UC San Diego

Viterbi Family Vision Research Center and East Campus Loop Road Projects
UC San Diego Project Number/Job Number: 5301 and 5548

Addendum No. 10 to the Program Environmental Impact Report for the University of California San Diego, 2018 Long Range Development Plan, La Jolla Campus

Prepared by:

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1 INTRODUCTION

1.1 PROJECT SUMMARY

The following Project is addressed in this Addendum for consistency with the 2018 Long Range Development Plan (LRDP) for the UC San Diego La Jolla Campus and the certified Program Environmental Impact Report (EIR) assessing the environmental impacts of implementing the plan (SCH No. 2016111019).

Project name:	Viterbi Family Vision Research Center and East Campus Loop Road
Project location:	University of California, San Diego
Lead agency's name and address:	The Regents of the University of California 1111 Franklin Street Oakland, CA 94607
Contact person:	Lauren Lievers, Principal Environmental Planner UC San Diego Campus Planning Office
Project sponsor's name and address:	UC San Diego 9500 Gilman Drive, MC 0074 La Jolla, California 92093-0074
Location of administrative record:	UC San Diego Campus Planning Office 10280 North Torrey Pines Road, Suite 460 La Jolla, CA 92093
Previously Certified 2018 LRDP Program EIR:	The 2018 LRDP is a comprehensive land use plan that guides physical development on campus to accommodate projected population increases and new program initiatives. The 2018 LRDP and its EIR are available at the following locations: • UC San Diego Campus Planning Office in Torrey Pines Center South, Suite 460, 10280 North Torrey Pines Road, La Jolla, CA. • Online at: https://plandesignbuild.ucsd.edu/planning/lrdp/la-jolla.html#Environmental-Impact-Report

1.2 PURPOSE OF CONSISTENCY REVIEW

This document evaluates whether the Viterbi Family Vision Research Center Project and the East Campus Loop Road Project (the "Projects") are consistent with the programmed growth identified in the 2018 LRDP and within the scope of activities covered in the environmental impact evaluation in the 2018 LRDP EIR. This document will also serve as an Addendum to the 2018 LRDP EIR.

The 2018 LRDP is a comprehensive land use plan that guides physical development on campus to accommodate projected population increases and expanded and new program initiatives (UC San Diego 2018a). The 2018 LRDP EIR was prepared in accordance with §15168 of the California Environmental Quality Act (CEQA) Guidelines and Public Resources Code §21094 and analyzed the environmental impacts of the 2018 LRDP (UC San Diego 2018b). The 2018 LRDP EIR (Volume I) analyzes full implementation of uses and physical development proposed under the 2018 LRDP and identifies measures to mitigate the significant adverse direct and cumulative impacts associated with that growth.

This Addendum documents whether or not the site-specific development proposed by the Projects are consistent with the objectives, land use plans and development and population forecasts contained in the 2018 LRDP and is covered by the 2018 LRDP EIR pursuant to §15168(c) of the State CEQA Guidelines, which states, "subsequent activities in the program must be examined in the light of the program EIR to determine whether an additional environmental document must be prepared." Pursuant to §15168(c)(4), an agency should use "…a written checklist or similar device to document the evaluation of the site and the activity to determine whether the environmental effects of the operation were covered in the program EIR." This Addendum also documents that none of the conditions described in CEQA Guidelines Section 15162 calling for the preparation of a subsequent EIR have occurred and an addendum to the 2018 LRDP EIR may be prepared (per CEQA Guidelines Section 15164).

1.3 CEQA DETERMINATION

UC San Diego previously prepared the 2018 LRDP EIR and on the basis of this evaluation and pursuant to the State CEQA Guidelines:

☒ I find that the Project WOULD NOT have new significant effects on the environment that have not already been addressed by the 2018 LRDP EIR, no substantial changes have occurred with respect to the circumstances under which the Project will be undertaken, and no new information of substantial importance to the Project has been identified. However, minor technical changes or additions are necessary, and in accordance with §15164 of the State CEQA Guidelines, an ADDENDUM has been prepared.

☐ I find that although the Project WOULD have one or more new significant effects on the environment, there will not be a significant effect in this case because new project-specific mitigation measures have been identified that would reduce the effects to a less than significant level. In accordance with §15162 of the State CEQA Guidelines, a TIERED MITIGATED NEGATIVE DECLARATION has been prepared.

☐ I find that the Project MAY have a new significant effect on the environment that was not adequately addressed in the previous EIR or a significant effect previously examined will be substantially more severe than shown in the previous EIR, and there may not be feasible mitigation which would reduce the new significant effect to a less than significant level. In accordance with §15162 of the State CEQA Guidelines, a TIERED ENVIRONMENTAL IMPACT REPORT is required.

Lauren Lievers	October 27, 2022
Signature of Project Sponsor	Date

2 PROJECT DESCRIPTION

2.1 REGIONAL LOCATION AND SETTING

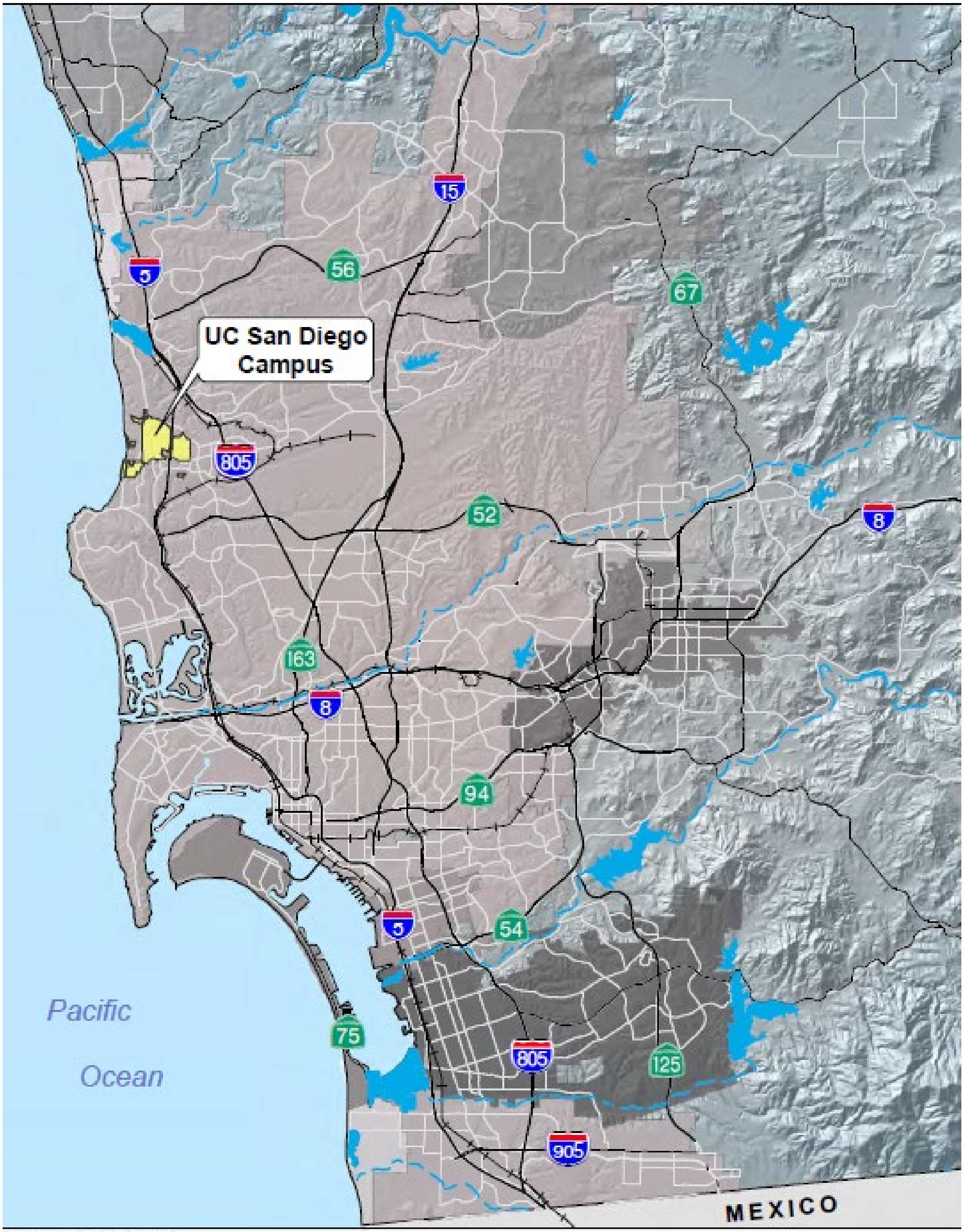
The UC San Diego La Jolla campus is located adjacent to the communities of La Jolla and University City, within the northwest portion of the City of San Diego (see Figure 2-1 of the 2018 LRDP EIR). UC San Diego's campus is generally composed of three distinct, but contiguous, geographical areas: the Scripps Institution of Oceanography (SIO) portion of the campus (178.7 acres), the western area of the campus (West Campus, 634.8 acres), and the eastern area of the campus (East Campus, 265.7 acres). The East and West Campuses are bisected by Interstate 5 [I-5]. The La Jolla del Sol housing complex (12 acres) is located southeast of these larger geographical areas and not contiguous to the campus. Refer to Section 2.2 of the 2018 LRDP EIR for additional description on each of the campus areas. Also included in the 2018 LRDP are the beach properties, consisting of the Audrey Geisel House and an adjacent coastal canyon and beachfront parcel (25.8 acres), and the Torrey Pines Gliderport, Torrey Pines Center and Torrey Pines Court (41.0 acres). The 2018 LRDP addresses campus properties that encompass a total of 1,158 acres in La Jolla, California (see Figure 2-2 of the 2018 LRDP EIR).

2.2 PROJECT SITE AND SETTING

The Projects are located within the East Campus in the Health Sciences East Neighborhood. (See Figure 1, *R*egional Location, and Figure 2, Campus Location). The Viterbi Family Vision Research Center (VFVRC) site is approximately 2 acres containing paved surface parking (parking lot P751) and adjacent landscape/hardscape areas located just off of Campus Point Drive and adjacent to the existing Shiley Eye Institute. The site's eastern edge faces the Shiley Eye Institute, Ratner Children's Eye Center, and Hamilton Glaucoma and Jacobs Retina Center; its southern edge shares Health Sciences Walk with Moores Cancer Center and Koman Outpatient Pavilion. The west site of the site faces existing surface parking and the main drop off for visitors to Jacobs Medical Center via Thornton Pavilion. An existing fire access lane, coupled with underground utilities along the eastern edge of the site, will require a "building free" zone of approximately 75 feet between Ratner Children's Eye Center and the Project. (See Figure 3, VFVRC Project Vicinity).

The Project also includes the East Campus Loop Road (ECLR) Project, which involves the rerouting of Medical Center Drive North and Health Sciences Drive to improve arrival experience to the medical facilities. The road realignments would better connect Campus Point Drive to Regents Road via Health Sciences Drive, and connect the Gilman Bridge to Regents Road via Medical Center Drive (previously Medical Center Drive South).

Figure 2-1: Regional Location



Source: Esri; SanGIS; SANDAG

Figure 2-2: Campus Location

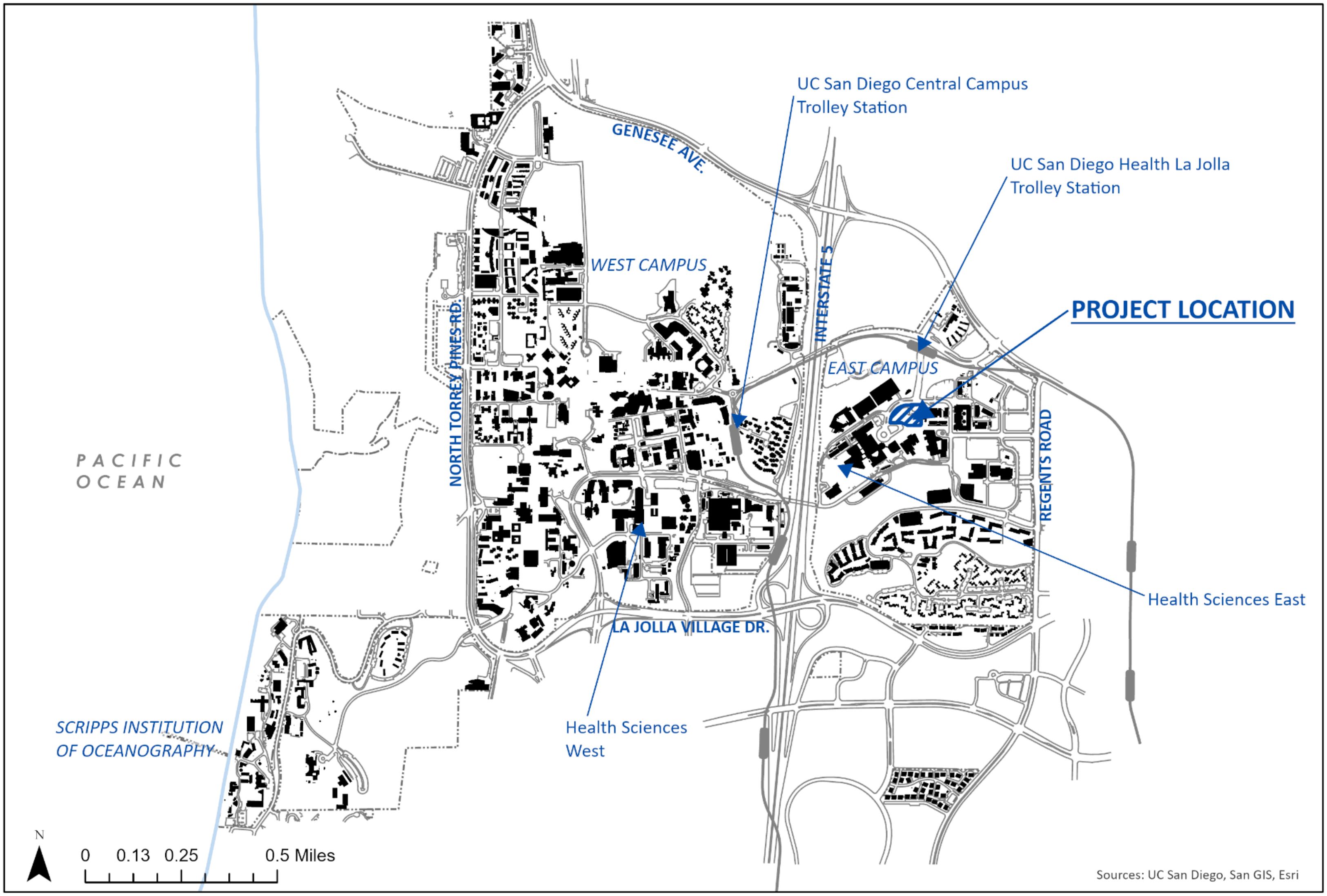
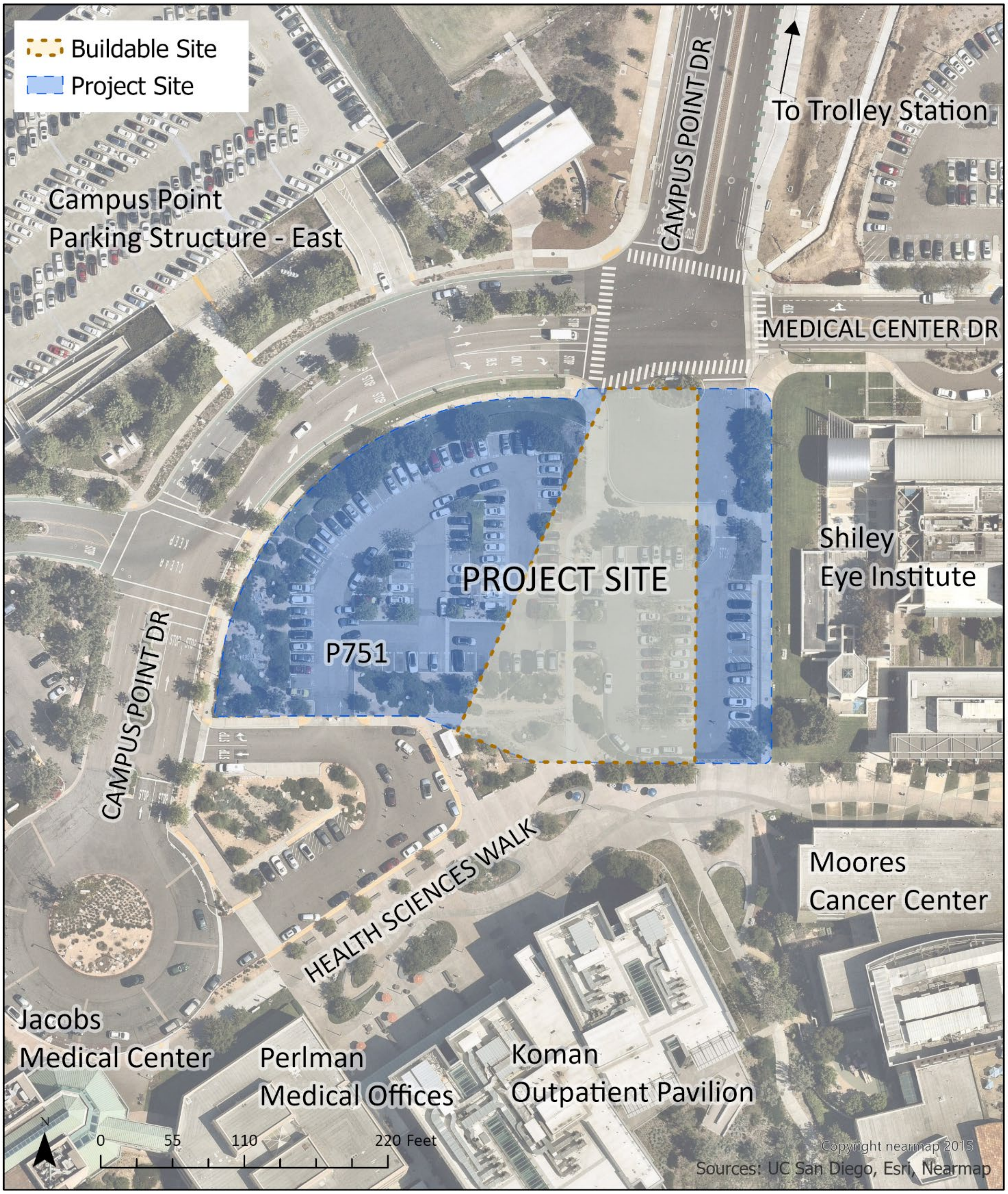


Figure 2-3: VFVRC Project Vicinity



2.3 PROJECT BACKGROUND

UC San Diego Health Sciences (Health Sciences) has one mission: to deliver outstanding patient care through commitment to the community, groundbreaking research, and inspired teaching. This is accomplished through translational research and interdisciplinary collaboration that creates an educational and research environment vibrant with the excitement of exploration and invention, all of which underscores compassionate, leading-edge patient care. Health Sciences celebrated its 50-year anniversary in 2018 and encompasses:

1. UC San Diego Health, the San Diego region's only academic health system

2. UC San Diego School of Medicine, one of the nation's top research-intensive medical schools

3. Skaggs School of Pharmacy and Pharmaceutical Sciences, Southern California's first public school of pharmacy

4. Herbert Wertheim School of Public Health and Human Longevity Science, established in 2019

Philanthropy served as the catalyst for the proposed VFVRC Project when the campus received a programmatic gift for the Department of Ophthalmology from the Viterbi family in 2018. The gift named the Viterbi Family Department of Ophthalmology and would name the proposed Viterbi Family Vision Research Center. The endowed funds create a sustainable model to support overall program costs, supporting new endowed faculty chairs and enabling faculty research, clinical practice, and dedication to education with sustained support.

The Viterbi Family Department of Ophthalmology, located at the existing Shiley Eye Institute, is the only academic eye center in the San Diego region. It offers the most advanced treatments across all areas of eye care. Research is at the forefront of developing new methods for the diagnosis and treatments of eye diseases and disorders. Between the growing clinical practice and the expansion of the research program, supported by the Viterbi family gift, the campus has outgrown existing space at the existing Shiley Eye Institute.

The proposed VFVRC would provide additional space for research on various ophthalmologic diseases as well as expand interdisciplinary collaborations across campus and the San Diego community to accelerate the pace of discovery and innovation for vision research. Research space in the proposed Project would build off of the existing program, focusing on curing glaucoma blindness, restoring vision of those blinded by retinal degeneration, and providing sight to individuals who have reversible vision loss due to cataracts or infections, among other vision research.

The ECLR Project includes the realignment of Medical Center Drive North, Health Sciences Drive, Medical Center Drive, and associated roadway improvements that would improve the arrival experience to the existing medical facilities as well as the proposed Viterbi Family Vision Research Center. The new loop road will be the main access for the East Campus, as called for in the Health Sciences East Neighborhood Study. The road improvements will improve wayfinding, in particular for patients, visitors, and emergency vehicles, from both the Genesee Avenue/I-5 and Regents Road/I-805 access points. The proposed Viterbi Family Vision Research Center and roadway improvements are two separate projects in terms of capital and approval processes; however, they are considered together in this Addendum due to their proximate location and overlap in construction phasing. In this Addendum, the two projects are often collectively referred to as the “Projects”, for discussion purposes, but where necessary are referred to separately as the VFVRC Project and ECLR Project.

2.4 PROJECT OBJECTIVES

The key objectives for the proposed VFVRC Project are as follows:

- Provide space for six new endowed chairs of the Viterbi Family Department of Ophthalmology and their programs
- Consolidate and provide dedicated space to bring together research groups that are currently housed in different locations
- Contribute to the concept of a cohesive health sciences neighborhood
- Efficiently utilize space and land resources by redeveloping a surface parking lot area
- Provide relief to the existing Shiley Eye Institute, which has reached maximum space capacity, as well as space that would support various programs that contribute to the campus’s community service mission

The key objective for the proposed ECLR Project is:

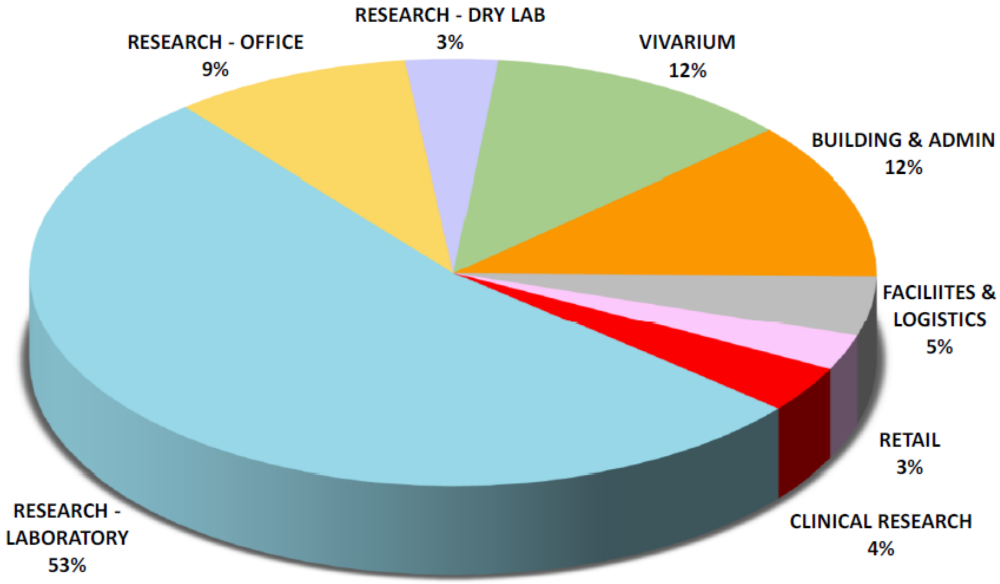
- Improve vehicular circulation and visitor/patient arrival experience within the East Campus by providing a more efficient and direct path of travel via an internal loop road
- Provide improved hospital access for emergency vehicles

2.5 PROJECT FEATURES

2.5.1 VFVRC Building Program and Design

The proposed VFVRC would house primarily research laboratory spaces. The new facility would be approximately 100,000 gross square feet (gsf). The majority of the building would be dedicated to research laboratory program uses, along with research office, vivarium, building and administrative, clinical research, facilities and logistics, and retail uses. The expected breakdown of building space allocated to each program type is shown below in Figure 2-4.

Figure 2-4 Program Space Allocations



The building would be five stories with no basement, reaching approximately 90 feet tall. The ground floor would house a loading area, utility and equipment rooms, conferencing/meeting spaces, a clinical trial space, main lobby and a café. The second level would house the vivarium, dry lab, and administrative offices. Levels 3, 4 and 5 would have similar layouts of open laboratory benches and offices. The building would sit atop an urban, triangular-shaped site. Along the east side is an existing fire lane and underground utility corridor that would remain in place. Along the south is Health Sciences Walk, and along the west is a proposed pedestrian walk and surface parking lot.

See Figure 2-5, Site Plan, and Figure 2-6, Building Elevations, for an aerial view of project features and building orientation. The building would be composed of two wings, one long rectilinear laboratory bar, sited diagonally along the west, and a smaller pavilion office building along the eastern side. They would be connected via shared lobbies and corridors to make one building. The building's shape would create a public-facing courtyard which connects to Shiley Eye Institute. The architectural design includes white terracotta and double-glazed insulated glass facades. Mechanical equipment (e.g., air handlers/air conditioning equipment, exhaust fans, heat pumps, vacuum and compressed air equipment) located on the roof would be screened from view with perforated metal screening.

2.5.2 ECLR Improvements

The ECLR Project includes improvements to Medical Center Drive and Health Sciences Drive. The road realignments would better connect Campus Point Drive to Regents Road via Health Sciences Drive, and connect the Gilman Bridge to Regents Road via Medical Center Drive (previously Medical Center Drive South). This new loop road alignment would improve wayfinding, circulation, and access on East Campus. The existing campus entry at Health Sciences Drive and Regents Road currently requires motorists, particularly UC San Diego Health patients, to navigate several intersections on their way towards patient care facilities. The improved road would create a more direct and intuitive path of travel, as well as reduced travel times, to patient-centered facilities such as the Jacobs Medical Center. The proposed road realignments would also simplify patient and visitor wayfinding by strengthening a singular, flowing path towards the hospital and clinical services while also reducing decision points. In addition, a new, more direct, road connection across existing parking lot P785 would allow service vehicles to continue directly towards the hospital, central utility plant, and clinical loading docks to the south.

The ECLR would encompass the eastern segments of Medical Center Drive and its existing intersections with Campus Point Drive, Health Sciences Drive, and Athena Circle. A roundabout will be installed at the intersection of Medical Center Drive with Athena Circle. Figure 2-7, East Campus Loop Road Site Plan, depicts the proposed road realignment features, which include:

- Health Sciences Drive realignment to north of Athena Parking Structure
- Medical Center Drive North & South realignments to intersect Health Sciences Drive
- Conversion of the existing Health Sciences Drive into a pedestrian and micromobility-friendly corridor, thus extending the Health Sciences Walk public realm spine to the east
- New interconnected traffic signals at all intersections within the Project that will communicate with each other to improve traffic flow and volumes, with the exception of a roundabout at the intersection of Medical Center Drive [South] and Athena Circle

The new roadways would provide vehicular traffic lanes in both directions and include Class II buffered bicycle lanes, sidewalks and landscaping. Key intersections would be signalized to manage traffic flows. The Athena Parking Structure has an existing vehicular access point at the northeast corner of the structure that is currently blocked with bollards. This access point would be opened once the existing access on the southeast corner is closed due to the conversion of Health Sciences Drive to “Health Sciences Walk”, a pedestrian and micromobility-only promenade.

