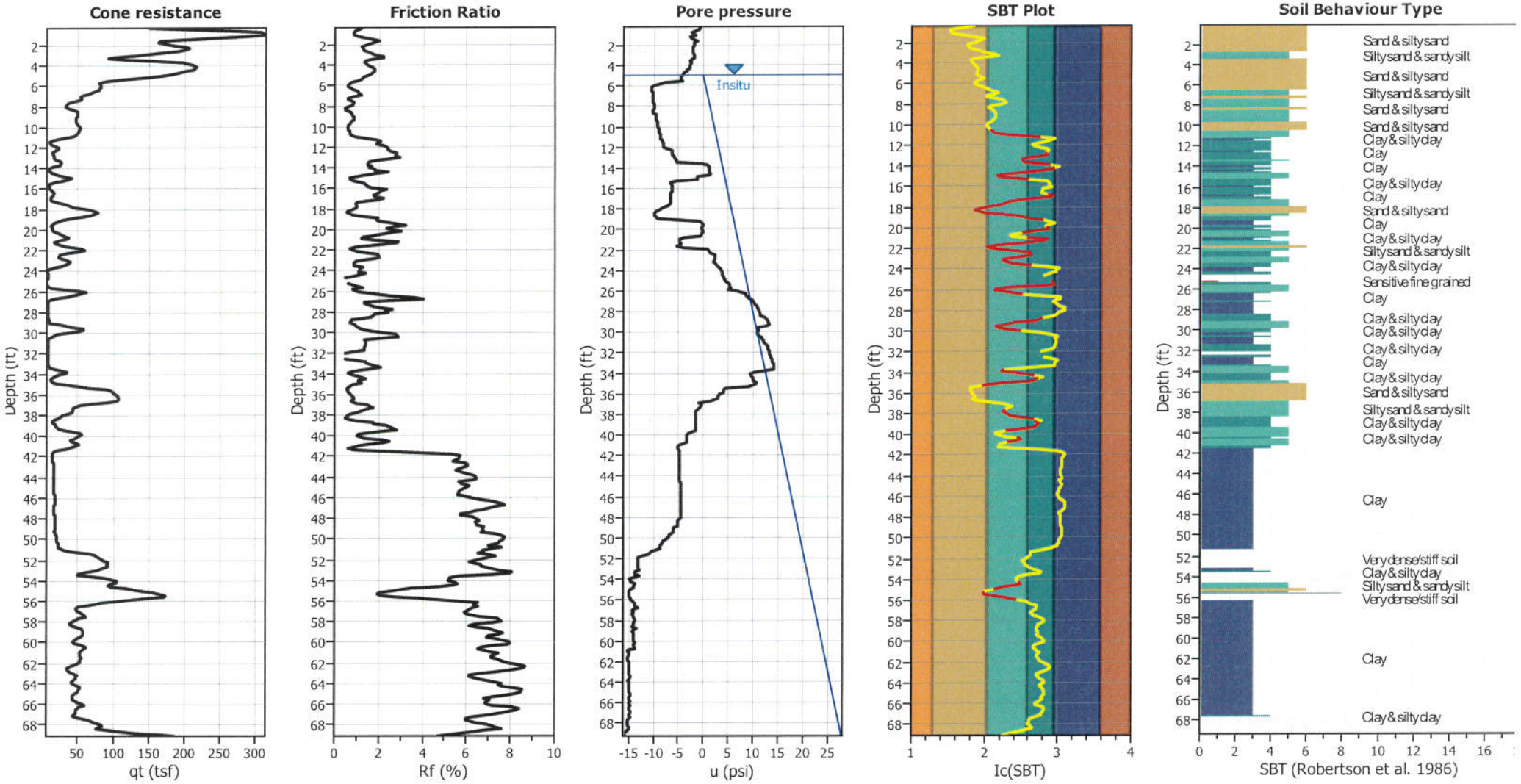






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



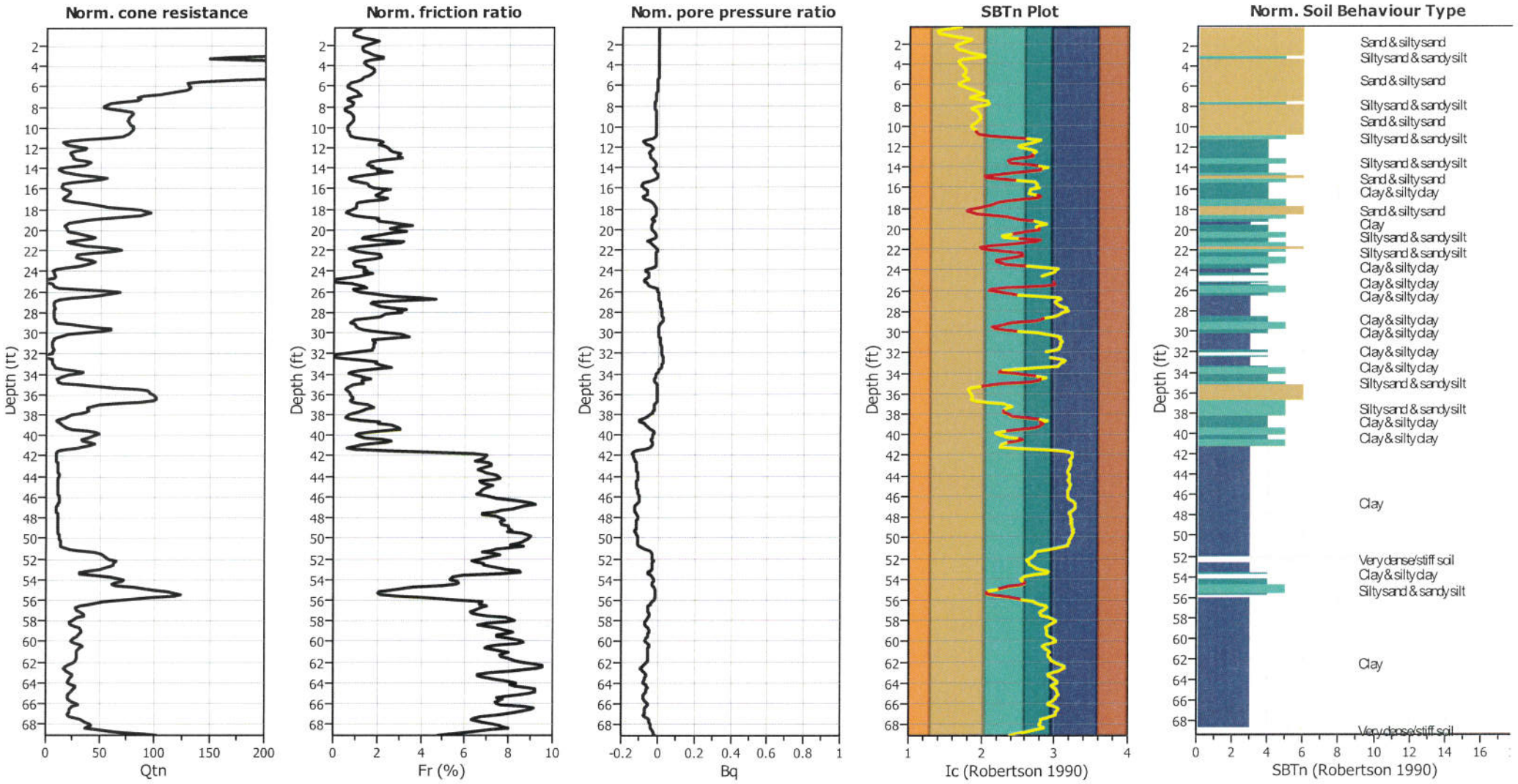
nput parameters and analysis data

nalysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
ines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
oints to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
arthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
eak ground acceleration:	0.50	Use fill:	No	Limit depth applied:	No
epth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT 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