Figure 2-5: VFVRC Site Plan

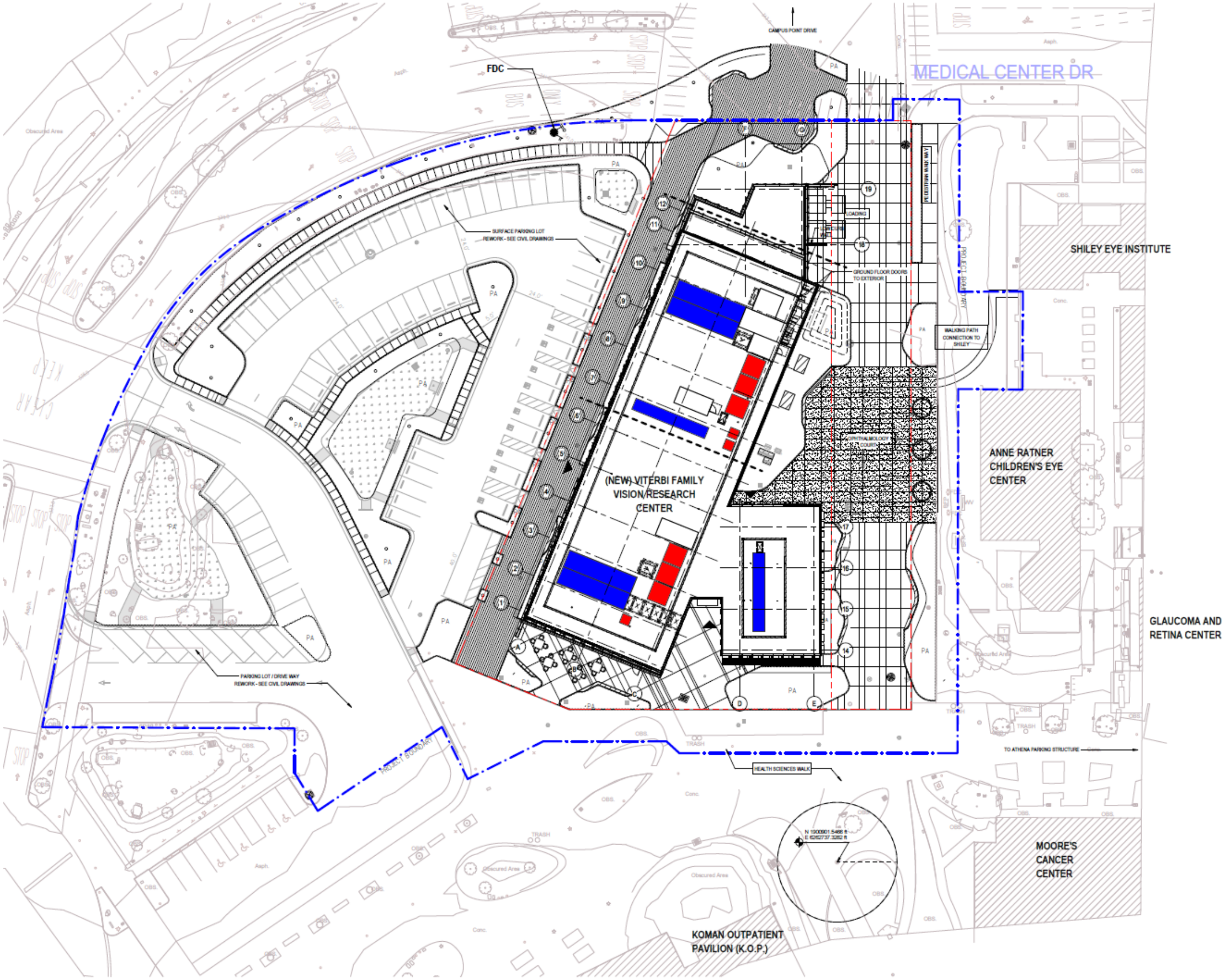


Figure 2-6: VFVRC Elevations

WEST ELEVATION

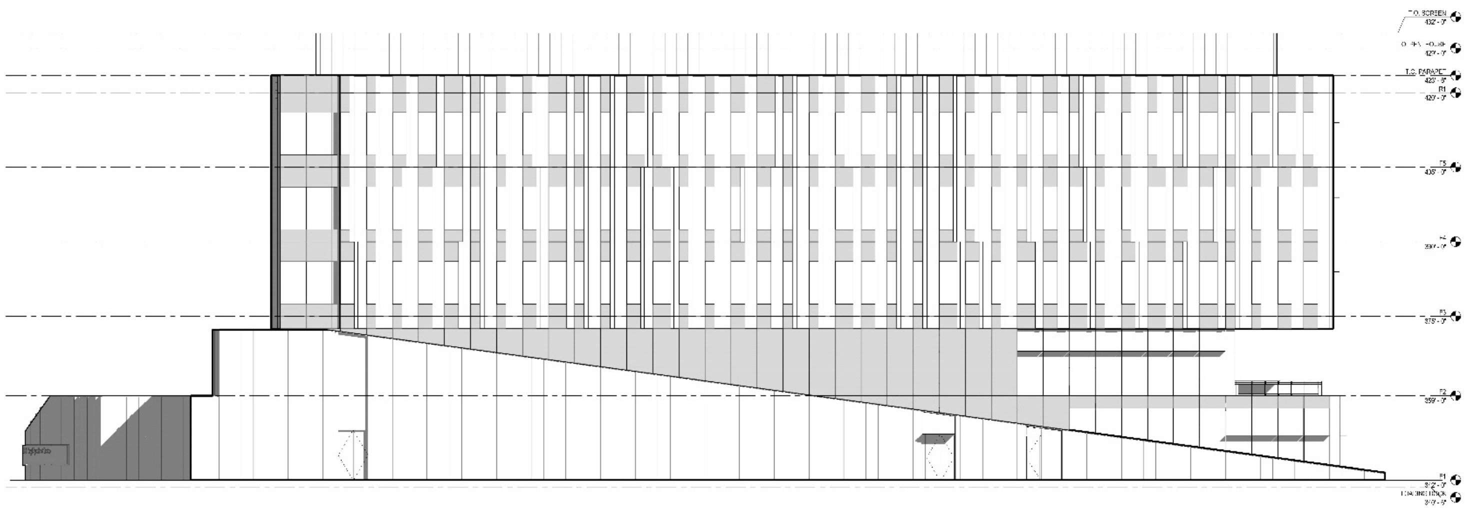


Figure 2-6: VFVRC Elevations (Continued)

SOUTH ELEVATION

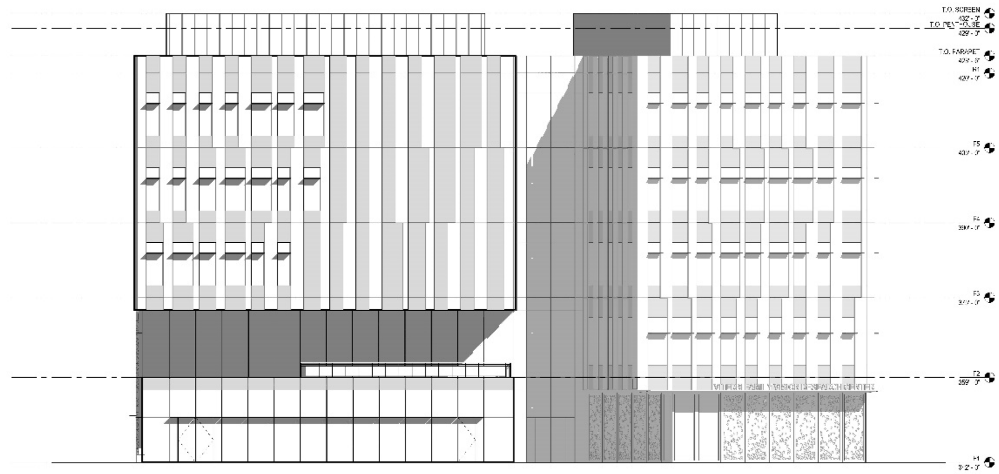


Figure 2-6: VFVRC Elevations (Continued)

EAST ELEVATION

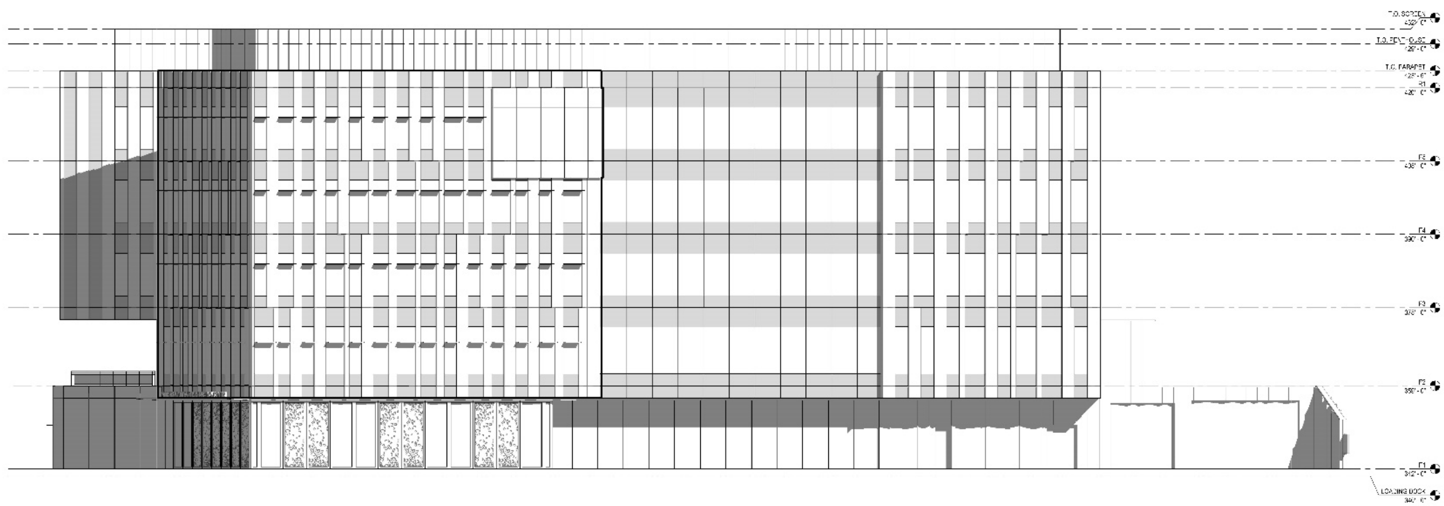


Figure 2-6: VFVRC Elevations (Continued)

NORTH ELEVATION

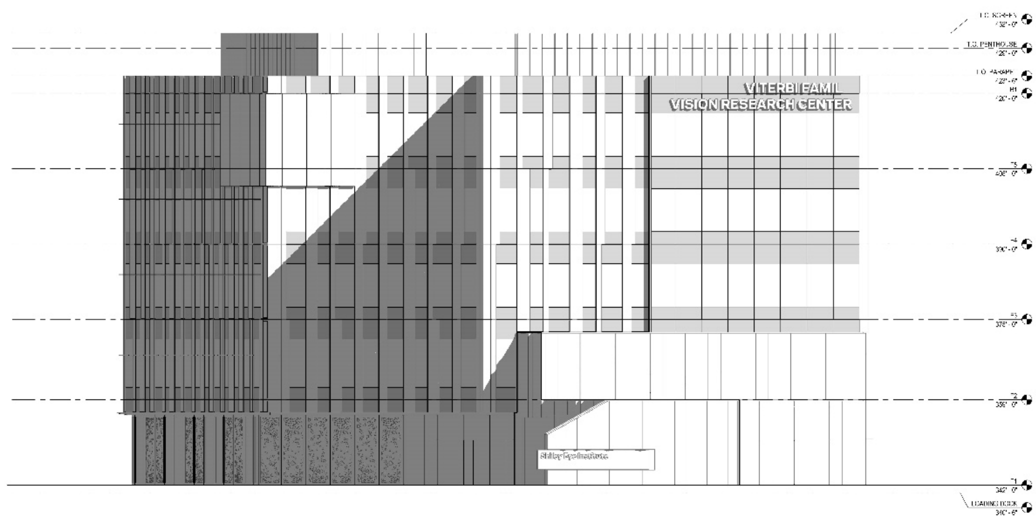
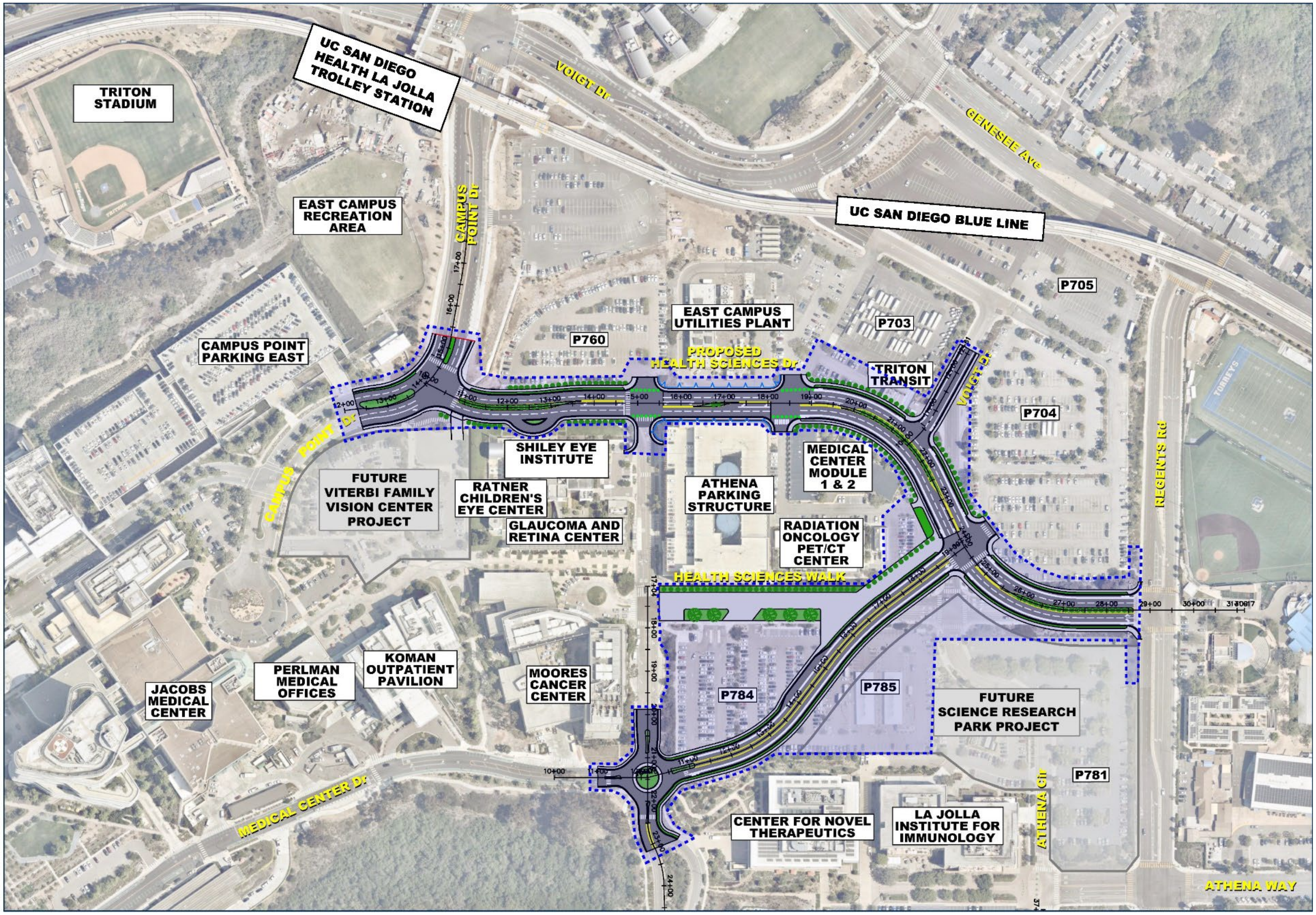


Figure 2-7: East Campus Loop Road Site Plan



2.5.3 Parking and Circulation

Vehicular access to the VFVRC building would be via Campus Point Drive; fire emergency access would also be available along the building's eastern edge, along the paved underground utility corridor. The existing parking lot to be demolished currently includes 122 parking spaces of which 113 are dedicated to valet service and 9 handicap accessible spaces. The newly reconfigured parking lot would include 75 spaces, including nine handicap accessible parking spaces. The majority of the parking spaces would be dedicated to maintaining valet service. Clinical trial visitor drop off would be accommodated in the proposed parking lot reconfiguration. The existing patient and visitor drop-off loop would be realigned to connect to the nearby intersection of Campus Point Drive and Medical Center Drive North.

Though there would be a decrease in total parking supply at the VFVRC site, there would be negligible loss in employee parking, as employee parking is assigned elsewhere on the East Campus and employee parking is not available at the existing parking lot under existing conditions (valet services are for the nearby heath facility visitors/patients). Building occupants which are primarily research employees would be parking in other dedicated employee parking areas or arriving via the nearby trolley station or alternative modes of transportation.

Approximately 500 parking spaces would be permanently displaced due to the new ECLR connection through parking lots P785, P784, P704, and P705 that would not be replaced as part of the proposed Project. The loss of surface parking due to targeted redevelopment was considered by the 2018 LRDP and is actively managed by the campus Transportation Services office on a campus-wide basis. Future implementation of the 2018 LRDP would continue to accommodate loss of parking through development of parking structures where appropriate. This project is also located in close proximity to the recently completed UC San Diego Blue Line Trolley extension with a station located just north of the project site at Campus Point Drive and Voigt Drive.

2.5.4 Utility and Service System Improvements

No major utility upgrades or off-site improvements are required to support the proposed VFVRC Project. An approximately 26-foot utility corridor exists along the eastern edge of the site, and the Project would maintain minimum development setbacks from this corridor. The VFVRC Project would connect to existing utilities, including existing storm drain, sanitary sewer, combined domestic/fire water, reclaimed water, chilled water and that have adequate capacity to serve the new building, as provided by NBBJ, the Architect/Lab Planning team (NBBJ 2022a). The Project would also connect to an existing 12 kV electrical conduit which distributes 100% clean electricity purchased through the UC Direct Access Program. Minor connection work within Medical Center Drive, immediately north of the VFVRC Project boundary, as well as minor rerouting and installation distribution lines would be conducted within the VFVRC Project work limits to ensure adequate clearance from the building and adequate pressure.

The ECLR would be installing new backbone utility infrastructure in the newly aligned streets, including water, recycled water, sewer and storm drain. These utilities would be sized in a manner to accommodate future connections of the East Campus Planning Study buildout. ECLR would also reroute existing utilities that may be in conflict with new and revised grades and alignments.

2.5.5 Landscape/Hardscape Improvements and Stormwater Management

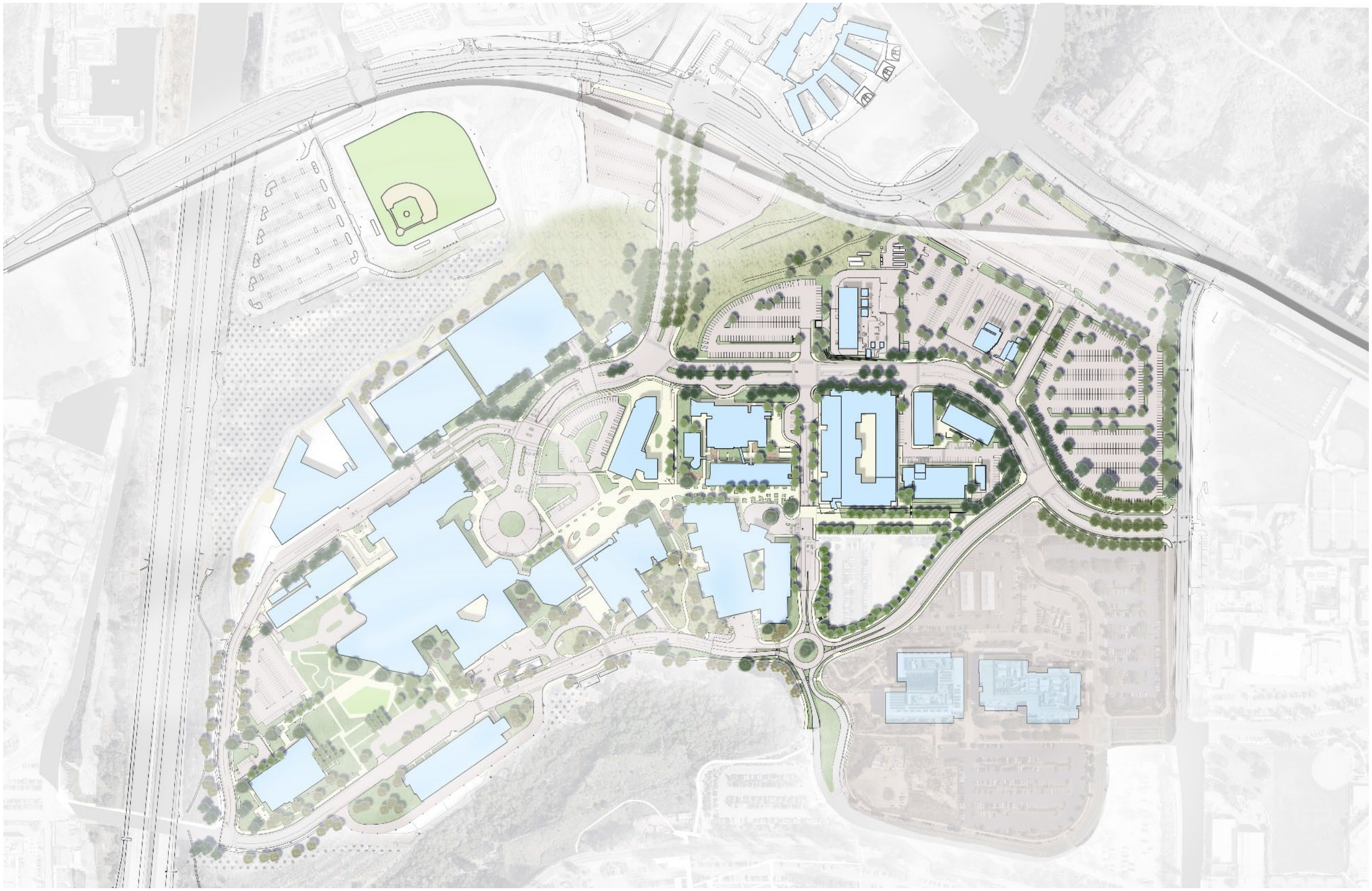
Key landscape and hardscape features for the VFVRC Project would include a tree-lined pedestrian promenade along the building's western façade. Pedestrian amenities would be located along this promenade. The new centralized median and adjacent areas would be landscaped and pedestrian access would include architectural paving. Tree selection would complement existing surrounding streetscape of the East Campus. Shrubs and trees would be selectively planted within the utility corridor located to the east of the VFVRC Project where possible to maintain clearance for utility maintenance and fire access. Potted trees and shrubs would be an alternative if in-ground locations are not feasible. Exterior tables, chairs and built-in seating options would further enhance the pedestrian experience surrounding the proposed VFVRC. All landscape would be irrigated using recycled water. See Figure 2-8, VFVRC Conceptual Landscape Plan, for a visual representation of planting locations.

The VFVRC would impact an existing bioretention basin located at the south-west corner of the building footprint, with a storage area of approximately 450 square feet. The proposed basins for the VFVRC Project would be increased to accommodate this impact. A preliminary calculation for the Project shows that the site requires a proposed stormwater treatment area of 3,900 square feet, which would be captured by new bioretention basins to be located in the central median of the reconfigured parking lot, in the landscape buffer at the north-west corner of the surface lot, and at the southeast corner of the site. All UC campuses are regulated under the Phase II Small MS4 General permit, and the UC San Diego campus is also regulated under the UC San Diego's Storm Water Management Program (SWMP). Stormwater management measures to be incorporated in the Project would be coordinated with UC San Diego Environmental Health & Safety (EH&S) and Capital Program Management (CPM).

Landscape/hardscape improvements associated with the ECLR Project include sidewalk and median plantings (shrubs and trees) consistent with existing palette used along roadways in the Health Sciences East Neighborhood as specified in the East Campus Planning Study. Storm water would be managed via onsite landscape features including vegetated swales and bioretention basins to ensure that there is no impact on the existing storm water infrastructure. All storm water capture and treatment features would be sized as appropriate so that post-construction flows are equal or less than existing. The ECLR Project would be regulated under UC San Diego's SWMP and all storm water management measures would be approved by UC San Diego EH&S and CPM to ensure compliance with the Phase II Small MS4 General permit is maintained. Refer to Section 2.5.6, Project Construction, for a discussion of construction phase storm water compliance.

Figure 2-8: VFVRC Conceptual Landscape Plan

Figure 2-9: ECLR Conceptual Landscape Plan



2.5.6 Project Construction

Construction of the VFVRC would begin in December 2022 and take approximately two years to complete. Construction of the ECLR would begin in early 2023 and be completed by the end of 2024. Vehicular, pedestrian/bicycle, and emergency access to all East Campus facilities would be maintained for the entirety of construction of both Projects.

Based on the VFVRC Project's geotechnical investigation report (Appendix A), for the proposed building, anticipated earthwork includes minor fills up to approximately two feet in thickness to achieve the proposed finished floor elevation. Other earthwork anticipated includes remedial grading, underground utility excavation and backfill, and subgrade preparation. Earthwork quantities for the VFVRC Project are anticipated to be no more than 5,000 cubic yards of export for the rough grade condition, and 4,000 cubic yards of import for finish grade condition. Expected construction equipment would include: excavator, grader, roller, dump truck, fork lift, tower crane, man lift, and other typical construction equipment.

During construction, the entirety of the VFVRC construction site would be closed off with construction fencing. The primary haul route for the VFVRC Project would be through Campus Point Drive to Genesee Avenue before accessing the Interstate 5 freeway (I-5). All construction materials staging for the VFVRC would be on site within the Project work boundaries. The VFVRC construction office trailer would be located off site in a portion of the existing surface parking lot P707, located at the intersection of Campus Point Drive and Voigt Drive, adjacent to the MTS Trolley's UC San Diego Health La Jolla Station. VFVRC contractor parking would be available in surface parking lot P705, located near the intersection of Genesee Avenue and Voigt Drive. Both of these surface lots are located proximate to the VFVRC Project site, at the northern edge of the East Campus.

The ECLR project would be constructed in segments and the entirety of the construction boundaries shown in Figure 2-6 would not be closed off at once. Access to all adjacent facilities would be maintained, with the exception that the existing modular structures adjacent to Athena Parking structure may need to be relocated or temporarily removed. Any personnel displaced from the modular structures would be temporarily housed in existing facilities elsewhere on campus until construction is completed. Expected construction equipment include: excavator, grader, dump truck, back hoe, roller, paver, fork lift, skid steer, and other typical construction equipment. The primary haul routes would be primarily through Health Sciences Drive to Regents Road before accessing La Jolla Village Drive ramp to the I-5 or through Campus Point Drive to the Genesee Avenue ramp to the I-5. The ECLR construction materials staging, construction office trailer, and contractor parking would be within the work limits shown on Figure 2-6, including surface parking lots P784 and P785 and/or on other surface park lots located on the East Campus.

Storm Water Pollution Prevention Plans (SWPPPs) containing appropriate construction site erosion and sedimentation control best management practices (BMPs) would be prepared and implemented at the beginning of the each of the two projects' construction phase and adapted regularly during construction to reflect current conditions in the field and the weather. The SWPPPs would outline BMPs to be actively implemented during construction of the proposed Project, including (but not limited to) good housekeeping; trash management; construction material and waste management; stockpile management; rinse or wash water management; spill prevention and response; vehicle and equipment storage and maintenance; non-storm water discharge management; tracking controls; run-on and runoff controls; erosion controls such as use of wattles, sediment controls; inlet protection; stabilization of construction entrances; coverage of materials storage areas; inspections; and use of concrete washout areas. Perimeter controls to prevent storm water pollution from exiting the construction site would be employed along the site's perimeter. The contractors would be responsible for implementing and monitoring the SWPPPs and maintaining BMPs.

2.5.7 Sustainability Features

The UC Sustainable Practices Policy covers nine areas of sustainable practices: green building, clean energy, climate protection, sustainable transportation, sustainable operations, recycling and waste management, environmentally preferable purchasing, sustainable foodservices, and sustainable water systems. The UC Sustainable Practices Policy establishes guidelines and includes climate change goals for all of the campus.

The VFVRC Project would comply with the UC Sustainable Practices Policy by implementing the following features:

- The Project would meet the requirements for LEED Silver at a minimum, with LEED Gold being the target.
- The building massing, orientation, and envelope would optimize passive strategies to reduce overall energy consumption related to thermal comfort, lighting, and ventilation (NBBJ, 2022a).
- All water and space heating would be electric (no natural gas combustion), utilizing air-source heat pumps.
- All electricity would be purchased 100% clean electricity from the UC Direct Access Program.
- Low-flow water fixtures would be installed. All landscape would be irrigated using recycled water and plant selection would be based on low water use.
- The building has been designed to optimize energy with a window-wall ratio of approximately 55 percent for minimizing envelop losses and to maximize daylight and views. Exterior shading and massing block the majority of direct sun on the south and west facades, providing an opportunity to downsize cooling capacity in south and west zones by up to 8 percent.
- Building design around a pedestrian promenade enhances the pedestrian experience and focuses pedestrian travel from the UC San Diego Health La Jolla Trolley Station to the main visitor entrances of the Health Sciences East Neighborhood.

The ECLR project would not construct any structures or new uses. However, it would contribute to the campus's sustainability efforts by installing new interconnected traffic signals at each of the new intersections, which improve traffic flow and reduce the time that vehicles are idling at intersections, thus reducing associated greenhouse gas emissions. Additionally, the project would install new Class II buffered bicycle lanes and pedestrian sidewalks along the length of the loop road. Irrigation of sidewalk and median plantings would use recycled water.

2.6 PROJECT APPROVAL/SCHEDULE

As a public agency principally responsible for approving or carrying out the Project, the University of California is considered the Lead Agency under CEQA. This Addendum to the 2018 LRDP EIR would be considered by The Regents at the time they consider approval of design of the proposed VFVRC. The proposed Project may be approved at The Regents discretion, and only if The Regents determine that such approval complies with CEQA. The proposed VFVRC is anticipated to be considered for approval by the Regents at their November 2022 hearing. The facility is anticipated to be constructed by the end of December 2024 and occupied first quarter of 2025.

Though evaluated together, the proposed East Campus Loop Road is a separate project from the VFVRC and approval of this portion of the Project is delegated by The Regents to the Chancellor. This Addendum to the 2018 LRDP EIR would also be considered at the time the Chancellor considers approval of design of the ECLR Project. The loop road and associated improvements are expected to be considered for approval late 2022, and completed by the end of 2024.

3 CONSISTENCY WITH 2018 LRDP

To determine whether the Projects are covered by the 2018 LRDP and 2018 LRDP EIR, the following questions must be answered:

- Are the objectives of the Project consistent with the objectives adopted for the 2018 LRDP?
- Are the changes to campus population associated with the Project included within the scope of the 2018 LRDP's population projections?
- Is the proposed location of the Project in an area designated for this type of use in the 2018 LRDP?
- Is the Project included in the amount of the development projected in the 2018 LRDP?
- Are the Project activities within the scope of the environmental analysis in the 2018 LRDP EIR?
- Have the conditions described in State CEQA Guidelines Section 15162 calling for the preparation of a subsequent EIR occurred?

Sections 3.1 through 3.4 document the Projects' consistency with the objectives, population projections, land use designations, and development projections contained in the 2018 LRDP.

Section 4 contains a detailed examination of environmental topics with the potential for significant impacts addressed in the 2018 LRDP EIR and documents whether or not the Projects are consistent with and within the scope of the environmental impact analysis of the 2018 LRDP EIR.

3.1 2018 LRDP OBJECTIVES

Key objectives of the 2018 LRDP, as outlined in the plan, include accommodate projected growth by expanding both academic and non-academic programs in support of the UC mission; establish two new undergraduate colleges; locate buildings in accordance with the established character, scale and design; co-locate and strengthen campus programs; activate and enliven the campus through mixed-use and transit-oriented development; redevelop the University Center into a town center; house approximately 65 percent of eligible students; provide faculty/staff affordable housing options; expand and enhance facilities for UC Health; expand multi-modal connections and trip reduction programs; implement sustainable development practices; and be responsible stewards for the campus open space systems.

The Projects would support the following 2018 LRDP objectives:

<u>Accommodating Projected Growth.</u> The proposed VFVRC Project directly accommodates projected growth by providing a new research facility including a focus on public service. The Project is proposed to meet the increasing programmatic needs of the Department of Ophthalmology. Between the growing clinical practice and the expansion of the research program, supported by the Viterbi family gift, the campus has outgrown existing space at the existing Shiley Eye Institute. The ECLP Project also accommodates growth by improving and making more efficient the internal campus road network.

Established Character, Scale and Design. The Projects are consistent with the LRDP and its guiding principles, particularly in that it directly contributes to the existing character of the neighborhood. The VFVRC Project site is within the Health Sciences East Neighborhood and is surrounded by other health care and health research facilities including the Shiley Eye Institute, Ratner Children's Eye Center, Jacobs Retina Center, Moores Cancer Center, Koman Outpatient Pavilion and Jacobs Medical Center via Thornton Pavilion. The VFVRC Project has been designed to maintain sight lines from public access points to the existing facilities, and its bulk/scale is consistent with the surrounding development. The VFVRC Project connects with the surrounding neighborhood by creating an "Ophthalmology Courtyard" that will be shared with the existing Shiley Eye Institute, and direct pedestrian connection with Health Science Walk. Building materials and the landscape/hardscape palette have been selected to be consistent with surrounding existing development, helping to maintain a cohesive neighborhood feel. The ECLR Project is also consistent with the established character and scale of the neighborhood; it considers improved road function and provides for the creation of a more efficient, multimodal loop within the campus. The loop road realignment concept was envisioned by the East Campus Neighborhood Study and is conceptually reflected in the LRDP Land Use Plan.

Co-locate and Strengthen Campus Programs. The proposed VFVRC Project is a prime example of co-locating development to strengthen campus programs and facilities, continue the exchange of ideas between academics and scientists, and to create synergy between shared resources and services. It is ideally situated adjacent to the Shiley Eye Institute which, along with the VFVRC Project, is programmed by UC San Diego's Viterbi Family Department of Ophthalmology. The VFVRC project would provide additional space for research on various ophthalmologic diseases as well as expand interdisciplinary collaborations across campus and the San Diego community to accelerate the pace of discovery and innovation for vision research. Research space in the proposed VFVRC Project would build off of the existing program, focusing on curing glaucoma blindness, restoring vision of those blinded by retinal degeneration, and providing sight to individuals who have reversible vision loss due to cataracts or infections, among other vision research.

UC San Diego Health Programs. The VFVRC project would expand and enhance research and core services of UC Health by providing a space for the expanding Viterbi Family Department of Ophthalmology including the new chairs the Viterbi Family gift created. It is ideally situated within the Health Sciences East Neighborhood, adjacent to the Shiley Eye Institute and other UC Heath programs. The proposed ECLR Project also furthers this goal by enhancing the internal road network, improving the patient/visitor arrival experience, and providing more efficient access for vehicles accessing UC San Diego Health facilities.

Sustainable Development Practices. The VFVRC project has been designed with sustainability in mind, and minimizes the environmental impacts of development by siting the Project in an existing paved surface parking lot, which is a targeted redevelopment priority of the 2018 LRDP. By doing so, the campus can preserve its undeveloped, natural areas while maximizing use of its developable land. The VFVRC project design would meet, at a minimum, LEED Silver certification requirements and would comply with the UC Sustainable Practices Policy. Additionally, the new interconnected traffic signals to be installed in the new ECLR ultimately reduces greenhouse gas emissions by reducing the time that vehicles are idling at red lights. The ECLR Project would provide Class II bicycle lanes and improved pedestrian sidewalks and crosswalks also promotes the use of alternative transportation, consistent with sustainable development practices.

3.2 2018 LRDP CAMPUS POPULATION

The 2018 LRDP anticipates that the total campus population would grow by 16,750 people over the 2018 LRDP planning period, resulting in a total population of 65,600 by 2035 (see Table 3-1). The VFVRC Project would both expand and provide space decompression to existing Viterbi Family Department of Ophthalmology programs, due to the donation provided for new endowed faculty chairs and faculty research, clinical practice, and education support. The VFVRC building would support a maximum of approximately 1,200 occupants, which would be comprised of faculty and staff already employed by the university and additional staff, as well as approximately 250 new faculty and staff needed to support the program growth. As such, the VFVRC Project would contribute incrementally to the population growth projected by the 2018 LRDP and is consistent with the 2018 LRDP EIR evaluations that were based on those projections. The ECLR Project is an infrastructure improvement project intended to make an existing internal road network more efficient and intuitive, and would not contribute to population growth. Based on this evaluation, the proposed Projects would be consistent with the population growth anticipated by 2018 LRDP and would not cause the campus to exceed the horizon year population projection.

The campus population presented in this table does not represent just those physically present on campus in any given day. Rather, it represents total student enrollment and fulltime-equivalent employees (e.g., "headcount"). The population figures are not adjusted to reflect the fact that not all students, faculty, and staff are on campus simultaneously on any given day due to variations in class and working/teaching schedules, vacations, sick leave, and sabbaticals. Additionally, since the onset of the COVID-19 pandemic in early 2020, a portion of the total campus population has transitioned to remote work schedules which may continue long-term. Based on work arrangement agreements completed by all campus and health employees in May 2022, the majority of campus employees are working at least one day a week from remote locations (e.g., from home) with many working remote full time. Approximately 15% of all campus employees are working remotely "all of the time," or 100% of their work hours; approximately 15% of campus employees are working remotely "most of the time," or 50-99% of their work hours; and approximately 22% of campus employees are working remotely "some of the time," or 1-49% of their work hours. Only approximately 48% percent of campus employees are working from a campus location full time. While hybrid schedules may shift over time, it is expected that hybrid remote work will continue to the foreseeable future. Thus, the actual on-campus population on any given weekday would be substantially less than what is presented in this table.

Table 3-1
Total Campus Population Growth Projections

Category	Fall 2015 (Baseline)[1]	Fall 2022 (Actual)[2,3]	Fall 2035 (LRDP Projected)[1]
Students	32,850	42,000	42,400
Faculty	1,300	1,770*	2,200
Staff	14,700	18,730*	21,000
Total Population	**48,850**	**62,400**	**65,600**

*Fall 2022 population data for faculty and staff were not available at the time this document was completed; therefore, fall 2021 data was utilized.

Sources:
1 UC San Diego2018a.
2 https://www.universityofcalifornia.edu/infocenter/fall-enrollment-glance
3 https://www.universityofcalifornia.edu/infocenter/uc-employee-headcount

3.3 2018 LRDP LAND USE

The Land Use Plan of the 2018 LRDP describes functional land use categories that reflect those activities that would be predominant in any given area of campus (Figure 2-3 in the 2018 LRDP EIR). Predominant uses are the primary programs, facilities, and activities in a general geographic area. Other support or ancillary uses are allowable within any given area defined by a predominant use. The 2018 LRDP designates the VFVRC Project site as Academic Healthcare, defined as land and structures that primarily include clinical and medical research, teaching facilities and patient care associated with UC San Diego Health Sciences and UC San Diego Health. The VFVRC Project would support vision care research conducted by UC San Diego Health. The ECLR Project is surrounded by Academic Healthcare, Science Research Park, and Community Oriented land uses and would not conflict with the intended use of these areas as the project provides improved infrastructure that would support these uses. Therefore, it has been determined that the Projects are consistent with the land use categories in the 2018 LRDP.

3.4 2018 LRDP DEVELOPMENT SPACE

The 2018 LRDP provides capacity for approximately 9 million GSF of additional building space for academic, clinical, housing, administrative, and service programs. This projected net increase accounts for the potential removal (demolition) of approximately 1 million GSF of buildings that are beyond their useful life and/or are located in strategic redevelopment areas. The current total campus building space is presented by geographic area on the UC San Diego La Jolla campus and compared to the LRDP EIR's baseline (2015) and horizon year projection (2035) in Table 3-2 below.

Table 3-2
Total Campus Space Projections

Campus Location	Baseline Fall 2015 GSF[1]	Actual Fall 2022 GSF[2]	Projected Fall 2035 GSF
West Campus	11,099,000	12,551,800	16,046,000
East Campus	3,075,300	5,011,900	9,358,300
Scripps Institution of Oceanography	1,018,000	1,018,000	2,011,000
Nearby Properties	471,000	471,000	471,000
Total Space	**15,663,300**	**19,052,700**	**27,886,300**

Sources:
1 UC San Diego 2018a
2 UC San Diego Campus Planning. Buildings by GSF and Location Excel Spreadsheet. Updated May 2022.

The table above presents the existing, operable building space on campus as of spring 2022. In addition, at the time this document was prepared, approximately 1.5 million GSF of net new building space was approved and under construction on the West Campus (i.e., the Theatre District Living and Learning Neighborhood, Pepper Canyon West Housing, and the Central Utilities Plant Expansion projects). As described in Section 2.5.5, the VFVRC Project would construct approximately 100,000 GSF in an existing paved parking lot area. Based on this data, it has been determined that the proposed VFVRC Project combined with completed and ongoing construction of projects under the 2018 LRDP would not exceed the building space projections contemplated in the 2018 LRDP and is consistent with the plan.

4 CONSISTENCY WITH 2018 LRDP EIR

The evaluation contained in this consistency review was conducted in accordance with §21094 of the California Public Resources Code. Pursuant to §15164 and 15168 of the State CEQA Guidelines, this addendum documents that the Project's effects have been adequately addressed in a prior (or earlier) programmatic analysis. The 2018 LRDP EIR is a Program EIR that comprehensively addressed the potential environmental effects of campus growth and development due to implementation of future projects and activities proposed under the 2018 LRDP EIR. Therefore, given the consistency of the proposed Projects with the 2018 LRDP, preparation of an addendum is appropriate.

In January 2019 and following certification of the 2018 LRDP EIR, amendments and additions to Appendix G of the State CEQA Guidelines went into effect. Because the Governor's Office of Planning and Research (OPR) proposed these amendments and additions to Appendix G of the State CEQA Guidelines in 2018, UC San Diego was able to anticipate the checklist changes during the preparation of the 2018 LRDP EIR and incorporate those concepts into the certified EIR. Therefore, while the 2018 LRDP EIR reflects the Appendix G checklist questions that were in effect at the time of EIR certification, the analysis contained therein reflect the context of and appropriately address the amended Appendix G that was approved in 2019. To address the amendments directly, this Addendum reflects the current Appendix G of the CEQA Guidelines and refers to sections of the 2018 LRDP EIR where relevant analysis can be found.

4.1 EVALUATION OF PROJECT ENVIRONMENTAL IMPACTS

Checklist Explanation

On the basis of the subsequent review concepts identified in the CEQA Guidelines, the University has defined the following column headings in this Addendum. Both headings rely on the relevant analyses in the 2018 LRDP EIR:

Impacts Adequately Examined in the 2018 LRDP EIR: This column is checked where the potential impacts of the Project were adequately examined in the certified 2018 LRDP EIR. Where applicable, mitigation measures identified in the 2018 LRDP EIR would mitigate the impacts of the Project. All applicable mitigation measures from the 2018 LRDP are incorporated into the Project as noted in Section 5 of this Addendum. The Project is consistent with the analysis evaluated in the 2018 LRDP EIR.

Impacts Not Examined in the 2018 LRDP EIR: If a column is checked in this section, this indicates potential effects of the Project were not adequately evaluated in the certified 2018 LRDP EIR. However, as described in the supporting text, the potential effects of the Project could result in: a) no impact in the category, b) less-than-significant impact in the category, or c) new potentially significant impact. In the instance that a) or b) is checked, no additional CEQA documentation would be necessary. In the instance that c) is checked, additional CEQA documentation would be necessary to further address the issue. All applicable mitigation measures (LRDP Program and/or project-specific) would be incorporated into the Project as noted in Section 5 of this Addendum.

Environmental Topics Addressed

The following environmental resources, if checked below, would be potentially affected by this Project and would involve at least one significant impact that substantially exceeds or is otherwise outside the scope of activities evaluated for potential environmental effects in the 2018 LRDP EIR, as discussed below in Sections 4.1.1 through 4.1.15 of the Addendum. Agriculture and Forestry and Mineral Resources are discussed in Section 4.1 of the 2018 LRDP EIR under *Effects Not Found to be Significant*. As noted in those discussions, no potential for significant impacts to those topics would occur due to the lack of such resources on the UC San Diego La Jolla campus. As such, those topics are not discussed in this Addendum.

If "None" is checked below, this Project is deemed entirely consistent with and covered by the environmental analysis contained in the 2018 LRDP EIR.

☐ Aesthetics	☐ Air Quality	☐ Biological Resources
☐ Cultural and Tribal Cultural Resources	☐ Energy	☐ Geology and Soils
☐ Greenhouse Gas Emissions	☐ Hazards and Hazardous Materials	☐ Hydrology and Water Quality
☐ Land Use and Planning	☐ Noise	☐ Population and Housing
☐ Public Services	☐ Recreation	☐ Transportation/Traffic
☐ Utilities and Service Systems	☐ Wildfire	☐ Mandatory Findings of Significance
☒ None		

4.1.1 Aesthetics

Section 3.1 of the 2018 LRDP EIR evaluates the impacts of campus growth under the 2018 LRDP on aesthetics. The 2018 LRDP EIR concludes that implementation of future projects under the plan would result in potentially significant impacts to scenic vistas, visual character or quality and light or glare (Sections 3.1.3.1 through 3.1.3.3). No potential for significant impacts to scenic resources within the viewshed of the state scenic highway is identified (Section 3.1.5). Mitigation Measures (MM) Aes-1 (scenic vistas) and Aes-2A and Aes-2B (visual character/quality) and Aes-3 (night lighting) are identified in the mitigation framework of the 2018 LRDP EIR for projects that would contribute to these impacts. Implementation of the measures would reduce the future aesthetics impacts to less than significant levels, consistent with the 2018 LRDP.

AESTHETICS Would the Project…	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR		
		No Impact	Less-than-Significant Impact	Potentially Significant Impact
a) Have a substantial adverse effect on a scenic vista?	☒	☐	☐	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☒	☐	☐	☐
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☒	☐	☐	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☒	☐	☐	☐

a) The Projects are not located within the viewsheds associated with the Key Vantage Points, the Visual Sensitive Zone, or the Perimeter Development Zone identified in the 2018 LRDP EIR (refer to Figure 3.1.2 in the 2018 LRDP EIR). Therefore, the Projects would result in less than significant impacts consistent with the scenic vistas/views analysis evaluated in the 2018 LRDP EIR.

b) Implementation of the Projects would not result in substantial damage to scenic resources within a state scenic highway because no such resources or roads exist on or adjacent to the UC San Diego, La Jolla campus. No scenic grove of trees, rock outcroppings, or historic buildings would be removed. Therefore, the Projects would result in less than significant impacts consistent with the scenic resources analysis evaluated in the 2018 LRDP EIR.

c) The Projects are located within an urbanized area and would comply with the 2018 LRDP and UC San Diego design guidelines. Because the Projects would comply with all applicable UC regulations governing scenic quality and with the UC San Diego Design Guidelines, the project would have low potential for a significant impact related to degradation of the visual character of the site and its surroundings. 2018 LRDP EIR mitigation measure Aes-2A, requiring Design Review Board (DRB) review of project design, has been implemented for the VFVRC and is not applicable for the ECLR Project. The VFVRC Project was presented to the DRB on February 2, 2022 and September 7, 2022, and comments related to site layout, building design, and materials were incorporated into the project design. Figure 4-1, Visual Renderings, provide visual representation of the VFVRC Project based on schematic design. While slight variations from the final design may occur, this provides adequate context to the building shape, design, materiality and colors to be used. The VFVRC Project design would be consistent with the surrounding community character both in bulk and scale and materiality. Surrounding uses include various health care and health science research facilities, consistent with the proposed use of the project (See Section 2.2, Project Site and Settings). In addition, the Projects are not located near a campus visual resource, (refer to Figure 3.1.2 in the 2018 LRDP EIR). Therefore, the Projects would result in less than significant impacts consistent with the visual character and quality analysis evaluated in the 2018 LRDP EIR.

d) While the VFVRC Project includes surface parking, neither of the Projects include an above-ground parking garage that would be most likely to result in vehicle headlights affecting nighttime views. Additionally, the VFVRC Project’s surface parking would replace existing parking that would be disturbed during construction, and parking patterns would be similar to existing conditions. As such, the VFVRC surface parking lot would not have a substantial adverse effect nighttime views due to the existing parking lot use. The VFVRC Project design also considered glare and has incorporated a panel design that visually breaks up glass facades. Therefore, the proposed building is not expected to create an impact due to glare. The ECLR Project does not include any structures that could create glare. Street lighting to be replaced and installed along the reconfigured roadway would be the minimum necessary for wayfinding and safety. Lighting would comply with the UC San Diego Outdoor Lighting Policy which requires lighting to be shielded and pointed down. Therefore, the Projects would result in less than significant impacts consistent with the light and glare analysis evaluated in the 2018 LRDP EIR.

Figure 4-1 Visual Renderings

View from North:

View from South:

Figure 4-1: Visual Renderings (Continued)

View from East:

View from Southwest:

4.1.2 Air Quality

Section 3.2 of the 2018 LRDP EIR addresses the air quality effects of campus growth under the 2018 LRDP and concludes that its implementation would result in potentially significant impacts from construction and operational activities that could lead to a violation of air quality standards or contribute substantially to an existing or projected air quality violation (Section 3.2. 3.2). Cumulatively significant impacts were identified due to a considerable net increase in criteria pollutants in a region that is in non-attainment (Section 3.2.3.3). Potentially significant construction-related emissions would cause exposure of sensitive receptors to toxic air contaminant (TAC) emissions (Section 3.2.3.5). Less than significant impacts were identified related to consistency with the Regional Air Quality Strategy (RAQS) and State Implementation Plan (SIP) and due to carbon monoxide hot spots (Sections 3.2.3.1 and 3.2.3.4). No potential for significant odors impacts was identified (Section 3.2.5).

MM AQ-2A (fugitive dust emissions) and AQ-2B (off-road construction emissions) are required for projects that would contribute to these impacts. However, the 2018 LRDP EIR acknowledges that not all projects under the plan can feasibly implement MM AQ-2B and certain projects would contribute to significant and unavoidable impacts related to criteria pollutants and TACs.

AIR QUALITY Would the Project…	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR		
		No Impact	Less-than-Significant Impact	Potentially Significant Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard?	☒	☐	☐	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☒	☐	☐	☐

a) The 2018 LRDP incorporates development strategies identified in the San Diego Association of Governments (SANDAG) Regional Transportation Plan and Sustainable Communities Strategy by integrating land use, housing, and transportation planning, which is consistent with the goals developed by SANDAG and the University land use assumed in the Regional Air Quality Strategy (RAQS). The Projects are consistent with the 2018 LRDP, as described in Section 3 of this Addendum. As noted in Section 3.2.3.1 of the 2018 LRDP EIR, the university incorporates a campus-wide transportation demand management (TDM) program that promotes pedestrian, micromobility, and transit commute modes and thereby reduces mobile sources of air pollutant emissions. Both Projects incorporate enhanced pedestrian and/or bicycle facilities and connections to the greater campus and would be served by the campus shuttle system, as well as MTS bus and trolley routes. The proposed ECLR road realignment would also support multi-modal circulation within the Health Sciences East Neighborhood. Therefore, the Projects would result in less than significant impacts and is consistent with the air quality management plan analysis evaluated in the 2018 LRDP EIR.

b) Implementation the Projects would contribute to a cumulatively considerable net increase of criteria pollutants for which the region is in non-attainment under an applicable federal or state ambient air quality standard. MMs AQ-2A (fugitive dust emissions) and AQ-2B (off-road construction emissions) would be incorporated into construction specifications to minimize this impact. With these measures in place, the Projects would result in less than significant impacts. However, the feasibility of implementing MM AQ-2B is not assured. Therefore, implementation of the Projects would contribute to a cumulatively considerable net increase of criteria pollutants for which the region is non-attainment. The Projects are consistent with the air quality analysis evaluated in the 2018 LRDP EIR.

c) Future traffic associated with the Projects would not result in or contribute to any exceedances of the 1-hour or 8-hour CO standards during the AM peak periods. Therefore, operation of the Project would not expose sensitive receptors to substantial pollutant concentrations caused by localized CO impacts. The Projects would result in less than significant impacts and is consistent with the air quality analysis evaluated in the 2018 LRDP EIR.

   TAC emissions would be associated with Project-related construction and operations due to diesel PM emissions from construction equipment and motor vehicles. As described in Section 3.2.3.5 of the 2018 LRDP EIR, campus growth, including the Projects, would not exceed the risk threshold for on-campus residents and workers; however, the potential to exceed the thresholds for cancer risks for off-campus residents and workers and off-campus and on-campus sensitive receptors of a programmatic level would exist. Because construction of the Project, as well as traffic generated during its operations, would contribute TAC emissions, MM AQ-2B would be incorporated into construction specifications to minimize this impact. However, the feasibility of implementing MM AQ-2B is not assured and the Projects would contribute to the significant and unavoidable air quality (TAC) impacts associated with implementing the 2018 LRDP, consistent with the air quality analysis evaluated in the 2018 LRDP EIR.

d) Potential sources that may emit odors during construction of the Projects would include exhaust from diesel construction equipment. However, because of the temporary nature of these emissions and the highly diffusive properties of diesel exhaust, odors from construction equipment would not affect a substantial amount of people. The Projects would use typical construction techniques, and the odors from off-road equipment and on-road vehicles would be typical of most construction sites and temporary in nature.

   In addition, the VFVRC Project would house specialized laboratory equipment; however any operation and/or equipment that produces emissions would be appropriately outfitted with fume hoods and exhaust fans to disperse emissions. Air-source heat pumps would also be provided in the building which generate emissions-free building heat instead of burning natural gas. As such, Project operation would not produce new sources of odor or other pollutants that would adversely affect a substantial number of people. The VFVRC Project building would be utilized for research and office uses, consistent with the 2018 LRDP land use and similar to other buildings in its vicinity. Associated emissions were adequately addressed in the 2018 LRDP EIR. Therefore, the Projects would result in less than significant impacts and is consistent with the air quality analysis evaluated in the 2018 LRDP EIR.

4.1.3 Biological Resources

Section 3.5 of the 2018 LRDP EIR addresses the effects of campus growth under the 2018 LRDP on biological resources and concludes that its implementation would result in potentially significant impacts to sensitive biological resources, including candidate, sensitive, or special-status plant species (Section 3.3.3.1); sensitive animal species (Section 3.3.3.2); and sensitive vegetation communities (Section 3.3.3.3) and federally-protected wetlands (Section 3.3.3.4). No potential for significant impacts to wildlife corridors or linkages and conflicts with local policies or ordinances, including any adopted habitat conservation plans (Section 3.3.5).

The mitigation framework addresses all of the potentially significant impacts identified in Section 3.3.3 of the 2018 LRDP EIR. If an LRDP project would impact sensitive plants, the site would be surveyed for sensitive plants in accordance with MM Bio-1A and, if applicable, San Diego barrel cactus would be relocated in accordance with MM Bio-1B. For impacts to sensitive animal species, surveys for the species, construction noise attenuation, and agency consultation is required by MMs Bio-2A, 2B, and 2C and avian nest surveys and avoidance measures are required by MMs Bio-2D and 2E. MMs Bio-3A and 3B require project-level surveys for sensitive vegetation communities, while avoidance and compensatory mitigation is required by MMs Bio-3C and Bio-3D. Indirect construction impacts are addressed through the implementation of MMs Bio-3E and Bio-3F, and indirect operational impacts require compliance with MMs Bio-3G through Bio-3M. Implementation of these measures would reduce future project-level impacts to less than significant levels.

BIOLOGICAL RESOURCES Would the Project…	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR: No Impact	Impact Not Examined in 2018 LRDP EIR: Less-than-Significant Impact	Impact Not Examined in 2018 LRDP EIR: Potentially Significant Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	☒	☐	☐	☐
c) Have a substantial adverse effect on state or federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☒	☐	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐	☐	☐

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☒	☐	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☒	☐	☐	☐

a) The Project sites are developed and the 2018 LRDP EIR defines the areas as Urban/Developed Land (refer to Figure 3.3-3 in the 2018 LRDP EIR). The only vegetation existing on the Project site includes non-native ornamental landscaped areas along the edges of the parking lots and roads within the VFVRC and ECLR project boundaries. The nearest sensitive habitat is located approximately 500 feet to the south of the VFVRC project site and separated by existing development and a road. This habitat area is located immediately adjacent to the Medical Center Drive/Athena Circle intersection which would be improved as part of the ECLR Project. The habitat area is within a portion of the campus Ecological Reserve called the East Campus Central Canyon and supports Diegan coastal sage scrub, southern willow scrub, southern mixed chaparral, non-native grassland, and eucalyptus woodland vegetation communities (See Figure 4-3). While Diegan coastal sage scrub is considered suitable habitat for coastal California gnatcatcher *(Polioptila californica californica)*, a sensitive species, surveys for coastal California gnatcatcher have conducted regularly since 2010 as part of the campus Ecological Reserve's Habitat Management Program (the most recent survey being in 2021) and no gnatcatchers have been identified in the canyon. Yellow warbler (*Setophaga petechia*), a special-status species, though widespread in the San Diego region, has been identified in the Central Canyon's southern willow scrub area. The Biological Resources Technical Report prepared for the 2018 LRDP EIR states that a significant impact would occur if a project removes a substantial portion of occupied southern willow scrub habitat within its breeding season. The project would not remove any habitat type and is separated from the southern willow scrub habitat by other land cover types. Therefore, no impacts to yellow warbler are anticipated. The Projects would not cause any significant direct or indirect impacts and is consistent with the sensitive species analysis evaluated in the 2018 LRDP EIR.