CPT basic interpretation plots (normalized)



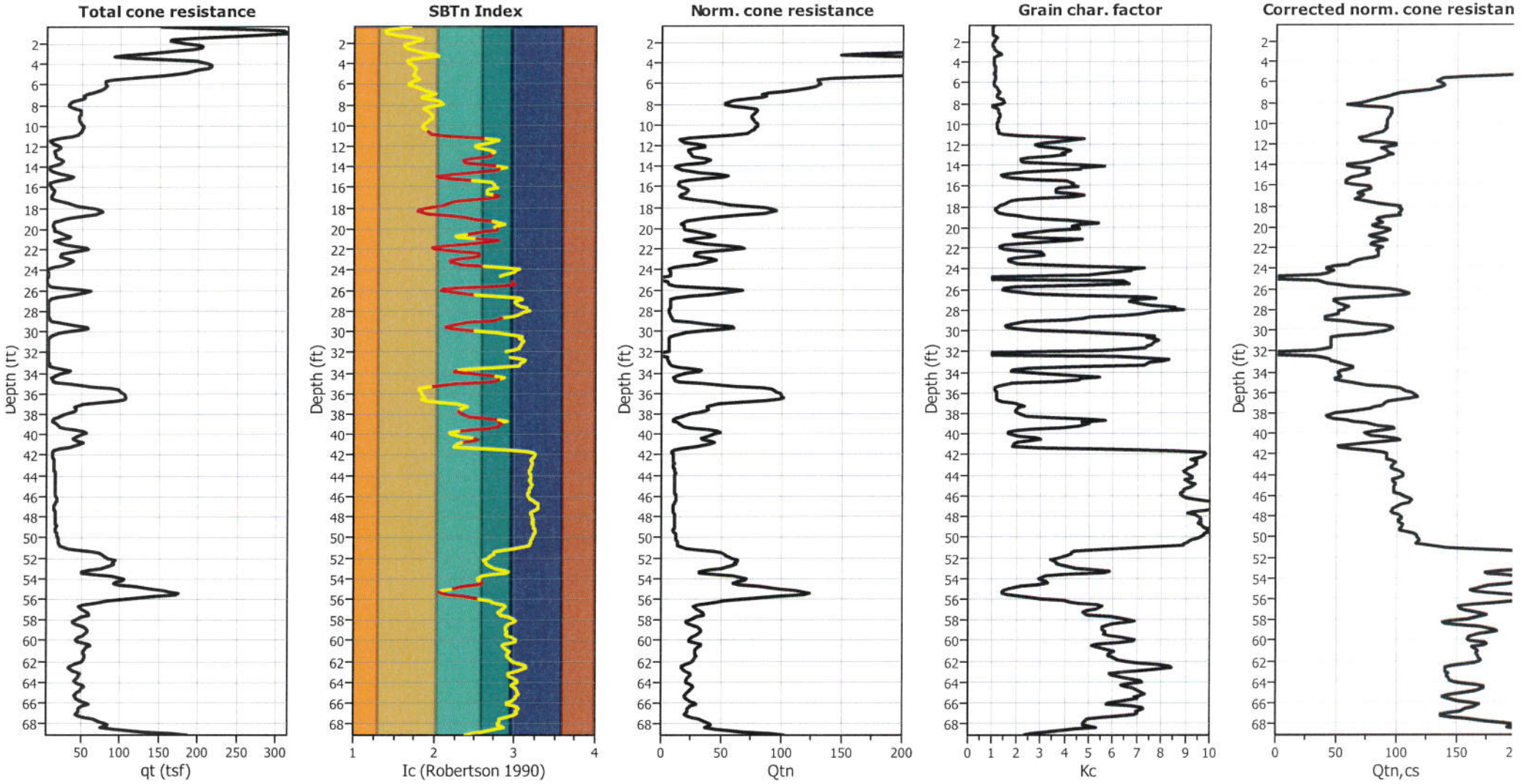
nput parameters and analysis data

ıalysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
ines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
oints to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
arthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
eak ground acceleration:	0.50	Use fill:	No	Limit depth applied:	No
ıepth to water table (insitu):	5.00 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

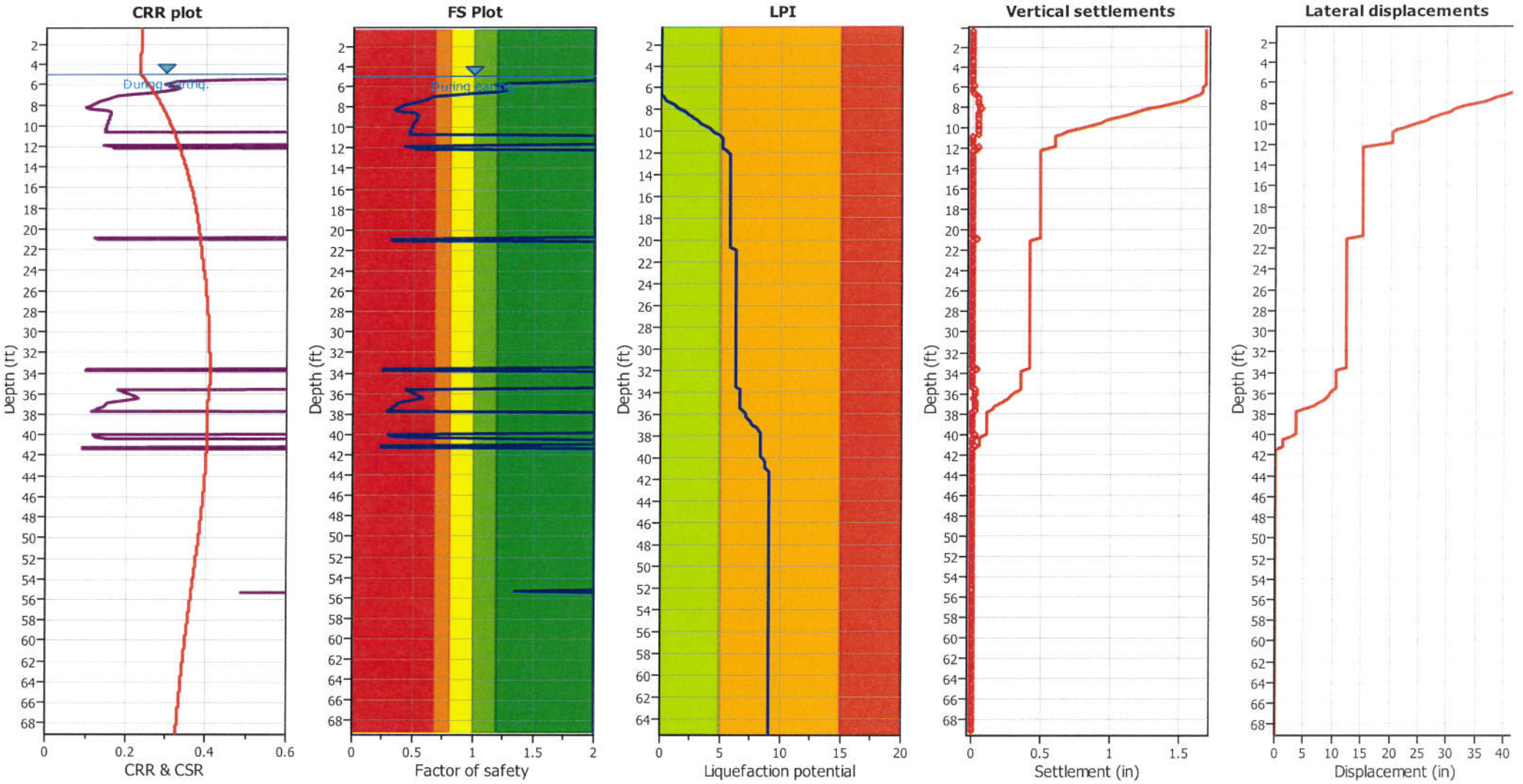
Liquefaction analysis overall plots (intermediate results)



nput parameters and analysis data

ıalysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
ines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
oints to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
arthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
eak ground acceleration:	0.50	Use fill:	No	Limit depth applied:	No
ıepth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



nput parameters and analysis data

nalysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
ines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
oints to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
arthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
eak ground acceleration:	0.50	Use fill:	No	Limit depth applied:	No
epth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

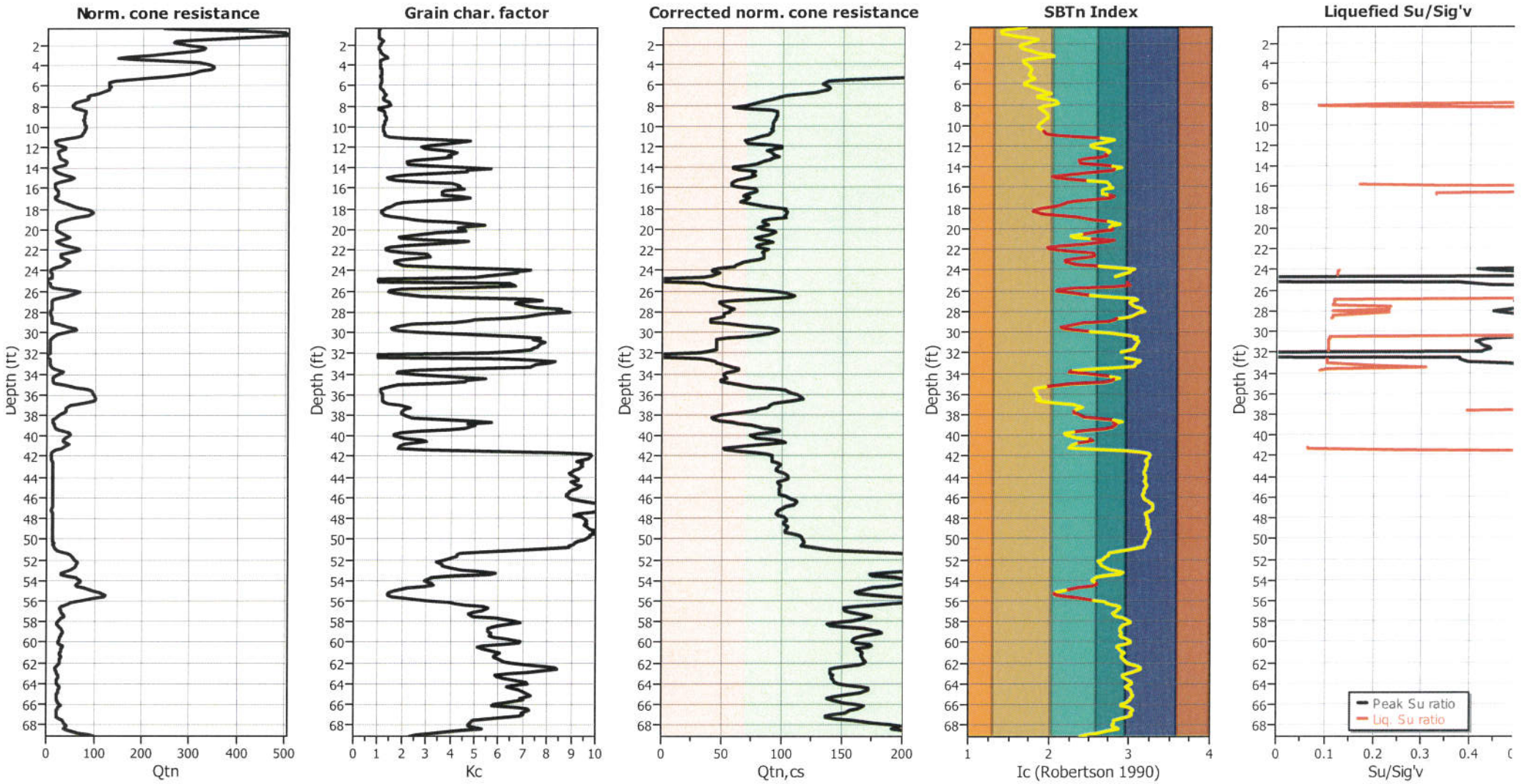
F.S. color scheme

- 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

Check for strength loss plots (Robertson (2010))