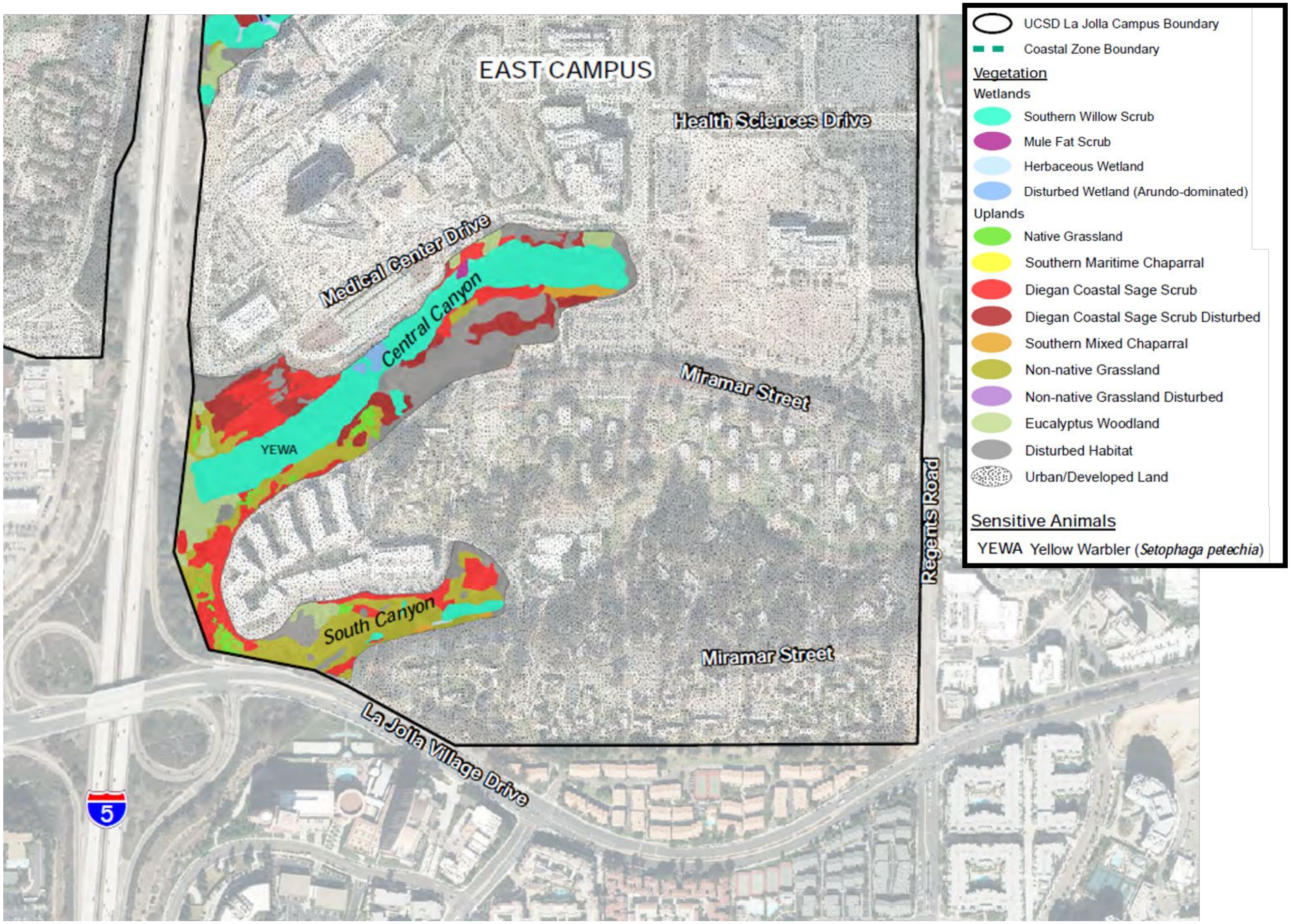
b, c) The Project sites are entirely developed, as noted above under item a, and do not contain any aquatic, wetland, or riparian habitat or other sensitive natural community. Pursuant to 2018 LRDP EIR mitigation program for projects involving plantings, mitigation measure Bio-3G would be implemented by both Projects to ensure landscape plantings are pest-free. A portion of the ECLR Project is located adjacent to the campus Ecological Reserve. The sensitive habitat types found within this area of the Ecological Reserve are discussed above under section a) above. The ECLR Project is located adjacent to eucalyptus woodland and disturbed habitat, though further separated by these non-sensitive habitat types, Diegan coastal sage scrub and southern willow scrub are present. No direct impact to any vegetation within the Ecological Reserve would result from project construction. However, due to the project's adjacency to the Ecological Reserve boundary, mitigation measures Bio-3E, Bio-3F, and Bio-3I through 3K would be implemented by the ECLR Project to ensure no indirect impacts occur during construction. Mitigation measure Bio-3L, which calls for permanent fencing or signage at new developments adjacent to the Ecological Reserve, would not apply to the project because the existing interface with the Ecological Reserve would not change in type or intensity of use. Additionally, under existing conditions, there are no access or habitat degradation issues at this portion of the Ecological Reserve and conditions are not expected to change following the ECLR project. With application of 2018 LRDP EIR mitigation, no significant impacts to sensitive natural communities would occur and the Project is consistent with the biological resources analysis evaluated in the 2018 LRDP EIR.

d) Development of the Project would not preclude wildlife movement or impact wildlife corridors or linkages as none exist on the campus. The ECLR would not construct a new road adjacent to or through wildlife habitat. While some landscape vegetation (including up to 30 trees) would be removed, implementation of 2018 LRDP EIR mitigation measures Bio-2D and Bio-2E would ensure less than significant impacts to nesting birds and raptors by requiring surveys during their respective breeding seasons to ensure no active nests are impacted by construction activities. Therefore, the Projects are consistent with the biological resources analysis evaluated in the 2018 LRDP EIR.

e) UC San Diego is a part of the UC, a constitutionally created unit of the State of California. As a state entity, UC is not subject to municipal plans, policies, and regulations, such as County and City General Plans or local ordinances. Thus, the Projects would not result in any conflicts with any local policies protecting biological resources and is consistent with the biological resources analysis evaluated in the 2018 LRDP EIR.

f) The Projects would not directly or indirectly affect resources preserved by the City of San Diego as part of its Multiple Species Conservation Plan (MSCP). Therefore, no impacts are anticipated to the City's MSCP or the NCCP Program and is consistent with the biological resources analysis evaluated in the 2018 LRDP EIR.

Figure 4-3: East Campus Central Canyon Biological Resources



4.1.4 Cultural and Tribal Cultural Resources

Section 3.4 of the 2018 LRDP EIR addresses the effects of campus growth under the 2018 LRDP on archaeological and historical resources, including tribal cultural resources, and concludes that its implementation would result in potentially significant impacts due to potential alterations of historical (built environment) resources that would cause a substantial adverse change in their significance (Section 3.4.3.1); land disturbance of recorded archaeological resources and unrecorded subsurface archaeological resources (Section 3.4.3.2); disturbance of human remains and of potential human remains in unrecorded subsurface sites (Section 3.4.3.4); and disturbance of tribal cultural resources (TCRs) (Section 3.4.3.5). Disturbance of geological formations containing paleontological (fossil) resources (Section 3.4.3.3) is discussed further in Section 4.1.6, Geology and Soils, of this Addendum.

The mitigation framework addresses all of the potentially significant impacts identified in Section 3.4.3 of the 2018 LRDP EIR. For impacts to historical resources, MM Cul-1A requires an analysis of historical resources and avoidance through compliance with the Secretary of the Interior's Standards for Rehabilitation; project redesign is required in accordance with MM Cul-1B; preparation of documentation is required by MM Cul-1C; and feasible relocation of historical resources through compliance with MM Cul-1D. Supplemental measures are also required for certain projects as described in MM Cul-1E through Cul-1G. Demolition would be considered a significant and unavoidable impact of the 2018 LRDP implementation.

The mitigation framework requires the identification of archaeological resources in the Area of Potential Effects (APE) and evaluation in accordance with MM Cul-2A; avoidance of impacted resources per MM Cul-2B; documentation and treatment is required by MM Cul-2C; unknown resources, including human remains, are treated in accordance with MM Cul-2D; and construction monitoring to comply with MM Cul-2E. Compliance with California Health and Safety Code Sections 7050.5 and 7052 and PRC Section 5097.98 is required for inadvertent discoveries of human remains, as noted in MM Cul-2E. Implementation of these measures would reduce future project-level impacts to archaeological resources, including human remains, to less than significant levels.

If campus development would affect TCRs, UC San Diego would initiate tribal consultation and identify feasible avoidance and minimization measures in accordance with MM Cul-5A. If avoidance is not feasible, TCRs would be treated through construction monitoring in accordance with MM Cul-5B; any cultural materials would be returned to the tribe per MM Cul-5C. Implementation of these measures would reduce future project-level impacts to TCRs to less than significant levels.

CULTURAL AND TRIBAL CULTURAL RESOURCES	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR		
Would the Project…		No Impact	Less-than-Significant Impact	Potentially Significant Impact
a) Cause a substantial adverse change in the significance of a historical resource as pursuant to §15064.5?	☒	☐	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☒	☐	☐	☐
c) Disturb any human remains, including those interred outside of formal cemeteries?	☒	☐	☐	☐

d) Cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Public Resources Code § 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: 1) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or 2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☒	☐	☐	☐

a) Based on the inventory and analysis contained in the Historic Resources Report prepared for the 2018 LRDP EIR (ARG 2018), the Project sites do not contain structures or facilities that are considered historic resources as identified in Figure 3.4-1 in the 2018 LRDP EIR. The Project sites are not located in any of the historic districts defined on campus. Therefore, the Projects would not cause any changes to the significance of historic resources due to removals or demolition and is consistent with the historic resources analysis evaluated in the 2018 LRDP EIR.

b,c) Based on a review of the Projects' Area of Potential Effects in accordance with MM Cul-2A and the inventory and analysis contained in the Archaeological Resources Report prepared for the 2018 LRDP EIR (AECOM 2018), the Project sites contain no known archaeological resources. The sites have been completely developed and likelihood for encountering unknown archaeological resources is low. Therefore, implementation of the Project would result in less than significant impacts, consistent with the cultural resources analysis evaluated in the 2018 LRDP EIR.

d) Assembly Bill 52 (AB 52) requires that CEQA lead agencies consult with California Native American tribes that have requested such consultation, at initiation of the CEQA process, to identify and evaluate the significance of TCRs. The process for identification of TCRs on the UC San Diego campus consisted of the formal consultation process mandated by AB 52, as well as a Native American consultation and outreach program conducted for the 2018 LRDP EIR.

In January 2016, UC San Diego proactively contacted California Native American tribes traditionally and culturally affiliated with the San Diego region to solicit their interest in being notified of proposed campus development projects as part of the planning process pursuant to AB 52. UC San Diego did not receive any responses as a result of this outreach attempt. However, UC San Diego was contacted independently by the San Luis Rey Band of Mission Indians, who expressed interest in receiving formal notifications of proposed projects on campus. Accordingly, UC San Diego has been sending out formal consultation request letters to the San Luis Rey Band of Mission Indians on a project-by-project basis. Such a letter describing the 2018 LRDP and requesting a consultation was sent to the San Luis Rey Band of Mission Indians on December 9, 2016. Because no response was received, UC San Diego must assume that consultation was declined.

The 2018 LRDP EIR Notice of Preparation (NOP) dated November 3, 2016, was also sent to 13 Native American tribes and the Native American Heritage Commission (NAHC) notifying them of the preparation of the 2018 LRDP EIR and soliciting input from them regarding potential environmental issues associated with implementing the 2018 LRDP. Although a NOP response letter was received from the NAHC, no response letters were received from the notified tribes (refer to Appendix A to the 2018 LRDP EIR). In February 2017, a Sacred Lands File (SLF) search was requested from the NAHC as part of the 2018 LRDP EIR preparation (see Appendix D to the 2018 LRDP EIR). The NAHC responded that sites had been identified within the Project area and recommended contacting the Iipay Nation of Santa Ysabel for more information. Campus representatives then contacted the tribe, which indicated there are several sites in the vicinity of UC San Diego that are considered sacred due to the known presence of human remains. Because the Projects are consistent with the 2018 LRDP and is not located on or near the TCRs identified on campus through these prior consultation and communication efforts, less than significant impacts to TCRs are anticipated occur. The Projects are consistent with the cultural resources analysis evaluated in the 2018 LRDP EIR.

However, out of respect for the region’s rich cultural history and associated tribal nations, construction monitoring by a Native American tribal representative from the appropriate Tribal Nation as required by MM Cul-5B would be required during initial ground disturbance of top three to four feet of native soil, or as recommended by the Native American monitor, during construction of both Projects. The discovery and notification protocols outlined in MM Cul-5B would be followed in the unlikely event that cultural materials are encountered during construction.

4.1.5 Energy

Since the 2018 LRDP EIR was certified, the CEQA Guidelines were amended to provide new requirements to address a project’s impacts on energy. While a separate section on Energy was not included in the 2018 LRDP EIR, applicable analyses and discussion to these new CEQA Guidelines questions are located in Section 3.15, Utilities, Service Systems, and Energy (specifically Section 3.15.3.6) of the 2018 LRDP EIR as well as Section 3.6, Greenhouse Gas Emissions. These analyses are referenced below as appropriate. No mitigation related to energy was required in the 2018 LRDP EIR.

ENERGY Would the Project…	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR		
		No Impact	Less-than-Significant Impact	Potentially Significant Impact
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☒	☐	☐	☐

ENERGY Would the Project…	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR		
		No Impact	Less-than-Significant Impact	Potentially Significant Impact
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☒	☐	☐	☐

a) During construction, the Projects would result in an increase in energy consumption through the combustion of fossil fuels in construction vehicles, worker commute vehicles, and construction equipment, and the use of electricity for temporary buildings, lighting, and other sources. The Projects would also consume energy for building heating and cooling, refrigeration, lighting, electricity, and laboratory/commercial equipment. New staff and visitor vehicle trips and fleet vehicle trips associated with the Project would also be a source of energy consumption. However, the Projects would comply with the energy conservation strategies expressed in the UC Sustainable Practices Policy. Electricity usage estimates for the Project assume approximately 3,500 megawatt hours annually. The Projects would use electricity purchased from the UC Energy Services Unit Direct Access Program (100 percent renewable). The Projects would aim to meet the requirements of LEED Gold certification, but would meet LEED Silver requirements, at a minimum. Climate conditions, including the sun, wind, humidity and temperature, were incorporated into the Project design to maximize energy efficiencies (see Section 2.0 Project Description). The VFVRC building has been designed to optimize energy with a window-wall ratio of approximately 55 percent for minimizing envelop losses and to maximize daylight and views. Exterior shading provides an opportunity to downsize cooling capacity in south and west zones by up to 8 percent, further reducing energy demand. Additionally, natural gas combustion would not be used for space or water heating as this would be electrified.

   As noted under the vehicle miles traveled (VMT) discussion below under item b) of the Transportation/Traffic discussion, the campus as a whole, including the Project would produce a VMT that would be measurably lower than the regional and City averages, thus reducing energy usage associated with vehicle trips. The proposed ECLR would also include new interconnected traffic signals that minimize the amount of time vehicles are idling at intersections, thus reducing associated fuel use. The Projects would not result in wasteful, inefficient, or unnecessary use of energy and is consistent with the energy analysis evaluated in the 2018 LRDP EIR.

b) Construction of the Projects would implement sustainability measures identified in Section 2.5.6 of this Addendum. Conformance with the UC Sustainable Practices Policy and other UC requirements related to energy reduction and carbon-free energy use would ensure that the Project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency, especially as it relates to laboratory use. Therefore, the Projects would not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects regarding conflict with energy plan or policy.

4.1.6 Geology and Soils

Section 3.5 of the 2018 LRDP EIR addresses the geology and soils effects of campus growth under the 2018 LRDP and concludes that implementation of future projects under the plan that comply with the applicable regulations related to geologic and soils hazards and result in less than significant impacts related to exposure to seismic-related hazards (Section 3.5.3.1), soil erosion and topsoil loss associated with ground disturbance (Section 3.5.3.2); unstable geologic or soil conditions (Section 3.5.3.3), and expansive soils (Section 3.5.3.4). The analysis determined there is no potential for a significant geology or soils impact related to use of septic tanks or alternative waste water disposal systems (Section 3.5.5).

No geology and soils mitigation is required in the 2018 LRDP EIR.

Section 3.4, Cultural and Tribal Cultural Resources, of the 2018 LRDP EIR addresses the effects of campus growth under the 2018 LRDP on paleontological resources and concludes that its implementation would result in potentially significant impacts to disturbance of geological formations containing paleontological (fossil) resources (Section 3.4.3.3). Paleontological monitoring is required in formations of high sensitivity; identification and evaluation; avoidance; documentation and treatment; and construction monitoring in accordance with Mitigation Measure Cul-3. Implementation of this measure would reduce future project-level impacts to less than significant levels.

GEOLOGY AND SOILS	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR		
Would the Project…		No Impact	Less-than-Significant Impact	Potentially Significant Impact
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☒	☐	☐	☐
ii) Strong seismic ground shaking?	☒	☐	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☒	☐	☐	☐
iv) Landslides?	☒	☐	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☒	☐	☐	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☒	☐	☐	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☒	☐	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☒	☐	☐	☐
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☒	☐	☐	☐

a) Based on a geotechnical investigation completed for the VFVRC Project (Appendix A), the site is underlain by fill material extending from approximately 2 feet to 15 feet below the ground surface. Beneath the fill, Very Old Paralic Deposits were encountered at depths varying from 20 to 22 feet below the ground surface. Further underlying these deposits is Scripps Formation, though excavation would not reach these depths. No groundwater was encountered during the investigation and the permanent groundwater table is not expected to be a constraint to development. The on-site silty sand and clayey sand are anticipated to have a very low expansion potential and were found to be suitable for reuse as compacted fill. Recommended foundations are conventional spread footings for concrete columns and continuous footings or a mat foundation for shear walls. The foundations could be bearing on either uniform compacted fills, or a combination of native materials and soil-cement structural fill (NBBJ, 2022a). The proposed VFVRC Project has been designed to implement the option with a combination of native material and soil-cement structural fill. Site walls and retaining walls not connected to buildings would be supported on spread footings with bottom levels bearing on formational materials, soil-cement structural fill, or compacted fill. Shade structures, covered walkways and other pole-type structures would be supported on cast-in-drilled hole concrete piles.

Based on a preliminary geotechnical investigation (Appendix B) conducted for the ECLR Project, the site is underlain by shallow fill soils typically less than about 5 feet deep, and further by Very old Paralic Deposits. No seepage or groundwater was encountered during the investigation. Near surface soils consist of silty and clayey with a very low expansion potential. The report concluded with recommendations including a minimum of 12-incese of exposed subgrade soil throughout the site be scarified and compacted immediately prior to placing new fill, aggregate base, wall footings, or other surface improvements. Additional recommendations regarding pavement, fill compaction, subgrade stabilization would be implemented as described in the preliminary geotechnical investigation report or as revised in a final investigation report closer to the start of construction.

The VFVRC and ECLR Projects would not result in significant impacts because the UC San Diego campus and the surrounding area are not located within an Alquist-Priolo Earthquake Fault Zone and the probability of fault rupture are considered low. In addition, the risk for landslides or slope instability at the sites are considered low. The potential for seismic-related liquefaction is considered very low on campus due to the types of soils and depths to groundwater. However, the area could be subject to a severe level of seismic ground shaking. The VFVRC Project would comply with the California Building Code (CBC) and the UC Policy on Seismic Safety (not applicable to the ECLR Project), which require independent review of structural seismic design of both new construction and remodeling projects. All recommendations of the geotechnical investigation would be implemented.

Project compliance with these policies and recommendations would avoid any potential for seismic hazards and the Projects are consistent with the geology and soils analysis evaluated in the 2018 LRDP EIR.

b) Similar to other campus development, the Projects would comply with the UC San Diego Design Guidelines, which include the incorporation of low impact development (LID) and erosion and sediment control BMPs, and UC San Diego's Stormwater Management Program and other regulatory requirements, as needed to minimize erosion and topsoil loss. Specifically, the Projects would comply with relevant National Pollutant Discharge Elimination System (NPDES) permits, including the General Permit for Storm Water Discharges Associated with Construction Activity (General Construction Permit) and the General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (Phase II Small MS4 Permit), which require soil erosion control measures. Project compliance with these regulations during construction and operation would provide adequate protection against soil erosion during and after site construction. Therefore, the Projects are consistent with the geology and soils analysis evaluated in the 2018 LRDP EIR

c) The Projects would comply with the CBC and the University of California Seismic Safety Policy which would address unstable soil and slope conditions, if needed. Project compliance with these regulations during construction and operation would provide adequate protection against impacts. However, based on the geotechnical investigation for the VFVRC and ECLR Projects, there are low risk related to unstable soil and slop conditions at the Project sites. The Projects are consistent with the geology and soils analysis evaluated in the 2018 LRDP EIR

d) The Projects would be required to comply with the CBC and the University of California Seismic Safety Policy. Project compliance with these regulations during construction and operation would provide adequate protection against impacts. However, soils at the VFVRC Project site were identified to have very low expansion potential. The Projects are consistent with the geology and soils analysis evaluated in the 2018 LRDP EIR.

e) UC San Diego is provided sanitary sewer service by the City of San Diego and no septic tanks or alternative wastewater systems are used or anticipated to be associated with the implementation of the 2018 LRDP, including the Project. The Projects are consistent with the geology and soils analysis evaluated in the 2018 LRDP EIR.

f) Both projects' geotechnical investigations concluded that the sites are generally underlain by fill and Very Old Paralic Deposits, in which fossils are scarcely reported. While Scripps Formation, which is generally considered to have a high paleontological sensitivity, was identified as further underlying portions of the VFVRC project and adjacent to a portion of the ECLR project, excavation would not occur within this formation by either project. Based on these findings and the mapping and analysis contained in the 2018 LRDP EIR, the Project sites are not located within an area of high potential for paleontological resources. Therefore, implementation of the Project would not cause impacts to unique paleontological resources and is consistent with the cultural resources analysis evaluated in the 2018 LRDP EIR.

4.1.7 Greenhouse Gas Emissions

Section 3.6 of the 2018 LRDP EIR addresses potential impacts from greenhouse gas (GHG) emissions and climate change and determines that implementation of the 2018 LRDP would generate GHG emissions that may have a potentially significant cumulative impact on the environment during construction and operation (Section 3.6.3.1) even with the implementation of GHG Reduction Actions contained in the 2018 LRDP and described in Section 3.6.3.1 of the 2018 LRDP EIR. Despite the projected increase in GHG emissions over time, the campus would not conflict with UC policies and plans adopted for the purposes of reducing GHG emissions which are consistent with GHG reduction targets contained in Assembly Bill (AB) 32 and Senate Bill (SB 32) (Section 3.6.3.2).

Implementation of programmatic measures identified in the 2018 LRDP EIR mitigation framework require the campus to decarbonize the cogeneration plant after 2032 (MM GHG-1A), to install electric charging stations across the campus (MM GHG-1B), and to conduct annual inventory updates and determine the need for and purchase of carbon credit purchases (MM GHG-1C) would reduce campus-wide contributions to cumulative GHG emissions (and related climate change impacts) to less than significance. No project-level mitigation measures are required for cumulative GHG emissions impacts.

GREENHOUSE GAS EMISSIONS Would the Project…	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR: No Impact	Less-than-Significant Impact	Potentially Significant Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐	☐	☐
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose or reducing the emissions of greenhouse gases?	☒	☐	☐	☐

a) Construction and operation of the Projects would result in GHG emissions from site preparation, construction vehicle trips, and construction equipment, and the VFVRC building would also result in emissions from energy use, water treatment/usage, solid waste disposal, and mobile sources (air and vehicle travel). However, the Projects would include multiple design features that would reduce its overall contribution to campus-wide GHG emissions. These green building design features, as described in the Project description in Section 2.5.4 of this Addendum, would help achieve the Project goal of being certified, at a minimum, as a LEED Silver building and achieve building energy efficiency of 20 percent better than Title 24 energy performance standard, in accordance with the UC Sustainable Practices Policy. These design elements are reflective of UC San Diego's commitment to sustainability.

Although the Projects would result in GHG emissions, through the initiatives to reduce campus-wide GHG emissions, project emissions would be reduced or offset over time. In addition, the Projects' emission would be included in the annual GHG inventory as part of the campus' implementation of MM GHG-1C. The Projects are consistent with the GHG analysis evaluated in the 2018 LRDP EIR.

b) The 2018 LRDP contains several GHG Reduction Actions focused as minimizing and reducing future GHG emissions across the campus. Implementation of those strategies would support the University's efforts in reaching the UC Sustainable Practices Policy target of climate neutrality for Scope 1 and 2 emissions by 2025 and climate neutrality for Scope 3 emissions by 2050, which are in line with the UC Carbon Neutrality Initiative and the UC San Diego Climate Action Plan. As described above in item a, the Projects would not conflict with UC Sustainable Practices Policy. Consistent with the overall 2018 LRDP, the Projects would not conflict with an applicable plan, policy, or regulation adopted for the purpose or reducing the emissions of GHGs and is consistent with the GHG analysis evaluated in the 2018 LRDP EIR.

4.1.8 Hazards and Hazardous Materials

Section 3.7 of the 2018 LRDP EIR addresses the hazards and hazardous materials effects of campus growth and determined that implementation of the 2018 LRDP would not result in a potentially significant impact related to the transport, use, and disposal of hazardous materials (Section 3.7.3.1 and 3.7.3.2); or pose a health risk to occupants of the school or the campus community (Section

3.7.3.3). The potential for significant hazards related to listed hazardous materials sites on the UC San Diego campus would exist due to the unknown potential for munitions debris or munitions and explosives of concern (MEC) associated with historical military training (Section 3.7.3.4). Aircraft operations and activities would not pose significant safety hazards (Section 3.7.3.5). Construction-related road closures or detours on the campus could impair or intervene with emergency response and result in potentially significant impacts (Section 3.7.3.6). Based on the analysis of wildfire hazards on campus, there would be less than significant potential for large-scale wildland fires (Section 3.7.3.7).

The 2018 LRDP EIR mitigation framework requires the assessment of hazardous materials contamination on the Project site and removal or remediation if a public health risk is identified (MM Haz-4A and -4B). MM Haz-4C requires construction activities to be halted if unknown contamination is encountered and implementation of remedial activities. Implementation of these measures during project-level planning and construction would reduce potential hazards from past contamination to less than significant levels. Compliance with MM Haz-6 would require contractors to notify Campus Fire Marshall and the campus community of any required road closures to reduce emergency access/response impacts to less than significant levels.

HAZARDS AND HAZARDOUS MATERIALS Would the Project…	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR		
		No Impact	Less-than-Significant Impact	Potentially Significant Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☒	☐	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☒	☐	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☒	☐	☐	☐
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☒	☐	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☒	☐	☐	☐
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☒	☐	☐	☐
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or	☒	☐	☐	☐

death involving wildland fires?

a, b) As typical with research and healthcare activities, small amounts of hazardous materials and waste may be used or generated. Construction activities also utilize small amounts of hazardous materials such as diesel fuel and lubricants. Adherence to existing regulations and compliance with campus safety standards mandated by applicable federal, state, University, and local laws and regulations, would minimize the risks resulting from the routine transportation, use, storage, or disposal of hazardous materials or hazardous wastes and from accidental releases during Project construction and operation. The Projects are consistent with the hazards and hazardous materials analysis evaluated in the 2018 LRDP EIR.

c) As typical with research and healthcare activities, small amounts of hazardous materials and waste may be used or generated by the VFVRC project. The campus would continue to comply with federal, state, and local regulations pertaining to hazardous materials and wastes and with existing campus programs, practices, and procedures that would ensure that risks associated with hazardous emissions or materials to existing or proposed primary or secondary schools located within one-quarter mile from the campus would remain less that significant through proper handling procedures, disposal practices, and/or cleanup procedures. The Projects are consistent with the hazards and hazardous materials analysis evaluated in the 2018 LRDP EIR.

d) The Project sites are located within an area associated with historical military training at Camp Matthews, which is listed as a contaminated site pursuant to Government Code Section 65962.5 (2018 LRDP EIR Impact 3.7-4). Due to the Projects' location relative to historic training operations, the potential exists for unknown contamination from munitions debris or MEC, albeit the potential is low. Therefore, the campus would require compliance with MM Haz-4A to assess the potential for risk and require remediation in accordance with MM Haz-4B, if required. In the event that underground storage tanks (USTs) or undocumented areas of contamination are encountered during construction, the contractor in collaboration with UC San Diego would stop work in compliance with MM Haz-4C to allow for the proper implementation of appropriate health and safety procedures, as required by applicable regulations. Compliance with the 2018 LRDP EIR mitigation framework would ensure the Projects would reduce its potentially significant impacts to less than significant levels and is consistent with the hazards and hazardous materials analysis evaluated in the 2018 LRDP EIR.

e) UC San Diego is not located within any Aircraft Potential Zones (APZs) for MCAS Miramar and, thus, implementation of the Project would not result in a significant aircraft safety hazard. With regard to the Torrey Pines Gliderport, its short-term use is not a safety hazard to the campus and surrounding area because the gliders do not take-off or land over UC San Diego structures. The Projects are consistent with the hazards and hazardous materials analysis evaluated in the 2018 LRDP EIR.

f) Project construction would require the temporary closure of portions of the existing campus roadway network but would not interfere with response times of emergency vehicles during its operation. Vehicular access to all facilities within the Health Sciences East Neighborhood would be maintained at all times. As required by MM Haz-6, UC San Diego would require the construction contractor to notify the campus Fire Marshall and community to prevent conflicts with emergency access or evacuation routes during construction. Compliance with the 2018 LRDP EIR mitigation framework would ensure the Projects would reduce their potentially significant impacts to less than significant levels and is consistent with the hazards and hazardous materials analysis evaluated in the 2018 LRDP EIR.

g) The Project sites overlap with an area identified as a Very High Fire Hazard Zone. UC San Diego would continue to implement brush management around buildings that are adjacent to undeveloped areas of the campus, would equip the proposed facility with emergency fire sprinkler systems in accordance with the CBC. Additionally, the campus continues to retrofit existing buildings with fire sprinklers in accordance with the CBC. The UC San Diego Fire Marshal would be responsible for ensuring that adequate access is maintained on campus at all times and would meet regularly with the City of San Diego Deputy Fire Chief to maintain a site plan/access plan that would adequately serve the campus. The Projects would result in less than significant wildfire impacts and is consistent with the hazards and hazardous materials analysis evaluated in the 2018 LRDP EIR.