nput parameters and analysis data

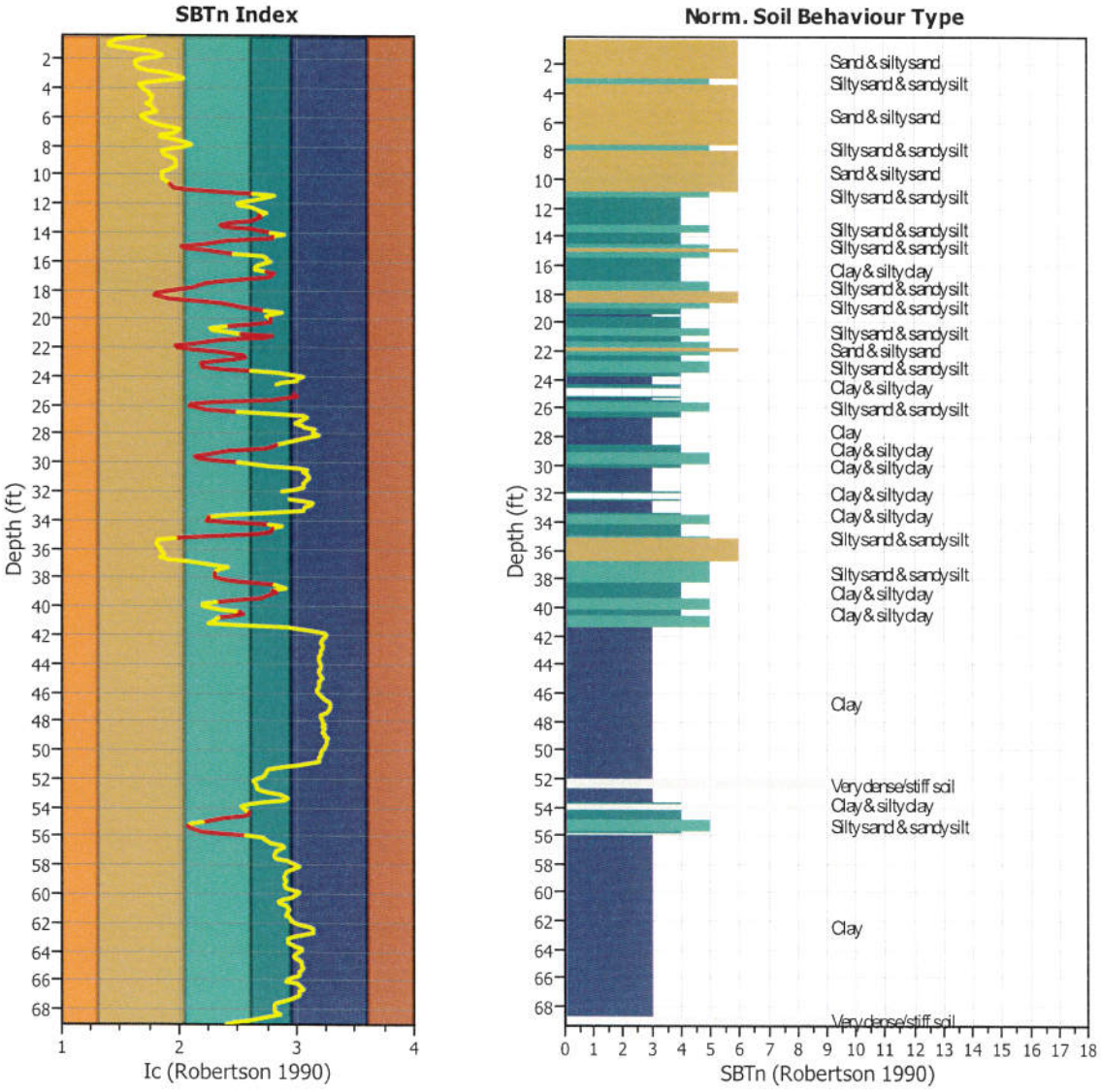
nalysis method:	NCEER (1998)	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
ines correction method:	NCEER (1998)	Average results interval:	3	Transition detect. applied:	Yes
oints to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
arthquake magnitude M_w:	6.63	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
eak ground acceleration:	0.50	Use fill:	No	Limit depth applied:	No
epth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

TRANSITION LAYER DETECTION ALGORITHM REPORT
Summary Details & Plots

Short description

The software will delete data when the cone is in transition from either clay to sand or vise-versa. To do this the software requires a range of I_c values over which the transition will be defined (typically somewhere between $1.80 < I_c < 3.0$) and a rate of change of I_c. Transitions typically occur when the rate of change of I_c is fast (i.e. delta I_c is small).

The SBT_n plot below, displays in red the detected transition layers based on the parameters listed below the graphs.