4.1.9 Hydrology and Water Quality

Section 3.8 of the 2018 LRDP EIR addresses the hydrology and water quality effects of campus growth under the 2018 LRDP and determined it would result in less than significant impacts related to the alteration of drainage patterns and potential water quality effects due to project compliance with applicable policies and regulations (i.e. UC San Diego's Design Guidelines, Sustainability Policies, Phase II Small MS4 Permit and additional Storm Water Management Program requirements (Sections 3.8.3.1 and 3.8.3.2)). No potential for seiches exists on campus, while less than significant risk associated with tsunamis would occur (Section 3.8.3.3). No potential exists for significant impacts related to the depletion of groundwater supplies and flooding (Section 3.8.5).

No mitigation is required for hydrology and water quality impacts as described in the 2018 LRDP EIR.

HYDROLOGY AND WATER QUALITY Would the Project…	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR		
		No Impact	Less-than-Significant Impact	Potentially Significant Impact
a) Violate any water quality standards or waste discharge requirements, or otherwise substantially degrade surface or groundwater quality?	☒	☐	☐	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☒	☐	☐	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: (i)result in substantial erosion or siltation on- or off-site? (ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; (iii) create or contribute runoff water which would exceed the capacity of existing or planned storm	☒	☐	☐	☐

water drainage systems or provide substantial additional sources of polluted runoff; or (iv) impede or redirect flood flows?				
d) In flood hazard, tsunami, or seich zones, risk release of pollutants due to project inundation?	☒	☐	☐	☐
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☒	☐	☐	☐

a,c) Construction of the Projects would not contribute substantial loads of sediment or other pollutants to stormwater runoff due to compliance with the NPDES state-wide General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activity (General Permit). As part of the General Permit, campus construction projects managed by outside contractors and disturbing over one acre (including the Projects) must implement SWPPPs, which specify BMPs to reduce the contribution of sediments, spilled and leaked liquids from construction equipment, and other construction-related pollutants to stormwater runoff. Compliance with the regulations would provide adequate protection from stormwater contamination and water quality protection from construction activities on campus. Stormwater management procedures for both Projects are expected to include the following:

- Ensuring hazardous and non-hazardous materials would be protected from coming in contact with stormwater runoffs.
- Preventing unauthorized discharges of non-stormwater or construction by-products into storm drains or sewer systems.
- Parking and fueling all motorized equipment in “designated” areas including after work hours and weekends. Contractors would have spill mitigation devices readily available during fueling operations.
- Practice good exterior housekeeping, to include daily cleanup.
- Keep materials in a secondary containment when required.
- Cover trash bins and containers at the end of each day and during rain events.
- Cover stockpiles when not being used and within 48 hours before a rain event.
- Keep stored materials on pallets and covered when not being used.
- Keep the streets and storm drains clean.
- Knock all mud and debris off of equipment and vehicles/tires in designated areas before leaving the site.
- Street sweeping if visible dust is on the roadway.

As detailed in the VFVRC Project’s Hydrology Study prepared by KPFF (Appendix C), following construction of the Project the site’s impervious surface area would be similar to existing, though changes to site-specific stormwater infrastructure would occur. During the VFVRC Project’s planning and design phases, it underwent review by UC San Diego Campus Planning, Capital Program Management (CPM), and Design and Development Services (DDS) staff to ensure utility infrastructure would be appropriately considered. During a 10- and 100-year storm event, storm water flows would slightly increase in the post-construction condition; however, hydromodification measures/BMPs would reduce these peak flows to ensure this does not cause a downstream impact. The existing storm drain line has adequate downstream capacity and is not required to be upsized due to its drainage area decreasing in the final build-out condition. On-site storm water capture would be increased to detail additional volumes and provide flow control, via measures such as vegetated swales, retention basin, and other capture features. Per the VFVRC Project Hydrology Study, it was determined that the site requires a proposed storm water treatment area of 3,900 square feet. As such, bioretention basins would be installed at the central median of the reconfigured surface lot, landscape buffer at the north-west corner of the surface lot, and at the southeast corner of the site. Installation of the bioretention basins would accommodate for any additional stormwater runoff as a result of the proposed VFVRC Project.

Similarly, the ECLR Project also underwent review by UC San Diego Campus Planning, CPM, and DDS staff to ensure utility infrastructure would be appropriately considered. Storm water would be managed via onsite landscape features including vegetated swales and bioretention basins to ensure that there is no impact on the existing storm water infrastructure. All storm water capture and treatment features would be sized as appropriate so that post-construction flows are equal or less than existing.

The Projects would both comply with UC San Diego Design Guidelines and Storm Water Management Program and other regulatory requirements related to storm water runoff. Campus development, including the Projects, is covered under the Phase II Small MS4 Permit, which requires management of long-term stormwater discharges and implementation of pollution protection measures. These management practices are enforced under the campus Stormwater Management Program and ensure long-term protection related to stormwater pollution.

Therefore, the Projects would result in less than significant water quality impacts and is consistent with the hydrology/water quality analysis evaluated in the 2018 LRDP EIR.

b) The geotechnical investigation conducted at the VFVRC Project site determined that it would be unlikely for VFVRC Project construction to encounter groundwater. Groundwater is unlikely to be encountered during construction of the ECLR Project as well, due to the shallow excavation required and depths at which groundwater would be expected in this area. No removal of groundwater is proposed, as the Projects, similar to the rest of campus, would use potable and recycled water supplied by the City of San Diego Public Utilities Department via existing and future lines on UC San Diego's campus. The Projects would not result in impacts to groundwater resources and is consistent with the hydrology/water quality analysis evaluated in the 2018 LRDP EIR.

d) The entire UC San Diego campus is outside of the 100-year and 500-year flood hazard areas or any County-identified flood hazard areas. In addition, the Projects are not within an area that contains risk from seiches because this phenomenon is typically associated with land-locked bodies of water. The Projects are also not within SIO and therefore not at risk for inundation by tsunamis. Thus, the Projects would not result in significant impacts related to potential pollutant release during floods, tsunamis, and seiches. The Projects are consistent with the hydrology/water quality analysis evaluated in the 2018 LRDP EIR.

e) Construction activities could result in significant short-term water quality impacts from uncontrolled sediment and pollutants in stormwater runoff that could conflict with the policies of the Basin Plan. The proposed Projects would be required to comply with the UC San Diego

Design Guidelines, policies, SWMP and other regulatory requirements related to storm water runoff to minimize the potential for pollutants to enter receiving waters.

Operation of the Projects could result in significant long-term water quality impacts from uncontrolled pollutants in stormwater runoff. As such, the proposed Projects would integrate a number of storm water BMPs to promote on-site treatment prior to being discharged. The VFVRC Project's Hydrology Study determined that with the minor increase in stormwater flows during the 10-year and 100-year storm events, storm water flows from the proposed Project would slightly increase, but would be reduced and captured via measures including vegetated swales and retention basins. Similarly, the ECLR Project would implement landscaped storm water management features that would ensure storm water flows from the Project areas would not exceed, or be reduced from, existing conditions.

With the incorporation of the proposed site design, source control, and treatment control BMPs and the continued implementation of UC San Diego Design Guidelines, SWMP and other regulatory requirements, water quality impacts associated with changes in stormwater runoff would be minimized and would not conflict with or obstruct implementation of the campus stormwater management system. In addition, the Projects are not in an area governed by a sustainable groundwater management plan. Therefore, impacts would be less than significant, and the Projects are consistent with the hydrology and water quality analysis evaluated in the 2018 LRDP EIR.

4.1.10 Land Use and Planning

Section 3.9 of the 2018 LRDP EIR addresses the land use and planning effects of campus growth under the 2018 LRDP and determined that its implementation would not result in inconsistencies with applicable land use plans, policies, and regulation (Section 3.9.3.1). In addition, as noted in Section 3.9.5 of the 2018 LRDP EIR, there is no potential for significant impacts related to physically dividing an established community or conflict with a Habitat Conservation Plan or Natural Community Conservation Plan (NCCP) Program.

No mitigation is required for land use and planning impacts as described in the 2018 LRDP EIR.

LAND USE AND PLANNING Would the Project…	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR		
		No Impact	Less-than-Significant Impact	Potentially Significant Impact
a) Physically divide an established community?	☒	☐	☐	☐
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☒	☐	☐	☐

a) The Projects do not involve any development outside of established campus properties or boundaries, and no incursion into, or division of, the surrounding residential communities would occur. The Projects would not result in an impact and is consistent with the land use analysis evaluated in the 2018 LRDP EIR.

b) As described in Section 3 of this document, the Projects are consistent with the objectives, population forecasts and building space projections in the 2018 LRDP, which is the applicable land use plan for the UC San Diego campus. The Projects would not result in significant environmental impacts due to a conflict with a land use plan, policy, or regulation and is consistent with the land use analysis evaluated in the 2018 LRDP EIR.

4.1.11 Noise

Section 3.10 of the 2018 LRDP EIR addresses the noise effects of campus growth under the 2018 LRDP and concludes there is the potential for significant impacts due to noise-sensitive land uses being exposed to noise levels in excess of applicable standards (Section 3.10.3.1); exposure of vibration sensitive land uses to or the generation of excessive groundborne vibration or groundborne noise levels (Section 3.10.3.2); permanent increases in ambient noise levels (Section 3.10.3.3); and temporary increases in ambient noise levels (Section 3.10.3.4). No potential for significant impacts from noise produced by a private, public or public use airport (Section 3.10.5).

The mitigation framework in the 2018 LRDP addresses these potentially significant impacts by evaluating whether screening distances can be observed to avoid the impact; requiring site-specific studies based on the type of noise source; and integrating source-specific controls into project designs to reduce noise levels at sensitive land uses as required by MM Noi-1A through Noi-1F. MM Noi-2A requires new vibration sensitive uses near the trolley to prepare a vibration mitigation program to identify controls to reduce vibration effects and the incorporation of those controls into project designs. Certain construction projects are required to prepare and implement a construction vibration program to comply with MM Noi-2B. Implementation of these measures would reduce future project-level impacts from noise and vibration to less than significant levels.

NOISE Would the Project…	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR		
		No Impact	Less-than-Significant Impact	Potentially Significant Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☒	☐	☐	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☒	☐	☐	☐
c) For a project located within the vicinity of a private airstrip or within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☒	☐	☐	☐

a) **Temporary Noise Increases:** Construction activities associated with the Projects could temporarily expose noise-sensitive land uses to noise levels in excess of standards due to their proximity to the Project sites or use of certain construction equipment. Pursuant to the 2018 LRDP EIR, potentially sensitive land uses include inpatient healthcare but not outpatient healthcare. Temporary noise impacts due to construction activities are anticipated to occur when noise-sensitive land uses are located 150 feet or less from active construction.

The nearest inpatient healthcare use to the Projects is the Thornton Pavilion at the Jacobs Medical Center located approximately 300 feet to the southwest of the VFVRC Project site and over 500 feet to the southwest of the ECLR Project, at the nearest point, and therefore construction noise would not be considered a significant impact. While not considered a noise-sensitive use per the 2018 LRDP EIR, multiple outpatient healthcare facilities are located within 150 feet of proposed construction activities: the Koman Family Outpatient Pavilion, Moores Cancer Center, Shiley Eye Institute, Anne Ratner Children's Eye Center, Glaucoma and Retina Center, Radiation Oncology Center, and La Jolla Institute for Immunology. Though not considered noise-sensitive land uses because they do not house inpatient care, out of respect for the healthcare programs, the Projects would comply with MM Noi-1F, which requires the integration of construction noise mitigation recommendations into the contractor specifications and its implementation during construction. Nighttime or early morning work may be required to avoid conflicts with the surrounding uses, to avoid conflict with peak traffic periods, and/or to accommodate certain construction scenarios such as lengthy concrete pours that require work outside of the allowed work limits.

Therefore, the mitigation framework in the 2018 LRDP EIR would ensure that construction-related noise impacts would be less than significant and the Projects are consistent with the noise analysis evaluated in the 2018 LRDP EIR.

Permanent Noise Increase: Implementation of the Projects would contribute to projected increases in traffic noise along local roadways; however, Project-related traffic would not result in a substantial noise increase because the overall change in noise levels would be less than 3 decibels (dB) which would be imperceptible to noise-sensitive land uses adjacent to the roads (as shown in Table 3.10-11 in the 2018 LRDP EIR). The Projects would also not involve the establishment of new noise-sensitive land uses near local roads, the Mid-Coast trolley line or in close proximity to existing stationary noise sources (i.e., HVAC units, utility plants or parking structure ventilation units). Therefore, less than significant noise impacts would occur due to Project implementation and the Projects are consistent with the noise analysis evaluated in the 2018 LRDP EIR.

b) Heavy earth-moving equipment would be utilized during site grading, which can produce some levels of groundborne vibration and groundborne noise. However, no impact-type pile driving, which produces greater vibration and noise levels, would be required. The use of earth moving equipment would be outside of the applicable screening distance identified in Table 3.10-16 for the nearest vibration-sensitive land use (in-patient medical care, located approximately 300 feet from the Project). No noise sensitive land uses are situated within 150 feet of proposed construction activities and excessively noisy or vibration-generating construction equipment would not be required to implement the Projects; therefore, temporary noise impacts would be less than significant, consistent with the noise analysis evaluated in the 2018 LRDP EIR.

c) Because there are no private airstrips within two miles of the UC San Diego campus and the campus is not located within the 60 dBA CNEL contour of any airport, including MCAS Miramar and the Medical Center heliport operations; there is no potential for significant noise impacts from aircraft operations in the Project area. Therefore, the Projects are consistent with the noise analysis evaluated in the 2018 LRDP EIR.

4.1.12 Population and Housing

Section 3.11 of the 2018 LRDP EIR addresses the population and housing effects of implementing the 2018 LRDP and concludes that plan implementation would result in the direct inducement of substantial population growth in the area (Section 3.11.3.1). However, the 2018 LRDP would not result in indirect inducement of substantial population growth due to the extension of roads or other infrastructure (Section 3.11.3.1). Less than significant impacts are identified for the temporary displacement of existing on-campus housing and people (Section 3.11.3.2). No feasible mitigation is available for direct inducement of substantial population growth in the area; therefore, the population-related impacts of the campus growth are unavoidable.

POPULATION AND HOUSING	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR		
Would the Project…		No Impact	Less-than-Significant Impact	Potentially Significant Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☒	☐	☐	☐
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☒	☐	☐	☐

a) The project VFVRC facility could support a maximum occupancy of approximately 1,200 people; however, this does not equate to an increase in population by 1,200 people as many of the building occupants would be already employed by UC San Diego. However, due to planned program expansion of the Viterbi Family Ophthalmology Department, the Project would incrementally increase the number of staff on the UC San Diego campus (by approximately 250 people), which would contribute to a direct population growth in the region; however, the level of growth is consistent with 2018 LRDP population projections, as discussed in Section 3 of this Addendum. No new roads would be extended into undeveloped areas as part of the Projects and any utility upgrades would be sized to accommodate projected campus growth as noted in Section 2 of this Addendum. Therefore, the Projects are consistent with the population and housing analysis evaluated in the 2018 LRDP EIR.

b) The Projects would not temporarily displace a substantial number of people on the campus or create a demand for new housing that cannot be accommodated locally. Therefore, no potential for an impact would occur, consistent with the population and housing analysis evaluated in the 2018 LRDP EIR.

4.1.13 Public Services

Section 3.12 of the 2018 LRDP EIR addresses the physical effects of providing public services to meet the needs of the campus growth under the 2018 LRDP and determines that less than significant environmental impacts would occur due to the need for additional fire protection facilities (Section 3.12.3.1), police protection facilities (Section 3.12.3.2), and public school facilities (Section 3.12.3.3). No mitigation is required for public services impacts as described in the 2018 LRDP EIR.

PUBLIC SERVICES Would the Project…	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR: No Impact	Impact Not Examined in 2018 LRDP EIR: Less-than-Significant Impact	Impact Not Examined in 2018 LRDP EIR: Potentially Significant Impact
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
i) Fire protection?	☒	☐	☐	☐
ii) Police protection?	☒	☐	☐	☐
iii) Schools?	☒	☐	☐	☐
iv) Parks?	☒	☐	☐	☐
v) Other public facilities	☒	☐	☐	☐

a) Implementation of the Projects would contribute to the overall need for new fire and police protection and school, park, and other public facilities in the University area, but not at a level that would require new facilities beyond those that exist or are already planned by the various service providers nor would any new facilities result in a significant physical impact to the environment. Therefore, the Projects are consistent with the public services analysis evaluated in the 2018 LRDP EIR.

4.1.14 Recreation

Section 3.13 of the 2018 LRDP EIR addresses the environmental effects associated with modifying recreational facilities to meet the needs of campus growth under the 2018 LRDP and concludes that despite the increase in usage of on- and off-campus recreational facilities, less than significant impacts would occur (Section 3.13.3.1). Any construction and expansion of recreational facilities would be addressed through compliance with the 2018 LRDP EIR mitigation framework and less than significant impacts would occur (Section 3.13.3.2). No mitigation is required for recreation impacts as described in the 2018 LRDP EIR.

RECREATION Would the Project…	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR		
		No Impact	Less-than-Significant Impact	Potentially Significant Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☒	☐	☐	☐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☒	☐	☐	☐

a) The incremental increase in campus population attributable to the Projects (approximately 250 people) would contribute to increase demands for recreation facilities on and off campus. The 2018 LRDP anticipates the need for new recreation facilities and the campus would continue to manage and maintain its existing recreation facilities. The City of San Diego would continue to expand and maintain its off-campus recreation facilities in response to its own population growth, whose residents could include the new campus population associated with the Projects. Additionally, the population growth attributable to the proposed Projects was anticipated by the 2018 LRDP and evaluated in the 2018 LRDP EIR. Substantial physical deterioration in recreation facilities is, therefore, not expected to occur as a result of the Projects. Therefore, the Projects are consistent with the public services analysis evaluated in the 2018 LRDP EIR.

b) Implementation of the Projects would not require the construction or expansion of recreational facilities but would contribute to the campus-wide need for new or expanded facilities. The environmental impacts associated with the development of new campus recreational facilities would be less than significant or would be mitigated to below a level of significance through the application of the mitigation framework in the 2018 LRDP EIR. Therefore, the Projects are consistent with the recreation analysis evaluated in the 2018 LRDP EIR.

4.1.15 Transportation and Circulation

Section 3.14 of the 2018 LRDP EIR addresses the transportation and traffic effects of campus growth under the 2018 LRDP. The 2018 LRDP EIR concludes that traffic associated with plan implementation would result in cumulatively significant impacts due to exceedances of level of service (LOS) criteria in the Near-Term (Year 2025) and Long-Term (Year 2035) Scenarios for intersections, street segments, freeway mainline segments, and freeway ramp meters in the area (Section 3.14.3.1). However, implementation of the 2018 LRDP would not cause substantial additional vehicle miles travelled (VMT) to exceed the regional averages for applicable campus land uses therefore less than significant VMT impacts are identified (Section 3.14.3.2). In addition, implementation of the 2018 LRDP would not conflict with applicable policies, plans, or programs regarding safety or performance of public transit, bicycle, or pedestrian facilities and its impact would be less than significant (Section 3.14.3.3). There is no potential for significant impacts to air traffic patterns, conflicts with a congestion management plan, safety hazards due to a design feature or incompatible uses, or inadequate emergency access (Section 3.14.5).

The 2018 LRDP mitigation framework includes programmatic mitigation to reduce or minimize the LOS impacts of plan implementation, as described in Section 3.14.3.1 of the 2018 LRDP EIR. Specifically, the campus would implement MM Tra-1A-OPT2 by funding and installing the needed improvements at a subset of impacted intersections, and freeway ramp meters in phases over the next five years. UC San Diego would work with the City of San Diego and Caltrans to obtain the appropriate agreements and permits. Despite these improvements, impacts would be cumulatively significant and unavoidable as described in Section 3.14.3.1 of the 2018 LRDP EIR. No project-level mitigation measures are required for cumulative traffic impacts.

On September 27, 2013, SB 743 was signed into law, which changed the way that transportation impacts are analyzed under CEQA. The transportation impact assessment updates to the CEQA Guidelines required under SB 743 were approved on December 28, 2018, and were required to be implemented statewide by July 1, 2020. Under the new (i.e., current) CEQA transportation guidelines, LOS, or vehicle delay, is no longer considered an environmental impact under CEQA; and, VMT has been adopted as the most appropriate measure of transportation impacts under CEQA. Therefore, this Addendum addresses the Project's consistency with the Program EIR's VMT analysis.

TRANSPORTATION/TRAFFIC Would the Project…	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR		
		No Impact	Less-than-Significant Impact	Potentially Significant Impact
a) Conflict with an applicable plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☒	☐	☐	☐
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☒	☐	☐	☐
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☒	☐	☐	☐
d) Result in inadequate emergency access?	☒	☐	☐	☐

a) Implementation of the Projects would not conflict with applicable policies, plans, or programs regarding safety or performance of public transit, roadway, bicycle, or pedestrian facilities. The VFVRC Project has been designed to enhance pedestrian access and circulation to the site and within the greater neighborhood. The proposed road realignments would include enhanced multi-modal infrastructure via high visibility bike lanes, improved sidewalks, and high visibility pedestrian/bicycle crossings as described in Section 2.5.2. As noted in Section 3.14.3.2 of the 2018 LRDP EIR, UC San Diego continues to look for opportunities to close gaps in the bicycle/pedestrian network in and adjacent to campus and improve last mile connections to campus trolley stations, whenever feasible. Therefore, less than significant impacts would occur and the Projects are consistent with the transportation analysis evaluated in the 2018 LRDP EIR.

b) CEQA Guidelines section 15064.3 pertains to impacts associated with vehicle miles traveled (VMT). As part of the 2018 LRDP EIR, a six-tier analysis of VMT impacts was conducted in accordance with the concepts expressed in Senate Bill (SB) 743. As shown in that comprehensive analysis, the 2018 LRDP VMT per resident, VMT per employee, and VMT per capita would be measurably lower than the regional and City averages. In addition, the campus TDM program combined with its location within a transit priority area (TPA) would lower auto dependency and VMT over time. The VFVRC occupants would be campus employees that would benefit from the campus TDM programs including subsidized transit passes. Pedestrian amenities to be constructed with the VFVRC project would also encourage building employees to commute to work via the UC San Diego Blue Line Trolley, as the nearest UC San Diego Health La Jolla Trolley Station is located a short walk away. The ECLR also project ties into the existing TDM program by providing for enhanced pedestrian and bicycle circulation to the site and within the greater neighborhood. Employees working at the new facility would have access to all UC San Diego employee alternative transportation programs and incentives, including subsidized transit passes. Additionally, the ECLR project would reduce parking supply which can encourage use of alternative modes of transportation. Therefore, less than significant impacts would occur and the Project is consistent with the transportation analysis evaluated in the 2018 LRDP EIR.

c) The VFVRC Project would not change the campus circulation system or off-site circulation system nor would it substantially increase hazards due to design features or incompatible uses. While the ECLR Project would change the local circulation system within the Health Sciences East Neighborhood, it would make access more efficient and intuitive and would not increase hazards due to design features or incompatible uses. Therefore, no impacts would occur and the Project is consistent with the transportation analysis evaluated in the 2018 LRDP EIR.

d) Upon implementation of the Projects, the campus would amend the emergency access route map, as necessary, to ensure that adequate fire protection and emergency access is maintained on campus at all times, which would be reviewed and approved by the Campus Fire Marshal. Therefore, no impacts would occur and the Project is consistent with the transportation analysis evaluated in the 2018 LRDP EIR.

4.1.16 Utilities and Service Systems

Section 3.15 of the 2018 LRDP EIR addresses the physical effects of expanding the utility infrastructure and the energy demands associated with campus growth under the 2018 LRDP and concludes that less than significant impacts would occur related to wastewater treatment capacity (Section 3.15.3.1); new and expanded water and wastewater infrastructure (Section 3.15.3.2); new or expanded storm water drainage facilities (Section 3.15.3.3), water supply availability (Section 3.15.3.4); and compliance with statutes and regulations related to solid waste management (Section 3.15.3.5). The 2018 LRDP EIR further determines there is no potential for significant impacts related to solid waste disposal needs or the capacity of local infrastructure to impact the provision of solid waste services or impair the attainment of solid waste reduction goals. No mitigation is required for utilities, service systems or energy impacts as described in the 2018 LRDP EIR.

UTILITIES, SERVICE SYSTEMS AND ENERGY Would the Project…	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR		
		No Impact	Less-than-Significant Impact	Potentially Significant Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities or expansion of existing facilities, the construction or relocation of which could cause significant environmental effects?	☒	☐	☐	☐
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?	☒	☐	☐	☐
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the providers existing commitments?	☒	☐	☐	☐
d) Generate solid waste in excess of State or local standards or the capacity of local infrastructure or negatively impact the provision of solid waste services or impair the attainment of solid waste reduction goals?	☒	☐	☐	☐
e) Comply with federal, state, and local management and reduction statues and regulations related to solid waste?	☒	☐	☐	☐

a) During the Project planning and design phase for the Project, UC San Diego Campus Planning, CPM, and DDS staff conducted a review of the Projects' utility needs to verify that adequate infrastructure would be available to serve its domestic water, wastewater, storm water, energy, and telecommunication needs. Additionally, as part of the site evaluation process and/or site feasibility study, the Campus Planner also consulted the Master Infrastructure Plan (MIP) and CPM/DDS engineers to identify any capacity constraints and determine whether system improvements would be required to support the Projects. The existing utilities are adequate to serve the needs of the proposed facility, and no major upgrade or off-site improvements are required to maintain adequate service to the Projects. As discussed in Section 4.1.9, Hydrology and Water Quality, the Projects includes low impact design features or stormwater BMPS that would address the stormwater regulation requirements. Therefore, less than significant impacts would occur and the Projects are consistent with the utilities and service systems analysis evaluated in the 2018 LRDP EIR.

b) Implementation of the Projects would increase potable water usage on the campus, but not beyond levels anticipated in the City's Water Supply Assessment Report prepared for the 2018 LRDP. The VFVRC project has been designed with water conservation in mind, with low-flow water fixtures throughout. Both the VFVRC and ECLR Projects would tie-in to the existing recycled water system for all irrigation. The VFVRC Project would meet, at a minimum, the requirements of LEED Silver which include water conservation measures. Therefore, less than significant impacts would occur and the Projects are consistent with the utilities and service systems analysis evaluated in the 2018 LRDP EIR.

c) Implementation of the VFVRC Project would increase the amount of on-campus building space and the on-campus residential population. Such increases would result in the generation and discharge of additional wastewater from the campus; the additional wastewater which would require treatment at the Point Loma Wastewater Treatment Plant (PLWTP). However, the PLWTP would have more than adequate capacity to receive and treat wastewater from UC San Diego and existing commitments. Additionally, water conservation efforts implemented on campus, including the Project, would further reduce flow rates from the campus. The ECLR Project would generate waste water. Therefore, less than significant impacts would occur and the Projects are consistent with the utilities and service systems analysis evaluated in the 2018 LRDP EIR.

d) Implementation of the 2018 LRDP would not result in inadequate capacity of solid waste facilities in the region such that construction of a new landfill or expansion of an existing landfill would be necessary. As noted above under item e, the Projects would minimize its waste disposal needs and assist the state and local agencies in achieving their applicable solid waste management and diversion goals. No impacts would result and the Projects are consistent with the utilities and service systems analysis evaluated in the 2018 LRDP EIR.

e) Project implementation would require demolition, clearing/grubbing, and grading activities that would produce excavated soils, green waste, asphalt/concrete, and other construction and demolition waste. Building operations would contribute additional non-recyclable/non-reusable waste which would be deposited at Miramar Landfill, after accounting for waste reduction and diversion. However, the Projects would comply with applicable waste reduction and diversion programs as part of the campus-wide effort to meet the UC Sustainable Practices Policy's zero waste goal. Therefore, the Projects would minimize its waste disposal needs and assist the state and local agencies in achieving their applicable solid waste management and diversion goals, resulting in less than significant impacts. The Projects are consistent with the utilities and service systems analysis evaluated in the 2018 LRDP EIR.