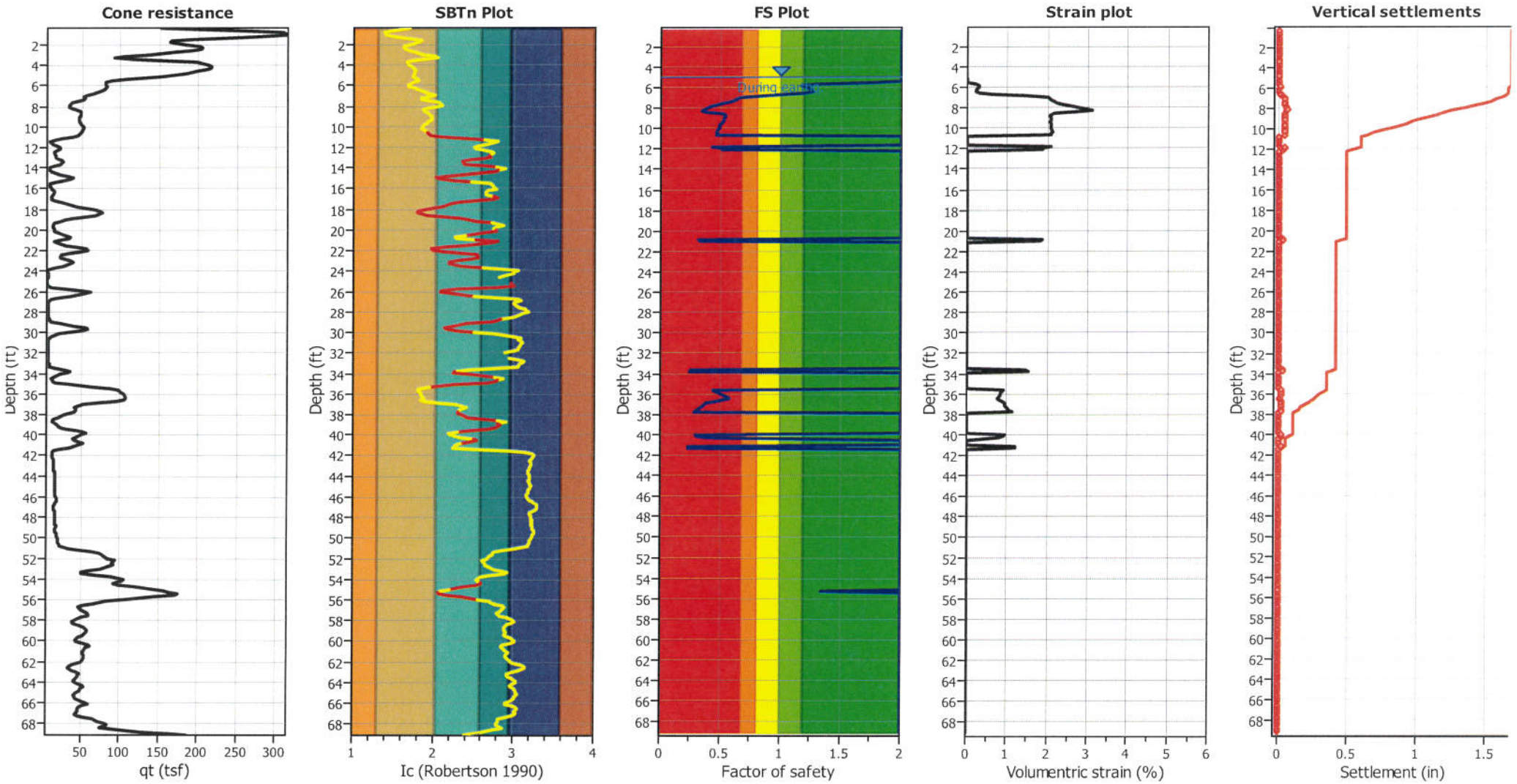
Transition layer algorithm properties

I_c minimum check value:	1.70
I_c maximum check value:	3.00
I_c change ratio value:	0.0250
Minimum number of points in layer:	4

General statistics

Total points in CPT file:	420
Total points excluded:	111
Exclusion percentage:	26.43%
Number of layers detected:	23

Estimation of post-earthquake settlements

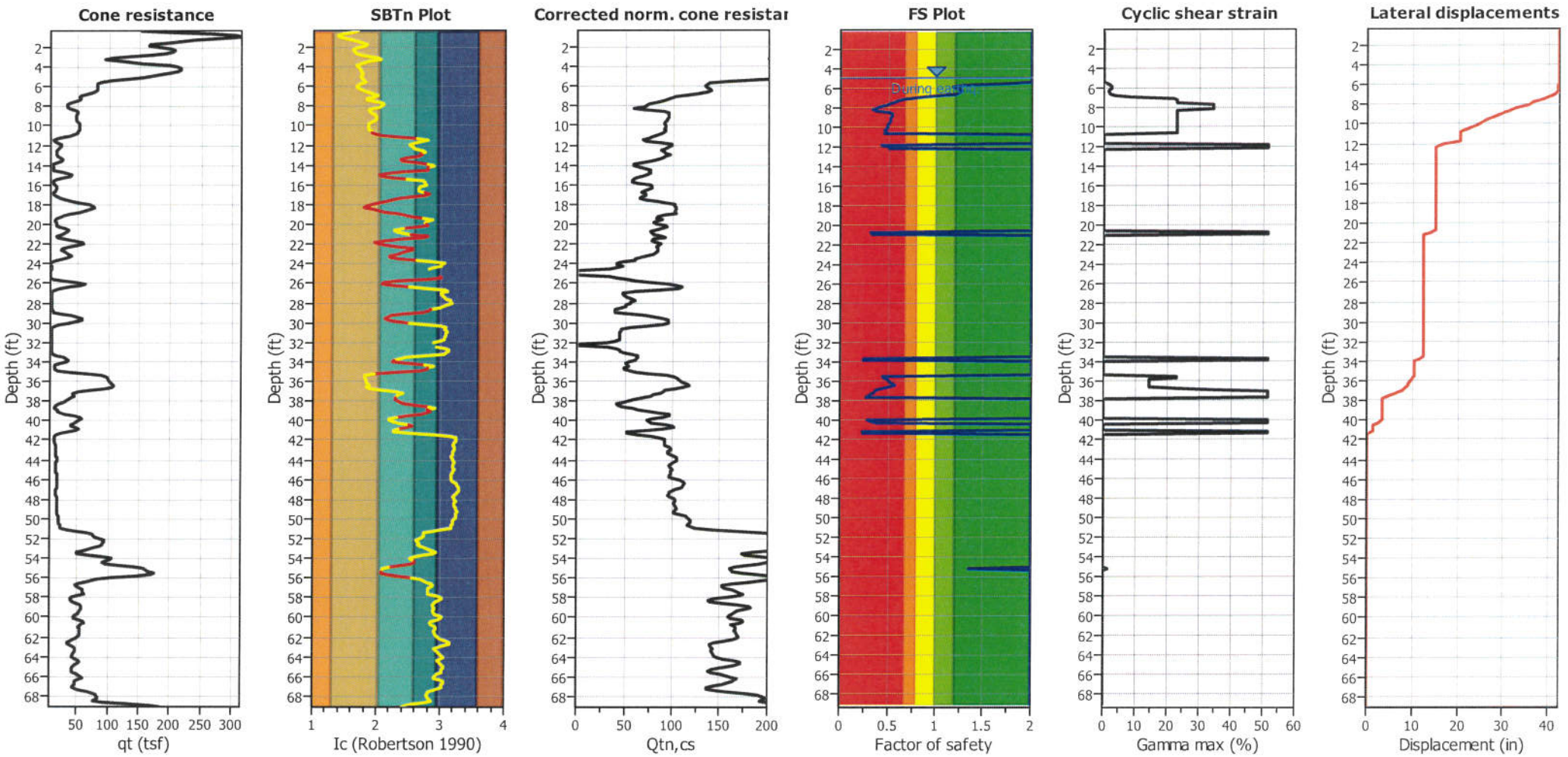


Abbreviations

Qt:	Total cone resistance (cone resistance q_c corrected for pore water effects)
Ic:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

Estimation of post-earthquake lateral Displacements

Geometric parameters: Gently sloping ground without free face (Slope 2.00 %)



Abbreviations

q_t: Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c: Soil Behaviour Type Index
$Q_{tn,cs}$: Equivalent clean sand normalized CPT total cone resistance
F.S.: Factor of safety
γ_{max}: Maximum cyclic shear strain
LDI: Lateral displacement index

Surface condition

APPENDIX E

STANDARD GRADING SPECIFICATIONS

APPENDIX E

STANDARD GRADING SPECIFICATIONS

GENERAL

These specifications present the usual and minimum requirements for grading operations observed by **Stoney-Miller Consultants, Inc.** or its designated representative. No deviation from these specifications will be allowed, except where specifically superseded in the geotechnical report signed by a registered geotechnical engineer.

The placement, spreading, mixing, watering and compaction of the fills in strict accordance with these guidelines shall be the sole responsibility of the contractor. The construction, excavation, and placement of fill shall be under the direct observation of the soils engineer signing the soils report. If unsatisfactory soil-related conditions exist, the soils engineer shall have the authority to reject the compacted fill ground and, if necessary, excavation equipment will be shut down to permit completion of compaction. Conformance with these specifications will be discussed in the final report issued by the soils engineer.

SITE PREPARATION

Brush, vegetation and other deleterious material such as rubbish shall be collected, piled and removed from the site prior to placing fill, leaving the site clear and free from objectionable material.

Soil, alluvium, or rock materials determined by the soils engineer as being unsuitable for placement in compacted fills shall be removed from the site. Any material incorporated as part of a compacted fill must be approved by the soils engineer.

The surface shall then be plowed or scarified to a minimum depth of 6 inches until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment used. After the area to receive fill has been cleared and scarified, it shall be diced or bladed by the contractor until it is uniform and free from large clods, brought to the proper moisture content and compacted to minimum requirements. If the scarified zone is greater than 12 inches in depth, the excess shall be removed and placed in lifts restricted to 6 inches.

Underground structures such as cesspools, cisterns, mining shafts, tunnels, septic tanks, wells, pipe lines or others not located prior to grading are to be removed or treated in a manner prescribed by the soils engineer.

MATERIALS

Materials for compacted fill shall consist of materials approved by the soils engineer. These materials may be excavated from the cut area or imported from other approved sources, and soils from one or more sources may be blended. Fill soils shall be free from organic vegetable matter and other unsuitable substances. Normally, the material shall contain no rocks or hard lumps

greater than 6 inches in size and shall contain at least 50 percent of material smaller than 1/4-inch in size. Materials greater than 4 inches in size shall be placed so that they are completely surrounded by compacted fines; no nesting of rocks shall be permitted. No material of a perishable, spongy, or otherwise of an unsuitable nature shall be used in the fill soils.

Representative samples of materials to be utilized as compacted fill shall be analyzed in the laboratory by the soils engineer to determine their physical properties. If any material other than that previously tested is encountered during grading, the appropriate analysis of this material shall be conducted by the geotechnical engineer as soon as possible.

PLACING, SPREADING, AND COMPACTING FILL MATERIAL

The material used in the compacting process shall be evenly spread, watered, processed and compacted in thin lifts not to exceed 6 inches in thickness to obtain a uniformly dense layer.

When the moisture content of the fill material is below that specified by the soils engineer, water shall be added by the contractor until the moisture content is near optimum as specified.

When the moisture content of the fill material is above that specified by the geotechnical engineer, the fill material shall be aerated by the contractor by blading, mixing, or other satisfactory methods until the moisture content is near optimum as specified.

After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted to 90 percent of the maximum laboratory density in compliance with ASTM D: 1557-70 (five layers). Compaction shall be accomplished by sheepsfoot rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compacting equipment. Equipment shall be of such design that it will be able to compact the fill to the specified density. Compaction shall be continuous over the entire area and the equipment shall make sufficient passes to obtain the desired density uniformly.

A minimum relative compaction of 90 percent out to the finished slope face of all fill slopes will be required. Compacting of the slopes shall be accomplished by backrolling the slopes in increments of 2 to 5 feet in elevation gain or by overbuilding and cutting back to the compacted inner core, or by any other procedure which produces the required compaction.

OBSERVATIONS AND TESTING

The geotechnical engineer shall observe the placement of fill during the grading process and will file a written report upon completion of grading stating his observations as to compliance with these specifications.

One density test shall be required for each 2 vertical feet of fill placed, or one for each 1,000 cubic yards of fill, whichever requires the greater number of tests.

Any cleanouts and processed ground to receive fill must be observed by the soils engineer and/or engineering geologist prior to any fill placement. The contractor shall notify the geotechnical engineer when these areas are ready for observation.

PROTECTION OF WORK

During the grading process and prior to the complete construction of permanent drainage controls, it shall be the responsibility of the contractor to provide good drainage and prevent ponding of water and damage to adjoining properties or to finished work on the site.

After the geotechnical engineer has terminated his observations of the completed grading, no further excavations and/or filling shall be performed without the approval of the soils engineer, if it is to be subject to the recommendations of this report.

APPENDIX F

UTILITY TRENCH BACKFILL GUIDELINES

APPENDIX F

UTILITY TRENCH BACKFILL GUIDELINES

The following guidelines pertinent to utility trench backfills have been adopted by the County of Orange, Environmental Management Agency Grading Section, effective March 31, 1986. The application of the guidelines is typically enforced similarly in the County of San Diego.

1. Each utility subcontractor (gas, electric, water, sewer, telephone, cable TV, irrigation, drainage, etc.) shall submit to the developer for dissemination to his consultants (civil engineer, geotechnical engineer, and utility contractor) a plot plan of utility lines installed under his purview which identifies line type, material, size, depth, and approximate location.

2. The developer or his agent shall provide a composite plot plan of all utilities or a copy of all individual utility plot plans to his geotechnical engineer for use in evaluating whether all utility trench backfills are suitable for the intended use.

3. The geotechnical engineer shall provide the County with a report which includes a plot plan showing the location of all utility trenches which:

   A. Are located within the load influence zone of a structure (1:1 projection)

   B. Are located beneath any hardscape

   C. Are parallel and in close proximity to the top or toe of a slope and may adversely impact slope stability if improperly backfilled

   D. Are located on the face of a slope in a trench 18 or more inches in depth.

   Typically, trenches that are less than 18 inches in depth will not be within the load influence zone if located next to a structure, and will not have a significant effect on slope stability if constructed near the top or toe of a slope and need not be shown on the plot plan unless determined to be significant by the geotechnical engineer. This plot plan may be prepared by someone other than the soil engineer, but must meet his approval.

4. Backfill compaction test locations must be shown on the plot plan described in No. 3 above, and a table of test data provided in the geotechnical report.

5. The geotechnical report (utility trench backfill) must state that all utility trenches within the subject lots have been backfilled in a manner suitable for the intended use. This includes the backfill of all trenches shown on the plot plan described in No. 3 and the backfill of those trenches which did not need to be plotted on this plan.

Appendix D -
City of Encinitas Staff Advisory Meeting Notes

Staff Advisory Committee
Lilac Room
June 29, 2016
10:00 am

FINAL MEETING NOTES

Agenda	San Elijo Joint Powers Authority (SEJPA) Office Building
Location:	SEJPA Facility, 2695 Manchester Avenue (APN 261-010-13)
Zoning:	Public/Semi-Public, Scenic/Visual Corridor, Hillside/Inland Bluff, Coastal Zone (Appeal Jurisdiction)
Project Description:	New two-story office building for SEJPA
Roll Call Staff:	Scott Vurbeff- Planning, J. Dichoso- Planning, Hans Schmidt - Fire, Steve Nowak- Engineering, Jesse Owens- Engineering and Masih Maher- Engineering, Blair Knoll – SDWD, Nestor Mangohig – Traffic Engineering
Applicant/ Representatives:	Mike Thornton, Mike Konicke, Joe Mansfield
Project Briefing:	A new two-story, approximately 12,000-square foot building is proposed to be built on the lawn towards the front of the facility near the existing gate. The proposed building would house administration staff. The building would be built in two 6,000 square foot phases. Permitting process, drainage, access and parking was discussed.