4.1.17 Wildfire

Since the 2018 LRDP EIR was certified, the CEQA Guidelines were amended to provide new requirements to address a project's impacts on wildfire hazards. This section of this Addendum addresses those new questions, which were not explicitly addressed in the 2018 LRDP EIR. Relevant information provided in the 2018 LRDP EIR along with new project-specific information is relied upon to make new impact determinations.

WILDFIRE Would the Project…	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR		
		No Impact	Less-than-Significant Impact	Potentially Significant Impact
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐
c) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐
d) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐

a) UC San Diego has an Emergency Operations Plan that addresses planned responses instructions and procedures to various levels of human-made or natural emergency situations for all campus staff, students, and visitors. It provides information for building evacuation, emergency supplies, and related emergency contacts and information sources. Multiple emergency response regions are provided throughout the campus equipped to provide necessary supplies and trained personnel in the event of an emergency. During construction, the ECLR Project would result in lengthy lane closures due to the proposed road realignments; however, through vehicular access would be maintained at all times. As such, construction would not impede emergency fire access to any existing facility or accessible area in the Health Sciences East Neighborhood. Consistent with the 2018 LRDP, the Project would be reviewed by the Campus Fire Marshal to ensure that adequate fire protection and emergency access is maintained on campus at all times. As required by Mitigation Measure Haz-6, UC San Diego would require the construction contractor to notify the Campus Fire Marshal and community to prevent conflicts with emergency access or evacuation routes during construction. Implementation of Mitigation Measure Haz-6, which requires the notification of the Campus Fire Marshal and campus community at large prior to the start of construction, would reduce impacts to less than significant levels. Therefore, the Projects would not result in any new significant environmental effects.

b) Vegetation used for landscaping, vehicles, and small machinery could exacerbate wildfire risk and expose project occupants to wildfire pollutants. However, per CBC standards, building sprinkler systems would be provided in the new facility. All landscaping would be irrigated and maintained so that there would not be buildup of dead/dying plant material that would pose a fire risk. Implementation of these fire protection measures, fuel management regulations, and compliance with associated regulations would ensure impacts to project occupants due to wildfire pollutants under the proposed Projects would be less than significant. Therefore, the Projects would not result in any new significant environmental effects regarding exposure of project occupants to pollutant concentrations from a wildfire.

c) Installation and/or maintenance associated with new infrastructure would be necessary for the Projects. However, this would not exacerbate fire risk due to its location within the campus where fire protection measures including fuel management zones and building review by the Campus Fire Marshal. Any temporary or ongoing impacts to the environment resulting from the installation and maintenance of infrastructure is part of ongoing operations and projected future development of the campus and therefore evaluated under the 2018 LRDP EIR. Therefore, the Projects would not result in any new significant environmental effects regarding installation or maintenance of associated infrastructure.

d) According to the geotechnical investigation conducted for the Projects, the Projects are not at risk of downslope or downstream flooding or landslides. As such, runoff, post-fire slope instability, or drainage changes are not expected to put the proposed structure or other existing structures at risk. Therefore, the Projects would not result in any new significant environmental effects regarding downstream or down slope flooding.

4.1.18 Mandatory Findings of Significance

	Impact Examined in 2018 LRDP EIR	Impact Not Examined in 2018 LRDP EIR		
		No Impact	Less-than-Significant Impact	Potentially Significant Impact
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☐	☐	☐

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

a) All applicable mitigation measures identified in the 2018 LRDP EIR to avoid and reduce impacts are integrated into the proposed Projects and with the integration of these measures, the Project would not degrade the quality of the environment. As described in Section 4.1.3, *Biological Resources*, of this Addendum, the Projects would not affect fish or wildlife habitat or species. The site is developed and mostly devoid of sensitive biological resources, except potential bird nesting habitat (landscape trees and shrubs), which would be addressed by 2018 LRDP EIR MMs.

As described in Section 4.1.4, *Cultural and Tribal Cultural Resources*, no historic architectural resources were identified on the Project sites and the Project sites are not within an area of known archaeological sensitivity. Therefore, the Projects would not eliminate any examples of the major periods of California history or prehistory.

b) The 2018 LRDP EIR identified significant and unavoidable cumulative impacts to air quality (construction, operational and toxic air contaminant emissions), cultural resources (historical resources and tribal cultural resources), population and housing (physical effects of population growth), transportation/traffic (levels of service) and growth inducement (regional growth). As part of the 2018 LRDP EIR development program, the Projects would contribute to some of these significant and unavoidable impacts (i.e., air quality: construction, operational, and toxic air contaminant emissions; population and housing; transportation/traffic; and growth inducement) as described in this Addendum. However, the Projects are within the scope of campus development and population evaluated in the 2018 LRDP EIR as noted in Section 3 of this document. The Projects are consistent with the 2018 LRDP, including its objectives and growth projections, and furthers the mission of the University in terms of research and public service.

These impacts were also addressed in the Findings and Statement of Overriding Considerations adopted by The Regents in connection with its approval of the 2018 LRDP. No conditions have changed, and no new information has become available since certification of the 2018 LRDP EIR that would alter this previous analysis. No additional mitigation is available to reduce the Project's contribution to these previously identified impacts.

c) As described above, the Projects would incrementally contribute to cumulative air quality (toxic air contaminants) that were identified as significant and unavoidable as well as cumulatively considerable in the 2018 LRDP EIR. The Projects' construction and operation emissions are within the scope of impacts examined in the 2018 LRDP EIR. These impacts were also addressed in the Findings and Statement of Overriding Considerations adopted by The Regents in connection with its approval of the 2018 LRDP.

Effects of the Projects would not result in substantial adverse effects on human beings beyond those analyzed in the 2018 LRDP EIR. No conditions have changed, and no new information has become available since certification of the 2018 LRDP EIR that would alter this analysis. No additional mitigation is available to reduce the Projects' contribution these impacts. Other impacts with the potential to affect human beings were determined to be less than significant.

5 APPLICABLE MITIGATION MEASURES

The following mitigation measures from the certified 2018 LRDP EIR Mitigation Monitoring and Reporting Program (MMRP) would be applicable to the potential impacts associated with the VFVRC and/or ECLR Projects. Each measure listed below indicates whether it applies to the VFVRC Project, the ECLR Project, or both Projects. No new significant impacts or increased severity in impacts that were not analyzed in the 2018 LRDP EIR have been identified; therefore, no additional project-specific mitigation is required.

Mitigation Measure	**Applicable Project(s)**
Aesthetics	
Aes-2A: Prior to project design approval, any proposed project that would have the potential to substantially degrade the visual character of the campus shall undergo design review by the UC San Diego Design Review Board (DRB) to ensure that the design is consistent with the visual landscape and/or the character of the surrounding development. The design review process shall evaluate and incorporate, where appropriate, factors including but not necessarily limited to: building mass and form, building proportion, roof profile, architectural detail and fenestration, texture, color, type and quality of building materials, and landscaping.	VFVRC
Air Quality	
AQ-2A: Implement Measures to Control PM Emissions Generated by Construction Activities. UC San Diego shall require by contract specification that contractors implement the following measures during all phases of construction of individual projects developed under the proposed 2018 LRDP: • Water the grading areas a minimum of twice daily to minimize fugitive dust; • Stabilize graded areas as quickly as possible to minimize fugitive dust; • Apply chemical stabilizer or pave the last 100 feet of internal travel path within the construction site prior to public road entry; • Install wheel washers adjacent to a paved apron prior to vehicle entry on public roads; • Remove any visible track-out into traveled public streets via regular street sweeping; • Wet wash the construction access point at the end of each workday if any vehicle travel on unpaved surfaces has occurred; • Provide sufficient perimeter erosion control to prevent washout of silty material onto public roads;	VFVRC and ECLR

• Cover haul trucks or maintain at least 12 inches of freeboard to reduce blow-off during hauling; • Suspend all soil disturbance and travel on unpaved surfaces if winds exceed 25 mph; • Cover/water onsite stockpiles of excavated material; • Enforce a 15-mph speed limit on unpaved surfaces; • On dry days, dirt and debris spilled onto paved surfaces shall be swept up immediately to reduce re-suspension of particulate matter caused by vehicle movement. Approach routes to construction sites shall be cleaned daily of construction-related dirt in dry weather; • Disturbed areas shall be hydroseeded, landscaped, or developed as quickly as possible to reduce dust generation; and • Limit the daily grading volumes/area to extent feasible.	
AQ-2B: <u>Minimize Off-Road Construction Equipment Emissions</u>. UC San Diego shall require by contract specification that the construction contractor use off-road construction diesel engines that meet, at a minimum, the Tier 4 interim California Emissions Standards, unless such an engine is not available for a particular item of equipment. Tier 3 engines will be allowed on a project-by-project basis when the contractor has documented that no Tier 4 interim equipment or emissions equivalent retrofit equipment is available or feasible for the project.	VFVRC and ECLR
Biological Resources	
Bio-2D: If project construction is scheduled to commence during the raptor nesting season (generally January 15 through July 31), pre-construction surveys for raptor nests shall be performed by a qualified biologist within 500 feet of project construction activities no more than seven days prior to the initiation of construction. Construction activities within 500 feet of an identified active raptor nest shall not commence during the breeding season until a qualified biologist determines that the nest is no longer active and any young birds in the area have adequately fledged and are no longer reliant on the nest. Trees with inactive nests can be removed outside the breeding season without causing an impact.	VFVRC and ECLR
Bio-2E: No grubbing, trimming, or clearing of vegetation (including brush management) from project sites shall occur during the general avian breeding season (February 15 through August 31). If grubbing, trimming, or clearing cannot feasibly occur outside of the general avian breeding season, a qualified biologist shall perform a pre-construction nesting bird survey no more than seven days prior to the commencement of vegetation clearing or grubbing to determine if active bird nests are present in the affected areas. Should an active migratory bird nest be located, the project biologist shall direct vegetation clearing away from the nest until it has been determined by the project biologist that the young have fledged, or the nest has failed. If there are no nesting birds (includes nest building or other breeding/nesting behavior) within the survey area, clearing, grubbing, and grading shall be allowed to proceed.	VFVRC and ECLR

Bio-3E: Prior to construction, a pre-construction meeting shall be held between the Project Manager, qualified Biologist, Environmental Planner, and construction crews to ensure crews are informed of the sensitivity of habitats in the Open Space Preserve and adjacent undeveloped lands. i. Prior to commencement of clearing or grading activities, fencing (e.g., silt fencing, orange construction fencing, and/or chain-link fencing as determined by campus planning) shall be installed around the approved limits of disturbance to prevent errant disturbance of sensitive biological resources by construction vehicles or personnel. Installation of fencing to demarcate the approved limits of disturbance shall be verified by the project biologist prior to initiation of clearing or grading activities. All movement of construction contractors, including ingress and egress of equipment and personnel, shall be limited to designated construction zones. This fencing shall be removed upon completion of all construction activities. ii. No temporary storage or stockpiling of construction materials shall be allowed within the Ecological Reserve or Restoration Lands, and all staging areas for equipment and materials shall be located at least 50 feet from the edge of these areas. This prohibition shall not be applied to facilities that are planned to traverse Ecological Reserve or Restoration Lands (e.g., trails and utilities). Staging areas and construction sites in proximity to the Ecological Reserve or Restoration Lands shall be kept free of trash, refuse, and other waste; no waste dirt, rubble, or trash shall be deposited in these areas. iii. Equipment to extinguish small brush fires (e.g., from trucks or other vehicles) shall be present on site during all phases of project construction activities, along with personnel trained in the use of such equipment. Smoking shall be prohibited in construction areas adjacent to flammable vegetation. iv. Temporary night lighting shall not be used during construction unless determined to be absolutely necessary. If night lighting is necessary, lights shall be directed away from sensitive vegetation communities and shielded to minimize temporary lighting of the surrounding habitat.	ECLR
Bio-3F: During project construction, a biological monitor shall visit the site weekly during site preparation and rough grading activities, and monthly following completion of rough grading, until construction is completed. During site visits, the monitor shall be responsible for ensuring that the construction activities and staging areas are restricted to the approved limits of work, and protective fencing is adequately maintained. The monitor shall be responsible for ensuring that the contractor adheres to the other provisions described above. The monitor, in cooperation with the on-site construction manager, shall have the authority to halt construction activities in the event that these provisions are not met. Monitors shall submit regular reports to the UC San Diego Campus Planning	ECLR

Office during construction documenting the implementation of construction measures Bio-3E.	
Bio-3G: The following best management practices shall be implemented for each project that would remove or install tree species on UC San Diego that may be used as host trees by SHBs i. Trees to be planted on UC San Diego shall be obtained from a reliable source and be free of sign of SHB infestation. ii. An education program for on-site workers responsible for tree installation shall be implemented. The program shall describe the signs of SHB infestation (e.g., sugary exudate on trunks or branches, and SHB entry/exit holes [approximately the size of the tip of a ballpoint pen]). iii. Sign of SHB infestation shall be reported to CDFW and UC Riverside's Eskalen Lab (www.eskalenlab.ucr.edu) by the UC San Diego Project Manager and/or the project biologist. iv. Trees with sign of SHB infestation shall be pruned or removed, as appropriate, and potential host materials shall be chipped to less than one inch prior to composting on site or transfer to a landfill. v. Equipment that is used to prune or remove SHB-infected trees shall be disinfected prior to additional use. vi. Biologists monitoring mitigation sites shall be knowledgeable regarding sign of SHB infestation.	VFVRC and ECLR
Bio-3I: Landscaping adjacent to the Open Space Preserve shall comply with the following requirements to prevent the introduction of invasive species: i. Appropriate landscaping shall be selected based on the vegetation communities within the portion of the Open Space Preserve adjacent to the project. In areas supporting native (or disturbed native) vegetation communities, revegetation of impacted slopes shall be with appropriate native plant materials. In particular, where the Open Space Preserve is disturbed by construction of the Campus Meander, installation of native plants such as lemonadeberry, toyon, deerweed (*Acmispon glaber*), monkey flower (*Diplacus aurantiacus*), and sages (*Salvia* spp.) are recommended to make the Open Space Preserve more impenetrable to people while reinforcing the boundaries and edges of the Campus Meander (The Harrison Studio 1997). ii. Only non-invasive plant species shall be included in the landscape plans for projects (species not listed on the California Invasive Plant Inventory prepared by the Cal-IPC [2006]). A qualified landscape architect and/or qualified biologist shall review landscape plant palettes prior to implementation to ensure that no invasive species are included.	ECLR

iii. Any planting stock brought onto a project site adjacent to the Open Space Preserve for landscaping or habitat restoration shall be inspected to ensure it is free of pest species that could invade natural areas, including but not limited to Argentine ants and South American fire ants. Inspections of planting stock for habitat restoration shall be by a qualified biologist, and inspections of planting stock for landscaping shall be the responsibility of qualified UC San Diego Project Manager or their designated assignee. Any planting stock found to be infested with such pests shall be quarantined, treated, or disposed of according to best management practices by qualified personnel, in a manner that precludes invasions into natural habitats.	
Bio-3J: Permanent lighting within or adjacent to the Ecological Reserve and Restoration Lands shall be selectively placed, shielded, and directed to minimize potential impacts to sensitive species. In addition, lighting from buildings or parking lots/structures abutting the Ecological Reserve shall be shielded and/or screened by vegetation to the extent feasible.	ECLR
Bio-3K: The following best management practices shall be implemented by the campus along areas that interface with the Open Space Preserve to address runoff/water quality impacts from landscaping: i. Integrated Pest Management principles (University of California Integrated Pest Management Program) shall be implemented to the extent practicable for areas in and adjacent to the Open Space Preserve for chemical pesticides, herbicides, and fertilizers. Examples of such measures may include, but are not limited to, alternative weed/pest control measures (e.g., removal by hand) and proper application techniques (e.g., conformance to manufacturer specifications and legal requirements). ii. Irrigation for project landscaping shall be minimized and controlled in areas in and adjacent to the Open Space Preserve through efforts such as designing irrigation systems to match landscaping water needs, using sensor devices to prevent irrigation during and after precipitation, and using automatic flow reducers/shut-off valves that are triggered by a decrease in water pressure from broken sprinkler heads or pipes.	ECLR
Cultural and Tribal Cultural Resources	
Cul-5B: <u>Monitoring.</u> Activities with the potential to cause a substantial adverse change to the significance of a TCR shall be monitored by a Native American tribal representative. Where the TCR is also considered a historical resource under CEQA, monitoring by a qualified archaeologist may also be required. i. Prior to any work that requires monitoring: a. UC San Diego shall enter into a Tribal Monitoring Agreement with the tribe. This agreement will specify procedures for the proper	VFVRC and ECLR

treatment of any tribal cultural resources and/or Native American human remains discovered during the monitoring. The agreement will also specify the roles and authorities of the Native American monitors and other participants. b. A preconstruction meeting shall be held that includes the tribal representative, archaeologist, Construction Manager and/or Grading Contractor, and other appropriate personnel so the tribal representative can make comments and/or suggestions concerning the Archaeological Monitoring Program to the Construction Manager and/or Grading Contractor. ii. Discoveries a. Discovery Process – In the event of a discovery, the tribal representative, in consultation with the Construction Project Manager, may divert, direct, or temporarily halt ground-disturbing activities in the area of discovery to allow for preliminary evaluation of potentially significant tribal cultural resources. The tribal representative shall also immediately notify Campus Planning of such findings at the time of discovery. b. Determination of Significance – The significance of the discovered resources shall be determined by the tribal representative in consultation with Campus Planning and the Native American Community, as appropriate. Campus Planning must concur with the evaluation before grading activities will be allowed to resume. c. If human remains are discovered, work shall halt in that area and the procedures detailed in the California Health and Safety Code (Section 7050.5) and the California PRC (Section 5097.98) and will be followed. iii. Notification of Completion – The tribal representative shall notify Campus Planning, as appropriate, in writing of the end date of monitoring.	
Hazards and Hazardous Materials	
Haz-4A: During project planning, EH&S shall be consulted in order to identify if any past contamination, USTs, ASTs, or other contamination could potentially occur in areas to be impacted. EH&S will consider the cases on file at the County of San Diego DEH and information on historical uses in the area to be impacted such as old maps and photos. If EH&S determines that there is limited potential for contamination to occur on site, no additional mitigation is necessary. If it is determined that contamination has potential to exist on a project site, Mitigation Measure Haz-4B shall be implemented.	VFVRC and ECLR
Haz-4B: If contamination exists on a proposed project site and if it poses a risk to human health or the environment, actions shall be taken prior to any construction, pursuant to applicable regulations, to remove or otherwise	VFVRC and ECLR

remediate the contamination through appropriate measures such as natural attenuation, active remediation, and engineering controls. Assessment and remediation activities shall incorporate the following conditions: i. All assessment and remediation activities shall be conducted in accordance with a work plan that is approved by the regulatory agency having oversight of the activities. ii. It may be necessary to excavate existing soil within the project site, or to bring fill soils into the site from off-site locations. At sites that have been identified as being contaminated or where soil contamination is suspected, appropriate sampling and classification are required prior to disposal of excavated soil. Contaminated soil shall be properly disposed of at an approved off-site facility. Fill soils also shall be sampled to ensure that imported soil parameters are within acceptable levels. iii. Caution shall be taken during excavation activities near existing groundwater monitoring wells, so that they are not damaged. Existing groundwater monitoring wells may have to be abandoned and reinstalled if they are located in an area that is undergoing redevelopment.	
Haz-4C: In the event that USTs, not identified in consultation with EH&S, or undocumented areas of contamination are encountered during construction or redevelopment activities, work shall be discontinued until appropriate health and safety procedures are implemented. Either the County of San Diego DEH or the San Diego RWQCB, depending on the nature of the contamination, must be notified regarding the contamination. Each agency and program within the respective agency has its own mechanism for initiating an investigation. The appropriate program (e.g., the DEH Local Oversight Program for tank release cases, the County of San Diego DEH Voluntary Assistance Program for non-tank release cases, the RWQCB for non-tank cases involving groundwater contamination) will be selected based on the nature of the contamination identified. The contamination remediation and removal activities will be conducted in accordance with pertinent regulatory guidelines, under the oversight of the appropriate regulatory agency.	VFVRC and ECLR
Haz-6: In the event that the construction of a project requires a lane or roadway closure on campus, prior to construction the contractor and/or Project Manager shall ensure that the UC San Diego Fire Marshal and campus community at large are notified. If determined necessary by the UC San Diego Fire Marshal, local emergency services will be notified by the Fire Marshal of the closure.	VFVRC and ECLR
Noise	
Noi-1F: If project construction activities resulting from implementation of the 2018 LRDP are proposed less than 150 feet of NSLU, or may involve the use of vibratory or impact-type pile drivers, impact-type equipment (including but not limited to: clam shovels, hydra break rams, hoe rams, and jackhammers), concrete saws, pavement scarifiers, sand blasters, or vibrating hoppers, mitigation shall be	VFVRC and ECLR

integrated into the project's construction specifications to minimize temporary noise caused by construction activities to less than significant levels: i. Require the construction contractor to work with proper administrative controls on equipment operation periods so as not to exceed a 12-hour average sound level of 75 dBA L_{eq} at any NSLU between 7:00 a.m. and 7:00 p.m. Monday through Saturday. ii. Outfit construction equipment with properly maintained, manufacturer-approved or recommended sound abatement means on air intakes, combustion exhausts, heat dissipation vents, and the interior surfaces of engine hoods and power train enclosures. iii. Locate (to the extent practical) steady-state, continuously operating stationary construction equipment such as generators, pumps, and air compressors at least 150 feet from nearby NSLUs. If this screening distance cannot be achieved in the field, consider deployment of temporary noise walls or acoustical blankets/curtains that would block direct sound paths between the operating equipment and the receptor(s) of concern. iv. Position (to the extent practical) construction laydown and vehicle staging areas as far from NSLUs as feasible. v. Inform, whenever possible and preferably with at least a two week advanced notice, all neighboring NSLUs expected to be exposed to elevated noise levels that a construction project would commence. vi. Where NSLU are expected to be less than 100 feet away, schedule anticipated loud construction activities, which could involve impact-type equipment and processes such as pile driving, jackhammering, pavement breaking, compactors, etc., to not coincide with any finals week of classes and recognized holidays. Adjust hours or days of the construction activity to occur before or after these noise-sensitive periods of the UC San Diego academic year.	

6 REFERENCES

The primary sources of information for the Addendum to the 2018 LRDP EIR are the 2018 LRDP and its EIR, including all relevant technical studies and references noted in those documents, which are incorporated by reference herein. Additional project-specific information has been added to supplement the information in those primary references.

UC San Diego. 2018a. *2018 Long Range Development Plan*. November.

UC San Diego. 2018b. *2018 Long Range Development Plan Environmental Impact Report (EIR)*. November.

KPFF. 2022. *CEQA Analysis Documentation - 5301 VFVRC Hydrology Study*. August.

NOVA Services. 2022. *Geotechnical Investigation 5301 Viterbi Family Vision Research Center.* September.

NBBJ. 2022a. *UCSD Viterbi Family Vision Research Center Final Report.* June.

NBBJ. 2022b. *UCSD Viterbi Family Vision Research Center Schematic Design*. June.

Group Delta. 2022. *Preliminary Geotechnical Reconnaissance East Campus Loop Road Realignment UCSD Project No. 5548. July.*

Appendix A: Geotechnical Investigation Report – 5301 Viterbi Family Vision Research Center

GEOTECHNICAL INVESTIGATION

5301 Viterbi Family Vision Research Center

La Jolla, California

UC San Diego, Capital Program Management
10280 North Torrey Pines Road, Suite 470
La Jolla, CA 92037

UC San Diego
CAPITAL PROGRAM MANAGEMENT

NOVA Project No. 2021183
September 23, 2021

NOVA Services

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September 23, 2021
NOVA Project No. 2021183

Subject: Geotechnical Investigation
5301 Viterbi Family Vision Research Center
La Jolla, California

Dear Juli:

NOVA Services, Inc. (NOVA) is pleased to present this report describing the geotechnical investigation and storm water infiltration testing performed for the Viterbi Family Vision Research Center project. The geotechnical investigation was conducted in general conformance with the scope of work presented in our proposal dated July 21, 2021 and authorized August 12, 2021.

This site is considered geotechnically suitable for the proposed development provided the recommendations in this report are followed.

NOVA appreciates the opportunity to be of service to UC San Diego on this project. If you have any questions regarding this report, please do not hesitate to call us at 858.292.7575 x 406.

Sincerely,
NOVA Services, Inc.

REGISTERED PROFESSIONAL ENGINEER THOMAS B. CANADY No. 50057 Exp. 6/30/2023 CIVIL STATE OF CALIFORNIA

Tom Canady, PE
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER JOHN F. O'BRIEN 651 EXP. 3/31/23 GEOTECHNICAL STATE OF CALIFORNIA

John F. O'Brien, PE, GE
Principal Geotechnical Engineer

Giovanni Norman
Staff Geologist, GIT

GEOTECHNICAL INVESTIGATION

5301 Viterbi Family Vision Research Center
La Jolla, CA

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1. INTRODUCTION

This report presents the results of the geotechnical investigation NOVA performed for the proposed Viterbi Family Vision Research Center on UC San Diego's East Campus in La Jolla, California. We understand the project will consist of the design and construction of an at-grade, four-story building and associated improvements. The purpose of NOVA's work is to provide conclusions and recommendations regarding the geotechnical aspects of the project. Figure 1-1 shows the approximate location of the proposed building site.

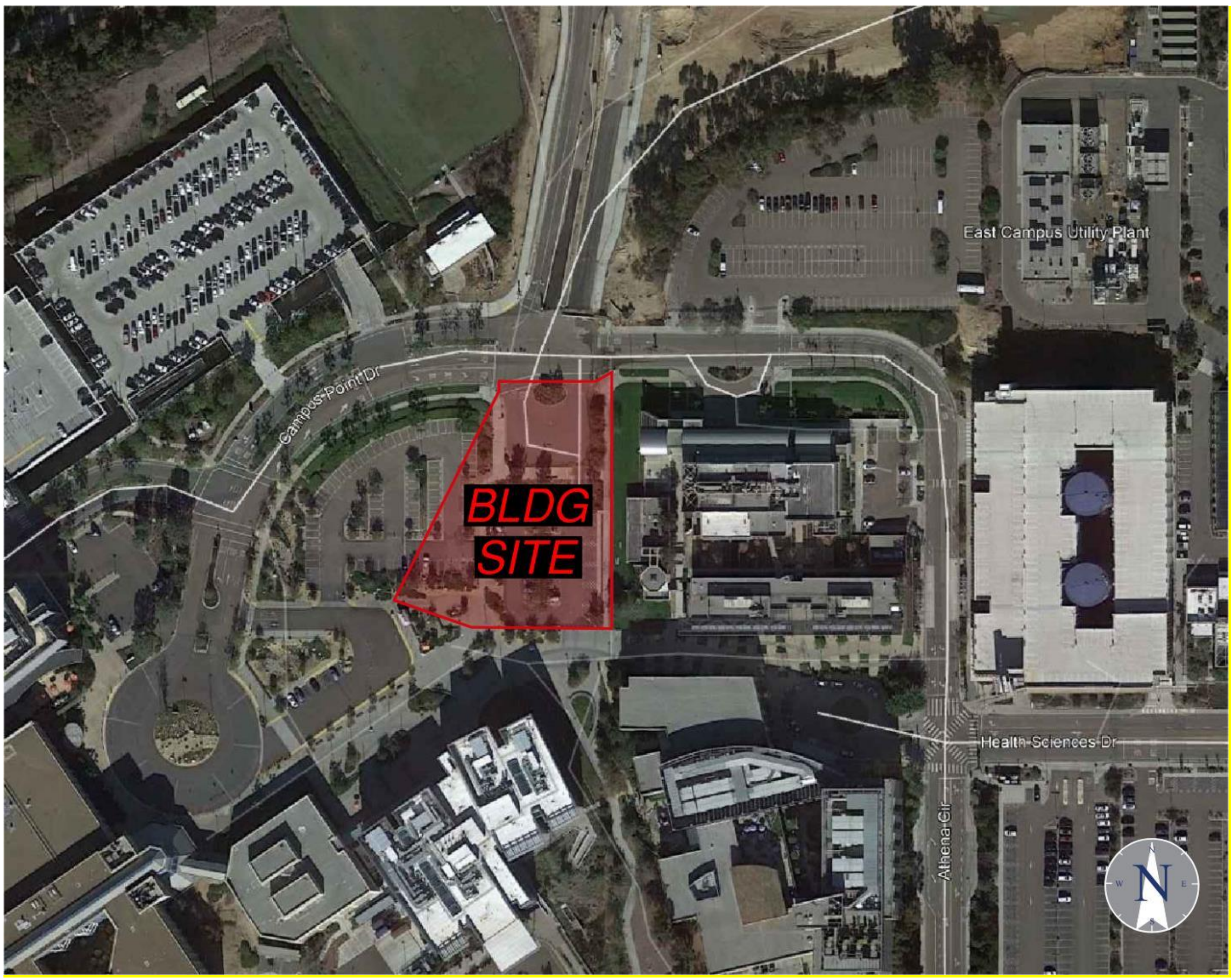

Figure 1-1. Location of Proposed Building Site

2. SCOPE OF WORK

2.1. Field Investigation

NOVA's field investigation consisted of drilling four (4) geotechnical borings (B-1 through B-3A) and one (1) percolation test boring (P-1) to depths up to about 31 feet below ground surface (bgs) using a truck-mounted drill rig equipped with a hollow stem auger or a hand auger. Boring B-3 was terminated at a depth of 7 feet bgs after very loose backfill and then pipe bedding gravel was encountered. Boring B-3A was terminated at a depth of 3½ feet bgs after a 3-inch diameter PVC pipe was exposed. Southern California Soil & Testing, Inc. (SCS&T) previously drilled several borings in the western portion the site and south of the site for the Outpatient Pavilion geotechnical investigations (SCS&T, 2013, 2014). Figure 2-1 presents the approximate locations of the current and previous borings.