Points of Discussion:

1. Planning Department

    a. The project requires a Design Review Permit and Coastal Development Permit. The project will require approval from the Planning Commission at a public hearing. The project will include a 15-day appeal period for the City of Encinitas and a subsequent 10-day appeal period because the property lies within the Coastal Commission Appeal Jurisdiction of the Coastal Zone.
    b. A Citizen Participation Program (CPP) and a public notice are required. For any questions regarding the CPP process please contact Maria Gremban at 760-633-2684 or mgremban@encinitasca.gov
    c. All required parking is to be onsite. The applicant will need to comply with all parking standards in Chapter 30.54 (Off-Street Parking) of the Municipal Code.
    d. The applicant should review the Design Review Guidelines and ensure four-sided architecture is proposed that is blended with the surrounding community and meets other Design Review Guidelines.
    e. The applicant shall design the landscape plan as per the State Landscape Model Ordinance and Chapter 23.26 (Landscape Water Efficient Guidelines) of the Municipal Code.

2. Engineering Department

    a. A preliminary grading plan shall be submitted with the discretionary application to evaluate the existing and proposed conditions on-site.

b. Frontage improvements could be required along Manchester Avenue pending CalTrans improvements.
c. Post construction BMPs shall be shown on the discretionary plans for new and/or removed and replaced impervious surfaces. Based upon the ultimate design this will likely be considered a priority stormwater project and will be required to comply with all hydromodification standards.
d. The applicant shall have a licensed civil engineer evaluate the drainage and proposed BMP conditions for the improvements.
e. Sewer capacity fees could be required for the project.
f. Traffic mitigation fees will be determined based upon the net new trips generated.
g. A soils report shall be submitted with the discretionary application including results of percolation testing and groundwater elevation.
h. All utility service lines shall be constructed underground for the new facility.
i. The applicant should look into existing and upcoming FEMA maps and elevations.

3. Fire Department

a. A minimum 24-foot width for all access roads.
b. Knox switches on all electric gates.
c. Fire sprinklers required in the new buildings.
d. No fire sprinklers required in the 1600 square feet for U occupancy metal building.
e. Additional hydrants will be required.

4. San Dieguito Water District

a. A new water main would be required to service the front portion of the site with new fire hydrants and a fire sprinkler system. That new main would connect to the 12-inch main in Manchester. The District will need to perform a hydraulic analysis to size the system. The new main would be limited to serve the new administration building and not extend to the plant operations area.

5. Traffic Engineering

a. Provide a breakdown of demolished, new, and net square footage.
b. Provide trip generation estimate based on square footage.
c. Provide a narrative detailing anticipated employee levels (SEJPA indicated employee levels will remain the same with expansion or potentially decrease).

Next Steps:

- Staff recommends that the applicant consult with any departments regarding additional requirements, schedule an appointment for an additional SAC meeting or submit a discretionary permit, by appointment, if applicable.

Note: The primary purpose of SAC is to assist the applicant and identify/resolve issues. Additional issues may be raised through a detailed review of the project by each department. In addition, information presented to SAC may be preliminary and could change, which may modify a department's comments.

STAFF ADVISORY COMMITTEE
ATTENDANCE SHEET

Poinsettia Room **Date:** JUNE 29, 2016
Meeting Title: SEJPA BUILDING IMPROVEMENT PROGRAM **Time:** 10AM
Project Location: LILAC

Name: (Please Print)	City Dept./Company:	Phone #:	Email Address:
☐ Manjeet Ranu	Planning	760.633.2712	mranu@encinitasca.gov
☐ Anita Pupping	Fire Prevention	760.633.2821	apupping@encinitasca.gov
☐ Kerri Berberet	Fire Prevention	760.943.2229	kberberet@encinitasca.gov
☐ Diane Langager	Advanced Planning	760.633.2714	dlangag@encinitasca.gov
☐ Kerry Kusiak	Planning	760.633.2719	kkusiak@encinitasca.gov
☐ Roy Sapa'u	Planning	760.633.2734	rsapau@encinitasca.gov
☒ Scott Vurbeff	Planning/Environmental	760.633.2692	svurbeff@encinitasca.gov
☐ Todd Mierau	Planning	760.633.2693	tmierau@encinitasca.gov
☒ Hans Schmidt	Fire Prevention	760.633.2823	hschmidt@encinitasca.gov
☐ Aaron Goodman	Building	760.633.2731	mbeauchamp@encinitasca.gov
☒ Masih Maher	Engineering	760.633.2776	mmaher@encinitasca.gov
☒ Steven Nowak	Engineering	760.633.2867	snowak@encinitasca.gov
☒ Nestor Mangohig	Traffic Engineering	760.943.2298	nmangoh@encinitasca.gov
☐ Rob Blough	Traffic Engineering	760.633.2705	rblough@encinitasca.gov
☒ Blair Knoll	SDWD	760.633.2862	bknoll@encinitasca.gov
☐ Andrew Maynard	Planning	760.633.2718	amaynard@encinitasca.gov
☒ J. Dichoso	Planning	760.633-2681	jdichoso@encinitasca.gov
☐ Christina Olson	SDWD	760-633-2792	colson@encinitasca.gov
☐ Jesse Owens	Engineering	760-633-2780	jowens@encinitasca.gov
☐ JOE MANSFIELD	RNT ARCH.	619.233.1023	mansfield@rntarchitects.com
☐ MIKE KONICKE	SEJPA	760.710.9880	konickem@sejpa.org
☐ MIKE THORNTON	SEJPA	760.801.0497	thornton@sejpa.org
☐			
☐			

Turn over for more spaces →

Appendix E -
SEJPA Staff Report Dated September 12, 2016

AGENDA ITEM NO. 15

SAN ELIJO JOINT POWERS AUTHORITY
MEMORANDUM

September 12, 2016

TO: Board of Directors
San Elijo Joint Powers Authority

FROM: General Manager

SUBJECT: BUILDING IMPROVEMENT PROGRAM

RECOMMENDATION

It is recommended that the Board of Directors:

1. Approve building alternative selection;
2. Authorize General Manager to request Proposals for Building Final Design; and
3. Discuss and take action as appropriate.