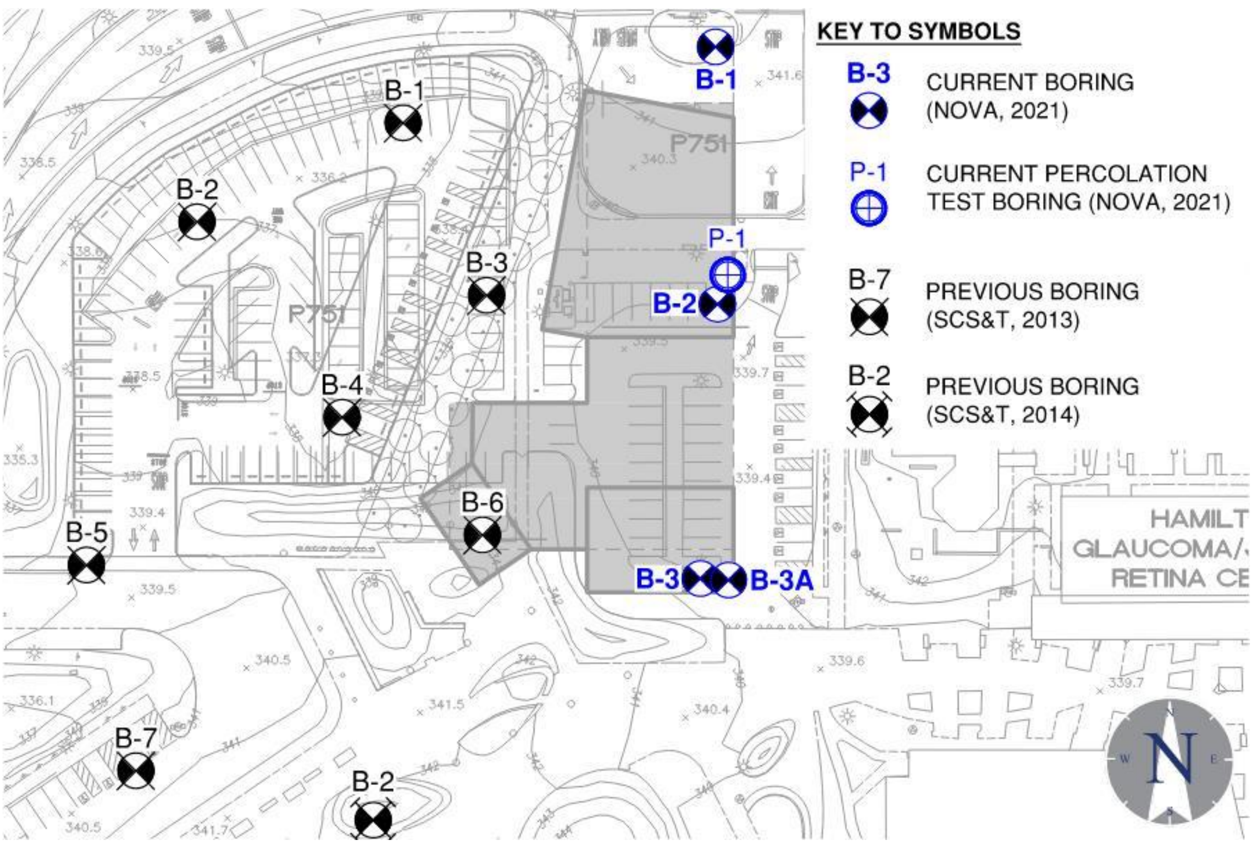

Figure 2-1. Locations of Current and Previous Borings

A NOVA geologist logged the current borings and collected samples of the materials encountered for laboratory testing. Relatively undisturbed samples were obtained using a modified California (CAL) sampler, a ring-lined split tube sampler with a 3-inch outer diameter and 2½-inch inner diameter. Standard Penetration Tests (SPT) were performed in the borings using a 2-inch outer diameter and 1⅜-inch inner diameter split tube sampler. The CAL and SPT samplers were driven using an automatic hammer with a calibrated Energy Transfer Ratio (ETR) of about 74%. The number of blows needed to drive the sampler the final 12 inches of an 18-inch drive is noted on the logs. Sampler refusal was encountered when 50 blows were applied during any one of the three 6-inch intervals, a total of 100 blows was applied, or there was no discernible sampler advancement during the application of 10 successive blows. The field blow counts, N, were corrected to a standard hammer (cathead and rope) with a 60% ETR. The corrected blow counts are noted on the boring logs as N_{60}. Disturbed bulk samples were obtained from the SPT sampler and the drill cuttings. Logs of the borings are presented in Appendix B. Soils are classified according to the Unified Soil Classification System.

2.2. Laboratory Testing

NOVA tested selected samples to evaluate soil classification and engineering properties and develop geotechnical conclusions and recommendations. The laboratory tests consisted of in-situ moisture and density, particle-size distribution, Atterberg limits, expansion index, R-value, corrosivity, and direct shear. Brief descriptions of the test procedures and the results of the laboratory tests are presented in Appendix C.

2.3. Borehole Percolation Testing

NOVA performed borehole percolation testing in accordance with the test method described in the City of San Diego BMP Design Manual (City of San Diego, 2018). The procedure is discussed in Section 8 of this report, and infiltration worksheets are presented in Appendix D.

2.4. Environmental Soils Testing

NOVA subcontracted with Eurofins Calscience, a State of California certified laboratory, to perform environmental testing of the on-site soils as an indication of the presence of hazardous materials at the site. The soil samples were placed in 4-ounce jars, labeled, stored in an insulated cooler with ice, and transported under chain-of-custody to Eurofins Calscience for analytical testing. The sampling equipment was decontaminated between samples to reduce the likelihood of cross-contamination. The analytical test results are presented in Appendix E.

2.5. Analysis and Report Preparation

The results of the field and laboratory testing were evaluated to develop conclusions and recommendations regarding the geotechnical aspects of the proposed construction. This report presents our findings, conclusions, and recommendations.

3. SITE AND PROJECT DESCRIPTION

3.1. Site Description

The site currently consists of the eastern portion of Parking Lot P751. The irregular-shaped site is located south of the intersection of Campus Point Drive and Health Center Drive in La Jolla, California. The site is in UCSD's east campus, an area dedicated to health sciences and medical research. The site is bounded by the western portion of Parking Lot P751 on the west, Koman Family Outpatient Pavilion on the south, the Ratner Building and Shiley Eye Center on the east, and Campus Point and Medical Center Drives on the north. The site is relatively flat, with surface elevations varying from about 340 feet mean sea level (msl) to about 342 feet msl.

Review of historic aerial photography indicates that the parking lot has existed in its current configuration since at least 2010. From 1991 to 2010, the site existed as a thoroughfare to the south. From 1978 until 1990, the site was occupied by a baseball field. Since 1953, the site has consisted of flat, graded land. The site is located within the Camp Matthews Formerly Used Defense Site (FUDS) area, a military training facility during World War II. In the 1943 historical topography, the earliest topography we reviewed, the site was underlain by a north-south tributary to a main east-west draining canyon to the south. Previous geotechnical investigations (SCS&T, 2013, 2014) indicate that the southern portion of the site is underlain by up to about 15 feet of fill.

3.2. Proposed Construction

Based on discussions with the design team and review of the provided Civil Exhibit (KPFF, 2021), NOVA understands that the proposed development will consist of the design and construction of an at-grade, four-story building and associated improvements. The building will house wet laboratories, a vivarium, administrative space, and potentially a small retail component. As currently planned, the building will have a finished floor elevation of 342.0 feet msl. BMP locations were not identified at the time of this report. NOVA assumes that stormwater BMP facilities will be constructed away from building foundations, retaining walls, and underground utilities.

3.3. Anticipated Earthwork

Based on the Civil Exhibit, minor fills up to about 2 feet in thickness will be required to achieve the proposed finished floor elevation. Other anticipated earthwork includes remedial grading, underground utility excavation and backfill, and subgrade preparation.

4. GEOLOGY AND SUBSURFACE CONDITIONS

The site is located within the Peninsular Ranges Geomorphic Province of California, which stretches from the Los Angeles basin to the tip of Baja California in Mexico. This province is characterized as a series of northwest-trending mountain ranges separated by subparallel fault zones and a coastal plain of subdued landforms. The mountain ranges are underlain primarily by Mesozoic metamorphic rocks that were intruded by plutonic rocks of the southern California batholith, while the coastal plain is underlain by subsequently deposited marine and nonmarine sedimentary formations. The site is located within the coastal plain portion of the province and is underlain by fill, Very Old Paralic Deposits, and Scripps Formation. Descriptions of the materials encountered are presented below. Figure 4-1 presents the regional geology in the vicinity of the site. Plate 1 following the text of this report presents the site-specific geology. Plate 2 presents a geologic cross-section.

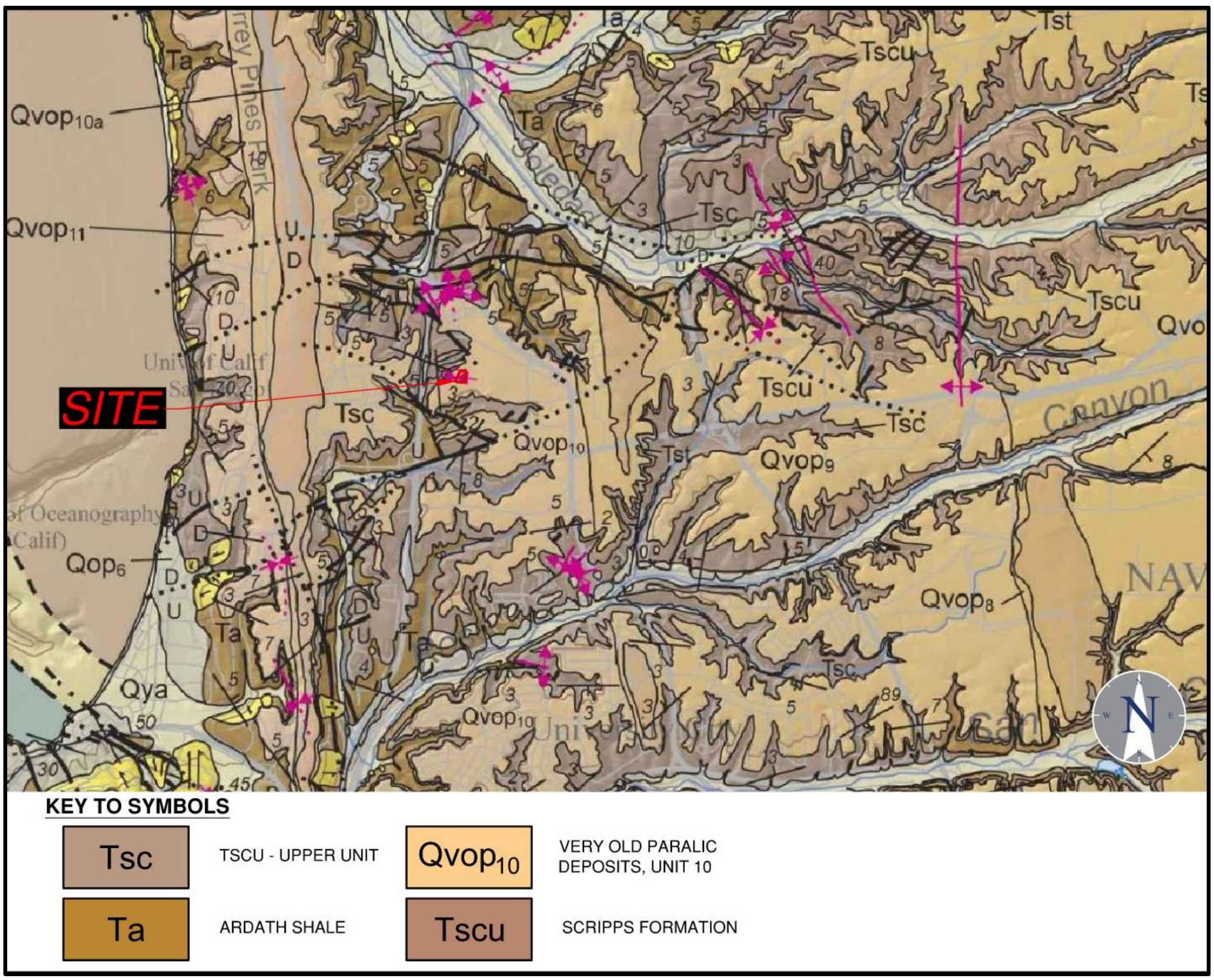

Figure 4-1. Regional Geology Map

Fill (afu): Fill was encountered in each of the borings. The fill consisted of very loose to medium dense silty sand and clayey sand with varying amounts of gravel, cobbles, and asphalt debris. The fill extended to depths varying from about 2 feet bgs in Boring B-2 to the maximum-explored depth of about 7 feet bgs in Boring B-3. Previous borings by SCS&T (2013, 2014) indicate that the southern portion of the site is underlain by up to about 15 feet of fill. Because we have no records regarding the placement and compaction of the fill, the fill is considered undocumented and at risk for wide variations in quality.

Figure 4-2. Fill at Boring B-1

Very Old Paralic Deposits ($Qvop_{10}$): Beneath the fill, Very Old Paralic Deposits were encountered to depths varying from about 20 to 22 feet bgs. As encountered in the borings, these deposits consisted of medium dense to very dense, weakly cemented silty sandstone. Figure 4-3 presents a photograph of the Very Old Paralic Deposits.

Figure 4-3. Very Old Paralic Deposits in Boring B-1

Scripps Formation (Tsc): Beneath the Very Old Paralic Deposits, Scripps Formation was encountered to the maximum-explored depth of about 31 feet bgs. As encountered in the borings, the Scripps Formation consisted of very dense, weakly to moderately cemented silty sandstone. Concretions up to several feet in dimension are known to exist in the Scripps Formation. Figure 4-4 presents a photograph of the Scripps Formation.

Figure 4-4. Scripps Formation in Boring B-2

Groundwater: Groundwater was not encountered in the borings. The permanent groundwater table is not expected to be a constraint to development.

5. GEOLOGIC HAZARDS

5.1. Faulting and Surface Rupture

The nearest known active faults are within the Newport-Inglewood-Rose Canyon Fault Zone (San Diego section), located about 3 miles to the southwest. The site is not located in an Alquist-Priolo Earthquake Fault Zone. No active surface faults are mapped across the site. No active faults are known to underlie or project toward the site. The probability of fault rupture is considered low. Figure 5-1 presents faulting in the site vicinity.

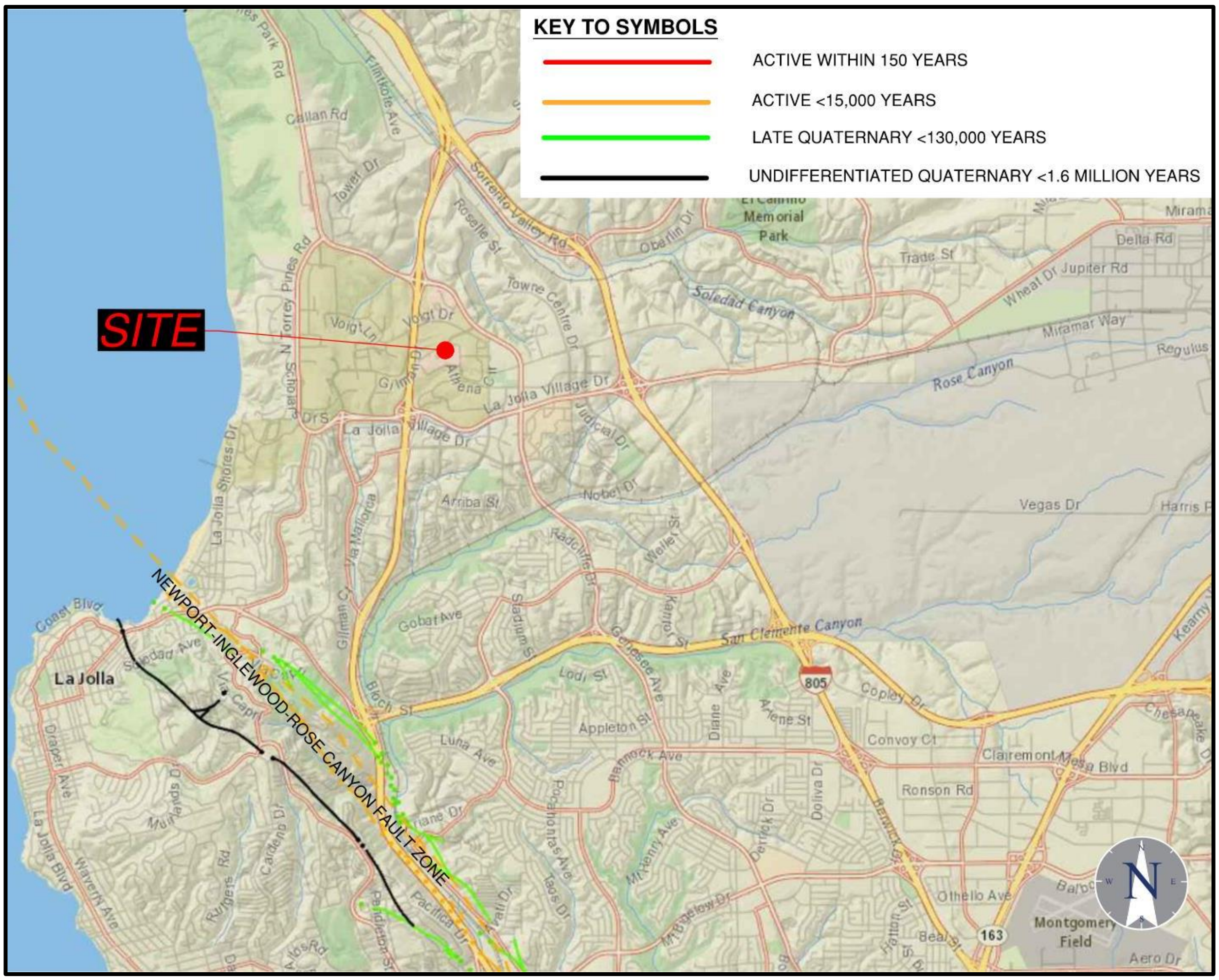

Figure 5-1. Faulting in the Site Vicinity

5.2. City of San Diego Seismic Safety Study

Figure 5-2 presents the site location on the City of San Diego Seismic Safety Study map. The site is located in Geologic Hazard Category 51, which is defined as level mesa, underlain by terrace deposits and bedrock, nominal risk. In our opinion, the geologic risk is very low.

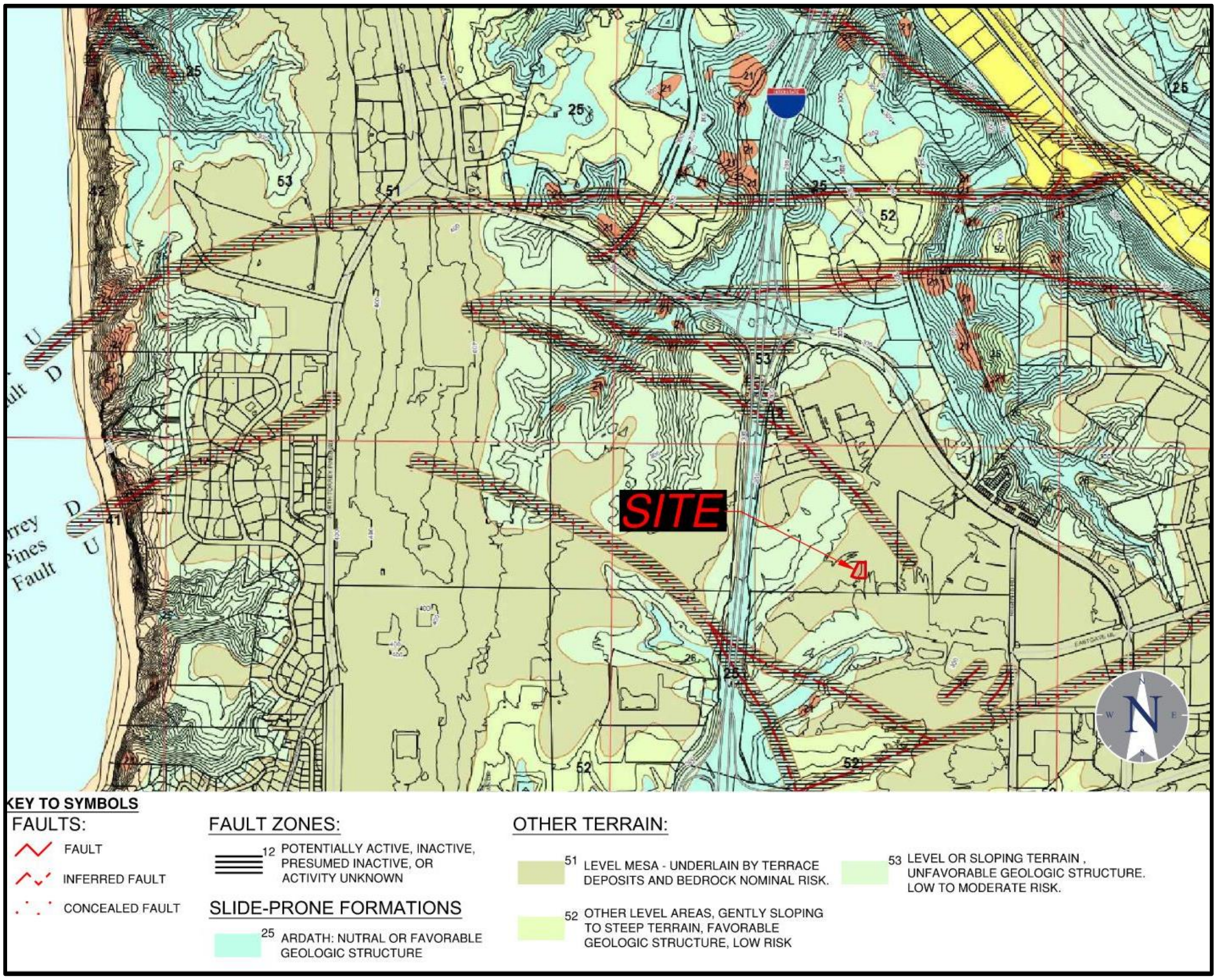

Figure 5-2. Site Location on City of San Diego Seismic Safety Study Map

5.3. Site Class

Site Class is determined by the weighted average of shear-wave velocity or standard penetration resistances (N-values) within the upper 100 feet of the soil and rock underlying a site. Soil and rock having an average N-value greater than 50 blows per foot within the upper 100 feet are considered Site Class C. The N-values NOVA encountered in the formational materials (Very Old Paralic Deposits and Scripps Formation) are generally greater than 50 blows per foot starting at about 10 feet in depth and increasing with depth. NOVA has considerable experience within the formational materials in the vicinity of the site and is confident, based on past experience with SPT blowcounts and shear-wave velocity testing, that the underlying very dense soil and rock are Site Class C in accordance with ASCE 7-16 (Table 20.3-1).

5.4. CBC Seismic Design Parameters

A geologic hazard likely to affect the project is ground shaking as a result of movement along an active fault zone in the vicinity of the subject site. The site coefficients and maximum considered earthquake (MCE_R) spectral response acceleration parameters in accordance with the 2019 CBC and ASCE 7-16 are presented in Table 5-1.

Table 5-1. 2019 CBC and ASCE 7-16 Seismic Design Parameters

Site Coordinates	
Latitude: 32.879247°	Longitude: -117.223772°
Site Coefficients and Spectral Response Acceleration Parameters	**Value**
Site Class	C
Site Coefficients, F_a	1.2
Site Coefficients, F_v	1.5
Mapped Spectral Response Acceleration at Short Period, S_s	1.219g
Mapped Spectral Response Acceleration at 1-Second Period, S_1	0.429g
Mapped Design Spectral Acceleration at Short Period, S_{DS}	0.975g
Design Spectral Acceleration at 1-Second Period, S_{D1}	0.429g
Site Peak Ground Acceleration, PGA_M	0.66

5.5. Landslides and Slope Stability

Evidence of landslides, deep-seated landslides, or slope instabilities was not observed at the time of NOVA's field evaluation. Additionally, there are no mapped landslides in the vicinity of the project site. The potential for landslides or slope instabilities to occur at the site is considered low.

5.6. Liquefaction and Dynamic Settlement

Liquefaction occurs when loose, saturated, generally fine sands and silts are subjected to strong ground shaking. The soils lose shear strength and become liquid, resulting in large total and differential ground surface settlements, as well as possible lateral spreading during an earthquake. Due to the lack of shallow groundwater and given the relatively dense nature of the materials beneath the site, the potential for liquefaction and dynamic settlement to occur is considered low.

5.7. Flooding, Tsunamis, and Seiches

The site is mapped within an area of minimal flood hazard (FEMA, 2012). The site is not located within a mapped area on the State of California Tsunami Inundation Maps (Cal EMA, 2009); therefore, damage due to tsunamis is considered low. Seiches are periodic oscillations in large bodies of water such as lakes, harbors, bays, or reservoirs. The site is not located adjacent to any lakes or confined bodies of water; therefore, the potential for a seiche to affect the site is considered low.

5.8. Subsidence

The site is not located in an area of known subsidence associated with fluid withdrawal (groundwater or petroleum); therefore, the potential for subsidence due to the extraction of fluids is considered low.

5.9. Hydro-Consolidation

Hydro-consolidation can occur in recently deposited sediments (less than 10,000 years old) that were deposited in a semi-arid environment. Examples of such sediments are eolian sands, alluvial fan deposits, and mudflow sediments deposited during flash floods. The pore spaces between the particle grains can re-adjust when inundated by groundwater, causing the material to consolidate. The fill materials may be considered susceptible to hydro-consolidation. The potential for hydro-consolidation can be reduced by over-excavation and recompaction of the materials susceptible to hydro-consolidation. Remedial grading recommendations are provided in subsequent sections of this report. The relatively dense materials underlying the site are not considered susceptible to hydro-consolidation.

6. CONCLUSIONS

Based on the results of NOVA's investigation, we consider the proposed construction feasible from a geotechnical standpoint provided the recommendations contained in this report are followed. Geotechnical conditions exist that should be addressed prior to construction. Geotechnical design and construction considerations include the following.