BACKGROUND

In 2015, the San Elijo Joint Powers Authority (SEJPA) completed a detailed assessment of the equipment, buildings, and capital assets at the San Elijo Water Reclamation Facility. These findings were documented in the 2015 Facility Plan, which provided recommendations for capital projects over the next 10 years.

The Facility Plan identified significant deficiencies with the Administration and Operations buildings, which included seismic, fire suppression, ADA access, and other code issues. In addition, both buildings are nearing the end of useful life and lack necessary workspace for the current workforce.

The SEJPA initiated a Building Improvement Program to develop options to replace or modernize the existing buildings. Staff retained the services of RNT Architects to develop a Building Needs Assessment to evaluate existing facilities against current standards, identify site constraints, and assess workspace requirements.

Working with RNT Architects, Staff prepared a Building Alternatives Analysis to identify and examine potential building alternatives that would meet SEJPA building needs. As a result of the initial evaluation it was determined that the optimal building location is at the site entrance, which improves access control, site security, and delineates public and restricted areas. Staff presented the draft Building Improvement Program report at the September and December 2015 Board meetings. The Board provided the following comments:

- Develop a project that is financially responsible
- Focus on immediate needs with consideration for future demands
- Minimize building size and cost where feasible to provide the best value
- Provide adaptability to future conditions
- Evaluate consolidation opportunities with the Encina Wastewater Authority (EWA)

Board comments were incorporated into the revised report and building options were revisited to ensure the appropriate size and scale of the project. After evaluating multiple building options, three were identified that most cost effectively address building needs. The three building options included:

Option	Description
Alternative 1:	Construct new combined Administration and Operations building; demolish existing Operations building and build Pre-engineered Maintenance Shop.
Alternative 2:	Construct new Administration building; renovate existing Operations building.
Alternative 3:	Consolidate administrative and laboratory functions with EWA, construct new Operations building.

Note: All options include the elimination of existing administration trailer.

Alternative 3, which consolidated administrative and laboratory functions with EWA, was considered at a special meeting with SEJPA and EWA on July 12, 2016 and did not receive approval to proceed. Therefore, Staff proceeded with the evaluation of Alternatives 1 and 2.

DISCUSSION

In order to determine the preferred alternative, Staff evaluated each option using the following criteria:

- Cost to construct (permits, design, and construction)
- Risk reduction
- Adaptability to meet future needs
- Compatibility with community and North Coast Corridor projects

Evaluation of Cost to Construct
At the current level of detail, the cost difference between the Alternative 1 and 2 is approximately $100,000, on an estimated construction cost of $7.4 million. The cost estimates are considered American Association of Cost Estimators (AACE) Class 4 estimates for conceptual design with an accuracy range of -30% to +50%. Based on this level of accuracy, the cost estimates of Alternative 1 and 2 are considered roughly equivalent. Therefore, it is Staff's conclusion that Cost to Construct is not a differentiator between the alternatives.

Evaluation of Risk Reduction
While both alternatives meet immediate needs, eliminate current deficiencies, and provide adaptability at a similar size and cost, the evaluation for Risk Reduction favors Alternative 1. The reasons are as follows:

- New facility construction; no remodel or refurbishing of existing buildings
    - Lower construction risk associated with new construction as compared to building remodeling
    - Reduced design and construction restraints
- Less disruption to staff and risk of operational upset during construction
    - Allows existing building to be used while new building is constructed
    - Reduces the need of temporary facilities
    - Eliminates the need of a temporary laboratory and control room
- Co-location of staff within a single building; improves security and increased functional efficiency

Adaptability to Meet Future Needs
Alternative 1 appears to provide the highest adaptability to meet future needs as it incorporates construction methods that will minimize bearing walls and allow for greater flexibility for future tenant improvements. Furthermore, Alternative 1 eliminates the existing operations building, which will improve workspace and driveway access near the preliminary treatment portion of the facility, providing more flexibility for future treatment.

Compatibility with Community and North Coast Corridor Projects
Both alternatives are compatible with the proposed regional bike path, Manchester roundabout, and overflow parking needs of the San Elijo Nature Center. The alternatives are also rated equal in providing an open entrance while addressing the need to create delineation between public and restricted access areas. Alternative 1 ranks slightly higher for facilitating public tours, as the operation control room and laboratory are located within a single building at the front of the facility. Alternative 2 provides the administration and engineering at the front of the facility and the operations and laboratory at the rear of the facility.

Conclusion
Staff's recommendation is to proceed with Alternative 1; construction of a single building located near the SEWRF site entrance that co-locates Administration, Operations, and Laboratory functions. The estimated size of the proposed building is 11,500 sf. In addition, the existing Operations Building will be demolished and replaced with a 1,600 sf pre-engineered shop building. The proposed alternative:

- Addresses seismic, fire, and ADA compliance issues
- Improves site security by siting administration building near facility entrance
- Reduces health and safety risks associated with overhead power lines
- Creates barriers to restrict unauthorized entries into the facility
- Increases operational efficiency with all staff located within one building
- Provides for public overflow parking for the lagoon nature center
- Creates improved public access
- Provides flexibility and adaptability for future processes and staffing needs
- Estimated cost: $7.4 Million

Staff is seeking Board concurrence on the Building alternative selection. Upon approval of the preferred alternative, Staff will direct RNT Architects to complete the preliminary design. Staff has completed the California Environmental Quality Act (CEQA) documentation for the project, which was broad enough to include both proposed alternatives. However, the Major Use Permit issued by the City of Encinitas and the Coastal Development Permit will require a selected building alternative and fully developed project design.

Staff anticipates developing and advertising a Request for Proposal (RFP) for the final design of the building within the next 60 days. The final design will include architectural renderings and contract documents including the drawings and specifications necessary to bid and construct the project. The selection of the architecture firm will be based on qualifications, experience designing similar facilities, project understanding, and value based approach. The highest rated proposal will then be presented to the SEJPA Board for approval consideration. Generally, the cost of final design is approximately 7% of the estimated construction cost, which for this project would be on the order of $430,000.

Figure 1. Conceptual plan of the new Operations and Administration building located at the entrance to the San Elijo Water Reclamation Facility (Alternative 1).

FINANCIAL IMPACT

Based on current conceptual budgets, the estimated construction cost of Building Alternative 1 is $7.4 Million (which includes design fees). The SEJPA has collected $565,000 of capital funding for project permitting and design. The agency has committed $81,488 to date for architectural and environmental professional services. The remaining project costs are proposed to be financed either through a State Revolving Fund (SRF) loan or tax-free municipal bonds. Current sewer rates of the SEJPA member agencies account for this planned future cost and therefore this project will not impact future sewer rate increases.

It is recommended that the Board of Directors:

1. Approve building alternative Selection;

2. Authorize General Manager to request Proposals for Building Final Design; and

3. Discuss and take action as appropriate.

Respectfully submitted,

Michael T. Thornton, P.E.
General Manager