- There are no known active faults underlying the site. The primary seismic hazard at the site is the potential for moderate to severe ground shaking in response to large-magnitude earthquakes generated during the lifetime of the proposed construction. The risk of strong ground motion is common to all construction in southern California and is typically mitigated through building design in accordance with the CBC. While strong ground motion could affect the site, the risk of liquefaction or dynamic settlement is considered negligible.
- The site is underlain by undocumented fill of varying thickness, increasing in thickness to the south, over formational materials consisting of Very Old Paralic Deposits and Scripps Formation. The formational materials are considered suitable for support of the proposed fill and structural loads. The undocumented fill, however, is potentially compressible and unsuitable for support of fill or structural loads. Recommendations for remedial grading are provided in this report.
- The on-site silty sand and clayey sand are anticipated to have a very low expansion potential. These soils are suitable for reuse as compacted fill.
- In general, the fill, Very Old Paralic Deposits, and Scripps Formation are anticipated to be readily excavatable using standard heavy earthmoving equipment in good-working order with experienced operators. However, localized cemented formational materials and concretions may require extra excavation effort. Additionally, the cement treated base in the existing asphalt concrete pavement may require extra excavation effort.
- The proposed building can be supported on shallow spread footings with bottom levels bearing either entirely on formational materials or entirely on a relatively uniform thickness of compacted fill. To accommodate uniform bearing on formational materials, soil-cement structural fill or 3-sack sand/cement slurry can be placed between the bottom of footing and underlying formation. Recommendations for foundations are provided in this report.
- Groundwater was not encountered in the borings. The groundwater table is expected to be below a depth that will influence the planned construction. However, perched groundwater commonly occurs where permeable material overlies less permeable materials. Groundwater seepage may occur in the future due to rainfall, irrigation, broken pipes, or changes in site drainage. Because groundwater seepage is difficult to predict, such conditions are typically mitigated if and when they occur.
- The infiltration feasibility condition category is "No Infiltration" within the Very Old Paralic Deposits. Infiltration is discussed further in Section 8 of this report.

7. RECOMMENDATIONS

The remainder of this report presents recommendations regarding earthwork construction as well as preliminary geotechnical recommendations for the design of the proposed improvements. These recommendations are based on empirical and analytical methods typical of the standard-of-practice in southern California. If these recommendations appear not to address a specific feature of the project, please contact NOVA for additions or revisions to the recommendations. The recommendations presented herein may need to be updated once final plans are developed.

7.1. Earthwork

Grading and earthwork should be conducted in accordance with the CBC and the recommendations of this report. The following recommendations are provided regarding specific aspects of the proposed earthwork construction. These recommendations should be considered subject to revision based on field conditions observed by a NOVA field representative during grading.

7.1.1 Site Preparation

Site preparation should begin with the removal of existing improvements, vegetation, and debris. Subsurface improvements that are to be abandoned should be removed, and the resulting excavations should be backfilled and compacted in accordance with the recommendations of this report. Pipeline abandonment can consist of capping or rerouting at the project perimeter and removal within the project perimeter. If appropriate, abandoned pipelines can be filled with grout or slurry as recommended by and observed by the geotechnical consultant.

7.1.2 Remedial Grading – Building Pad

The proposed building should not be underlain by a cut/fill transition or a transition from shallow fill to deep fill. To mitigate such transitions and reduce the potential for differential settlement, the building should be supported either entirely on formational materials or entirely on a relatively uniform thickness of compacted fill. Recommendations for both options are provided below.

Option 1: Footings Bearing on Formational Materials

Beneath the proposed building pad, the existing fill should be excavated to expose competent formational materials. Horizontally, excavations should extend at least 5 feet outside the planned perimeter building foundations or up to existing improvements, whichever is less. NOVA should observe the conditions exposed in the bottom of excavations to evaluate whether additional excavation is recommended. The resulting excavation should then be filled to the planned bottom of footing elevation with soil-cement structural fill to match the stiffness and strength of the underlying formational materials. Recommendations for soil-cement structural fill are provided in section 7.1.8 of this report. Compacted fill having an expansion index of 50 or less should then be placed from the bottom of footing elevation/top of soil-cement structural fill to finished pad grade.

Option 2: Footings Bearing on Compacted Fill

Beneath the proposed building pad, the existing fill should be excavated to expose competent formational materials. Additionally, formational materials beneath the northern portion of the building should be over-excavated and replaced with compacted fill to provide a relatively uniform thickness of compacted fill beneath the entire building and reduce the potential for differential settlement. The over-excavation depth should be at least 5 feet below the deepest planned footing bottom elevation or to a depth of H/2, whichever is deeper, where H is the greatest depth of fill beneath the building. Horizontally, the excavations should extend at least 5 feet outside the planned perimeter building foundations or up to existing improvements, whichever is less. Where practical, the bottom of excavations should be sloped toward the fill portion of the site and away from its center. NOVA should observe the conditions exposed in the bottom of excavations to evaluate whether additional excavation is recommended. The resulting excavation should then be filled to the finished pad grade with compacted fill having an expansion index of 50 or less.

7.1.3 Remedial Grading – Pedestrian Hardscape

Beneath proposed hardscape areas, the on-site soils should be excavated to a depth of at least 2 feet below planned subgrade elevation. Horizontally, excavations should extend at least 2 feet outside the planned hardscape or up to existing improvements, whichever is less. If competent formational materials are exposed, excavation need not be performed. NOVA should observe the conditions exposed in the bottom of excavations to evaluate whether additional excavation is recommended. The resulting surface should then be scarified to a depth of 6 to 8 inches, moisture conditioned to near optimum moisture content, and compacted to at least 90% relative compaction. If competent formational materials are exposed, scarification and recompaction need not be performed. The excavation should be filled with compacted fill having an expansion index of 50 or less.

7.1.4 Remedial Grading – Vehicular Pavements

Beneath proposed vehicular pavement areas, the existing soils should be excavated to a depth of at least 1 foot below planned subgrade elevation. Horizontally, excavations should extend at least 2 feet outside the planned pavement or up to existing improvements, whichever is less. NOVA should observe the conditions exposed at the bottom of excavations to evaluate whether additional excavation is recommended. The resulting surface should then be scarified to a depth of 6 to 8 inches, moisture conditioned to near optimum moisture content, and compacted to at least 90% relative compaction. If competent formational materials are exposed, scarification and recompaction need not be performed. The excavation should be filled with material suitable for reuse as compacted fill.

7.1.5 Remedial Grading – Site Walls and Retaining Walls

Beneath proposed site walls and retaining walls not connected to buildings, the existing fill should be excavated to a depth of at least 2 feet below bottom of footing. Horizontally, the excavations should extend at least 2 feet outside the planned hardscape, wall footing, or up to existing improvements, whichever is less. If competent formational materials are exposed, excavation need not be performed. NOVA should observe the conditions exposed at the bottom of excavations to evaluate whether additional excavation is recommended. Any required fill should have an expansion index of 50 or less.

7.1.6 Expansive Soil

The on-site soils tested have expansion indexes varying from 0 to 16, classified as very low expansion potential. To reduce the potential for expansive heave, the top 2 feet of material beneath building footings, concrete slabs-on-grade, hardscape, and site and retaining wall footings should have an expansion index of 50 or less. Horizontally, the soils having an expansion index of 50 or less should extend at least 5 feet outside the planned perimeter building foundations, at least 2 feet outside hardscape and site/retaining wall footings, or up to existing improvements, whichever is less. NOVA anticipates that the on-site silty and clayey sand will meet the expansion index criteria.

7.1.7 Compacted Fill

Excavated material, except for soil containing roots, debris, and rock greater than 6 inches, can be used as compacted fill. Fill and backfill should be placed in 6- to 8-inch-thick loose lifts, moisture conditioned to near optimum moisture content, and compacted to at least 90% relative compaction. The maximum density and optimum moisture content for the evaluation of relative compaction should be determined in accordance with ASTM D1557. Utility trench backfill beneath structures, pavements, and hardscape should be compacted to at least 90% relative compaction. The top 12 inches of subgrade beneath pavements should be compacted to at least 95% relative compaction.

7.1.8 Soil-Cement Structural Fill

The excavated on-site soils will generally be suitable for use as soil-cement structural fill, if used. The soils should be mixed with Type II cement, moisture conditioned to not less than 1% below or not more than 2% above optimum content and compacted to at least 95% relative compaction. The maximum dry density and optimum moisture content for evaluating relative compaction should be determined in accordance with ASTM D558, except the test method should be modified such that compaction is performed using a 10-lb rammer dropped from a height of 18 inches. The unconfined compressive strength (UCS) of the soil-cement should be at least 250 pounds per square inch (psi) at 28 days. NOVA anticipates that a cement application rate of 3% to 5% cement by dry unit weight can be used. A soil-cement mix design should be performed to determine the actual cement application rate to achieve a UCS of at least 250 psi. A soil-cement dry unit weight of 120 pounds per cubic foot (pcf) can be assumed.

7.1.9 Imported Soil

Imported soil should consist of predominately granular soil, free of organic matter and rocks greater than 6 inches. Imported soil should be observed and, if appropriate, tested by NOVA prior to transport to the site to evaluate suitability for the intended use.

7.1.10 Subgrade Stabilization

Excavation bottoms should be firm and unyielding prior to placing fill. In areas of saturated or yielding subgrade, a reinforcing geogrid such as Tensar® Triax® TX-5 or equivalent can be placed on the excavation bottom, and then at least 12 inches of aggregate base placed and compacted. Once the surface of the aggregate base is firm enough to achieve compaction, then the remaining excavation should be filled to finished pad grade with suitable material.

7.1.11 Excavation Characteristics

It is anticipated that excavations within the Very Old Paralic Deposits can be achieved with conventional earthwork equipment in good working order. Gravel, cobbles, and potentially boulders should also be anticipated.

7.1.12 Oversized Material

Excavations may generate some oversized material, particularly excavations extending into the Very Old Paralic Deposits. Oversized material is defined as rocks or cemented clasts greater than 6 inches in largest dimension. Oversized material should be broken down to no greater than 6 inches in largest dimension for use in fill, use as landscape material, or disposed of off-site.

7.1.13 Temporary Excavations

Temporary excavations 3 feet deep or less can be made vertically. Deeper temporary excavations in fill should be laid back no steeper than 1:1 (horizontal:vertical). Deeper temporary excavations in cemented formational materials should be laid back no steeper than ¾:1 (h:v).

The faces of temporary slopes should be inspected daily by the contractor’s Competent Person before personnel are allowed to enter the excavation. Any zones of potential instability, sloughing, or raveling should be brought to the attention of the engineer and corrective action implemented before personnel begin working in the excavation. Excavated soils should not be stockpiled behind temporary excavations within a distance equal to the depth of the excavation. NOVA should be notified if other surcharge loads are anticipated so that lateral load criteria can be developed for the specific situation. If temporary slopes are to be maintained during the rainy season, berms are recommended along the tops of slopes to prevent runoff water from entering the excavation and eroding the slope faces.

Slopes steeper than those described above will require shoring. Additionally, temporary excavations that extend below a plane inclined at 1½:1 (h:v) downward from the outside bottom edge of existing structures or improvements will require shoring. Soldier piles and lagging, internally braced shoring, or trench boxes could be used. If trench boxes are used, the soil immediately adjacent to the trench box is not directly supported. Ground surface deformations immediately adjacent to the pit or trench could be greater where trench boxes are used compared to other methods of shoring.

7.1.14 Temporary Shoring

For design of cantilevered shoring with level backfill, an active earth pressure equal to a fluid weighing 35 pcf can be used. An additional 20 pcf should be added for 2:1 (h:v) sloping ground. The surcharge loads on shoring from traffic and construction equipment working adjacent to the excavation can be modeled by assuming an additional 2 feet of soil behind the shoring. For design of soldier piles, an allowable passive pressure of 350 pounds per square foot (psf) per foot of embedment can be used, over two times the pile diameter up to a maximum of 5,000 psf. Soldier piles should be spaced at least three pile diameters, center to center. Continuous lagging will be required throughout. The soldier piles should be designed for the full anticipated lateral pressure; however, the pressure on the lagging will be less due to arching in the soils. For design of lagging, the earth pressure can be limited to a maximum of 400 psf.

7.1.15 Slopes

Permanent slopes should be constructed no steeper than 2:1 (h:v). Faces of fill slopes should be compacted either by rolling with a sheepsfoot roller or other suitable equipment, or by overfilling and cutting back to design grade. Fills should be benched into sloping ground inclined steeper than 5:1 (h:v). In NOVA's opinion, slopes constructed no steeper than 2:1 (h:v) will possess an adequate factor of safety. An engineering geologist should observe cut slopes during grading to ascertain that no unforeseen adverse geologic conditions are encountered that require revised recommendations. Slopes are susceptible to surficial slope failure and erosion. Water should not be allowed to flow over the top of slope. Additionally, slopes should be planted with vegetation that will reduce the potential for erosion.

7.1.16 Surface Drainage

Final surface grades around structures should be designed to collect and direct surface water away from structures, including retaining walls, and toward appropriate drainage facilities. The ground around the structure should be graded so that surface water flows rapidly away from the structure without ponding. In general, we recommend that the ground adjacent to the structure slope away at a gradient of at least 2%. Densely vegetated areas where runoff can be impaired should have a minimum gradient of at least 5% within the first 5 feet from the structure. Roof gutters with downspouts that discharge directly into a closed drainage system are recommended on structures. Drainage patterns established at the time of fine grading should be maintained throughout the life of the proposed structures. Site irrigation should be limited to the minimum necessary to sustain landscape growth. Should excessive irrigation, impaired drainage, or unusually high rainfall occur, saturated zones of perched groundwater can develop.

7.1.17 Grading Plan Review

NOVA should review the grading plans and earthwork specifications to ascertain whether the intent of the recommendations contained in this report have been implemented, and that no revised recommendations are needed due to changes in the development scheme.

7.2. Foundations

The foundation recommendations provided herein are considered generally consistent with methods typically used in southern California. Other alternatives may be available. NOVA's recommendations are only minimum criteria based on geotechnical factors and should not be considered a structural design, or to preclude more restrictive criteria of governing agencies or by the structural engineer. The design of the foundation system should be performed by the project structural engineer, incorporating the geotechnical parameters described herein and the requirements of applicable building codes.

The proposed building can be supported on shallow spread footings with bottom levels bearing entirely on formational materials or soil-cement structural fill extending down to formation or entirely on compacted fill. Site walls and retaining walls not connected to buildings can be supported on spread footings with bottom levels bearing on formational materials, soil-cement structural fill, or compacted fill. Shade structures, covered walkways and other pole-type structures can be supported on cast-in-drilled hole (CIDH) concrete piles.

7.2.1 Spread Footings

Footings should extend at least 24 inches below lowest adjacent finished grade. A minimum width of 12 inches is recommended for continuous footings and 24 inches for isolated or wall footings. An allowable bearing capacity of 5,000 psf can be used for footings supported on formational materials, soil-cement structural fill, or 3-sack sand/cement slurry. An allowable bearing capacity of 2,500 psf can be used for footings supported on compacted fill. The allowable bearing capacity can be increased by 500 psf for each foot of depth below the minimum and 250 psf for each foot of width beyond the minimum up to a maximum of 8,000 psf on formation/soil-cement/slurry or 5,000 psf on compacted fill. The bearing value can be increased by ⅓ when considering the total of all loads, including wind or seismic forces. Footings located adjacent to or within slopes should be extended to a depth such that a minimum horizontal distance of 10 feet exists between the lower outside footing edge and the face of the slope.

Lateral loads will be resisted by friction between the bottoms of footings and passive pressure on the faces of footings and other structural elements below grade. An allowable coefficient of friction of 0.35 can be used. An allowable passive pressure of 350 psf per foot of depth below the ground surface can be used for level ground conditions. The allowable passive pressure should be reduced for sloping ground conditions. The passive pressure can be increased by ⅓ when considering the total of all loads, including wind or seismic forces. The upper 1 foot of soil should not be relied on for passive support unless the ground is covered with pavements or slabs.

7.2.2 CIDH Piles

CIDH piles should be spaced at least three pile diameters, center to center, and be embedded in compacted fill and/or formational materials. The axial downward capacity of piles can be obtained from skin friction and end bearing. An allowable downward skin friction of 300 psf and an allowable end bearing of 5,000 psf can be used. If end bearing is used, the bottom of drilled holes should be cleaned of loose soil prior to placing concrete. The axial uplift capacity of piles can be obtained from skin friction and the weight of the pile. An allowable uplift skin friction of 100 psf can be used.

Lateral loads can be resisted by passive pressure on the piles. An allowable passive pressure of 350 psf per foot of embedment acting on twice the pile diameter up to a maximum of 5,000 psf can be used, based on a lateral deflection up to ½-inch at the ground surface and level ground conditions. The uplift and passive pressure values can be increased by ⅓ when considering the total of all loads, including wind or seismic forces. The upper 1 foot of soil should not be relied on for passive support unless the ground is covered with pavements or slabs.

7.2.3 Settlement Characteristics

Total foundation settlements are estimated to be less than 1-inch. Differential settlements between adjacent columns and across continuous footings are estimated to be less than ¾-inch over a distance of 40 feet. Settlements should be completed shortly after structural loads are applied.

7.2.4 Foundation Plan Review

NOVA should review the foundation plans to ascertain that the intent of the recommendations in this report has been implemented and that revised recommendations are not necessary as a result of changes after this report was completed.

7.2.5 Foundation Excavation Observations

A representative from NOVA should observe the foundation excavations prior to forming or placing reinforcing steel.

7.3. Interior Slabs-On-Grade

Interior concrete slabs-on-grade should be underlain by at least 2 feet of material with an expansion index of 50 or less. We recommend that conventional concrete slabs-on-grade floors be at least 5 inches thick and reinforced with at least No. 4 bars at 18 inches on center each way. To reduce the potential for excessive cracking, concrete slabs-on-grade should be provided with construction or 'weakened plane' joints at frequent intervals. The project structural engineer should design on-grade building slabs and joint spacing.

Moisture protection should be installed beneath slabs where moisture sensitive floor coverings will be used. The project architect should review the tolerable moisture transmission rate of the proposed floor covering and specify an appropriate moisture protection system. Typically, a plastic vapor barrier is used. Minimum 15-mil plastic is recommended. The plastic should comply with ASTM E1745. The vapor barrier installation should comply with ASTM E1643. The slab can be placed directly on the vapor barrier.

7.4. Hardscape

Hardscape should be underlain by at least 2 feet of material with an expansion index of 50 or less. Exterior slabs should be at least 4 inches in thickness and reinforced with at least No. 3 bars at 18 inches on center each way. Slabs should be provided with weakened plane joints. Joints should be placed in accordance with the American Concrete Institute (ACI) guidelines. The project architect should select the final joint patterns. A 1-inch maximum size aggregate mix is recommended for concrete for exterior slabs. The corrosion potential of on-site soils with respect to reinforced concrete will need to be taken into account in concrete mix design. Coarse and fine aggregate in concrete should conform to the “Greenbook” Standard Specifications for Public Works Construction.

7.5. Conventional Retaining Walls

Conventional retaining walls can be supported on spread footings. The recommendations for spread footings provided in the foundation section of this report are also applicable to conventional retaining walls.

The active earth pressure for the design of unrestrained retaining walls with level backfill can be taken as equivalent to the pressure of a fluid weighing 35 pcf. The at-rest earth pressure for the design of restrained retaining wall with level backfill can be taken as equivalent to the pressure of a fluid weighing 55 pcf. These values assume a granular and drained backfill condition. Higher lateral earth pressures would apply if walls retain clay soils. An additional 20 pcf should be added to these values for walls with 2:1 (h:v) sloping backfill. An increase in earth pressure equivalent to an additional 2 feet of retained soil can be used to account for surcharge loads from light traffic. The above values do not include a factor of safety. Appropriate factors of safety should be incorporated into the design. If any other surcharge loads are anticipated, NOVA should be contacted for the necessary increase in soil pressure.

If required, the seismic earth pressure can be taken as equivalent to the pressure of a fluid pressure weighing 24 pcf. This value is for level backfill and does not include a factor of safety. Appropriate factors of safety should be incorporated into the design. This pressure is in addition to the un-factored, active earth pressure. The total equivalent fluid pressure can be modeled as a triangular pressure distribution with the resultant acting at a height of H/3 up from the base of the wall, where H is the retained height of the wall. The passive pressure and bearing capacity can be increased by ⅓ in determining the seismic stability of the wall.

Retaining walls should be provided with a backdrain to reduce the accumulation of hydrostatic pressures or be designed to resist hydrostatic pressures. Backdrains can consist of a 2-foot-wide zone of ¾-inch crushed rock. The crushed rock should be separated from the adjacent soils using a non-woven filter fabric, such as Mirafi 140N or equivalent. A perforated pipe should be installed at the base of the backdrain and sloped to discharge to a suitable storm drain facility, or weep holes should be provided. As an alternative, a geocomposite drainage system such as Miradrain 6000 or equivalent placed behind the wall and connected to a suitable storm drain facility can be used. The project architect should provide dampproofing/waterproofing specifications and details. Figure 7-1 (following page) presents typical conventional retaining wall backdrain details. Note that the guidance provided on Figure 7-1 is conceptual. A variety of options are available to drain retaining walls.

Wall backfill should consist of granular, free-draining material having an expansion index of 20 or less. The backfill zone is defined by a 1:1 plane projected upward from the heel of the wall. Expansive or clayey soil should not be used. Additionally, backfill within 3 feet from the back of the wall should not contain rocks greater than 3 inches in dimension. Backfill should be compacted to at least 90% relative compaction. Backfill should not be placed until walls have achieved adequate structural strength. Compaction of wall backfill will be necessary to minimize settlement of the backfill and overlying settlement sensitive improvements. However, some settlement should still be anticipated. Provisions should be made for some settlement of concrete slabs and pavements supported on backfill. Additionally, any utilities supported on backfill should be designed to tolerate differential settlement.

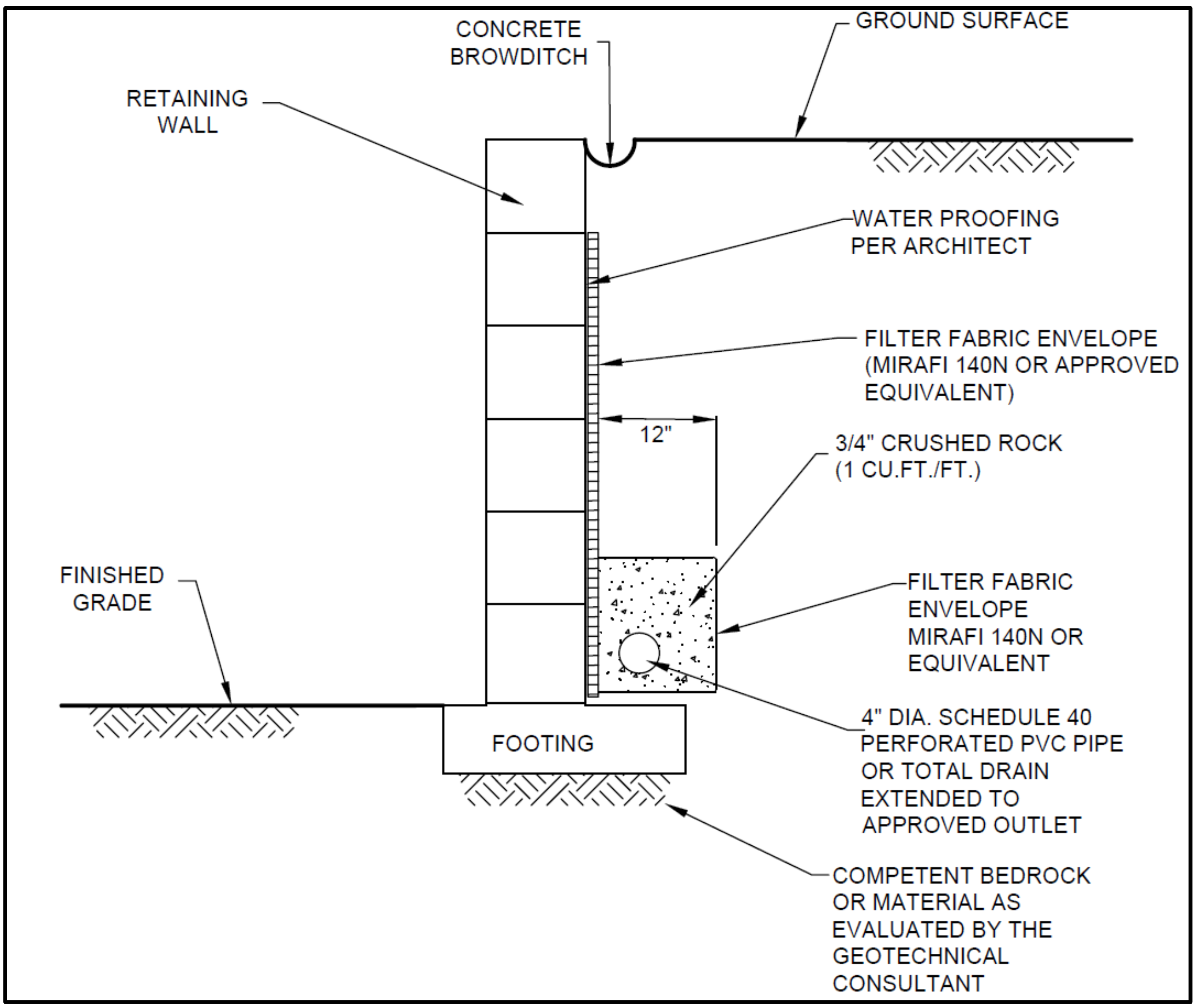

Figure 7-1. Typical Conventional Retaining Wall Backdrain Details

7.6. Pipelines

For level ground conditions, a passive earth pressure of 350 psf per foot of depth below the lowest adjacent final grade can be used to compute allowable thrust block resistance. A value of 150 psf per foot should be used below groundwater level, if encountered.

A modulus of soil reaction (E') of 1,500 psi can be used to evaluate the deflection of buried flexible pipelines. This value assumes that granular bedding material is placed adjacent to the pipe and is compacted to at least 90% relative compaction.

Pipe bedding as specified in the "Greenbook" Standard Specifications for Public Works Construction can be used. Bedding material should consist of clean sand having a sand equivalent not less than 20 and should extend to at least 12 inches above the top of pipe. Alternative materials meeting the intent of the bedding specifications are also acceptable. Samples of materials proposed for use as bedding should be provided to the engineer for inspection and testing before the material is imported for use on the project. The on-site materials are not expected to meet "Greenbook" bedding specifications. The pipe bedding material should be placed over the full width of the trench. After placement of the pipe, the bedding should be brought up uniformly on both sides of the pipe to reduce the potential for unbalanced loads. No voids or uncompacted areas should be left beneath the pipe haunches. Ponding or jetting the pipe bedding should not be allowed.

Where pipeline inclinations exceed 15%, cutoff walls are recommended in trench excavations. Additionally, we do not recommend that open graded rock be used for pipe bedding or backfill because of the potential for piping erosion. The recommended bedding is clean sand having a sand equivalent not less than 20 or 2-sack sand/cement slurry. If sand/cement slurry is used for pipe bedding to at least 1 foot over the top of the pipe, cutoff walls are not considered necessary. The need for cutoff walls should be further evaluated by the project civil engineer designing the pipeline.

7.7. Corrosivity

Representative samples of the on-site soils were tested to evaluate corrosion potential. The test results are presented in Appendix B. The project design engineer can use the sulfate results in conjunction with ACI 318 to specify the water/cement ratio, compressive strength, and cementitious material types for concrete exposed to soil. A corrosion engineer should be contacted to provide specific corrosion control recommendations.

7.8. Pavement Section Recommendations

The pavement support characteristics of the soils encountered during NOVA's investigation are considered low to medium. An R-value of 28 was assumed for design of preliminary pavement sections. The actual R-value of the subgrade soils should be determined after grading, and the final pavement sections should be provided. Based on an R-value of 28, the following preliminary pavement structural sections are provided for the assumed Traffic Indexes on Table 7-1 (following page).

Table 7-1. AC and PCC Pavement Sections

Traffic Type	Traffic Index	Asphalt Concrete (inches)	Portland Cement Concrete (inches)
Parking Stalls	4.5	3 AC / 5 AB	6 PCC
Driveways	6.0	4 AC / 7 AB	6½ PCC
Fire Lanes	7.5	5 AC / 10 AB	7 PCC

AC: Asphalt Concrete
AB: Aggregate Base
PCC: Portland Cement Concrete

Subgrade preparation should be performed immediately prior to placement of the pavement section. The upper 12 inches of subgrade should be scarified, moisture conditioned to near optimum moisture content, and compacted to at least 95% relative compaction. All soft or yielding areas should be stabilized or removed and replaced with compacted fill or aggregate base. Aggregate base and asphalt concrete should conform to the Caltrans Standard Specifications or the "Greenbook" and should be compacted to at least 95% relative compaction. Aggregate base should have an R-value of not less than 78. All materials and methods of construction should conform to good engineering practices and the minimum local standards.

8. INFILTRATION FEASIBILITY

Final stormwater infiltration Best Management Practices ('stormwater BMP') locations were not identified at the time of the investigation; however, NOVA coordinated with the project architect to provide infiltration testing in the areas most likely to have BMPs.

One (1) percolation test boring (P-1) was constructed following the recommendations for percolation testing presented in the City of San Diego BMP Design Manual (hereinafter, 'the BMP Manual').

The percolation test boring was drilled with a truck-mounted, 8-inch hollow stem auger to a depth of about 5 feet bgs. Field measurements were taken to confirm that the boring was excavated to about 8 inches in diameter. The boring was logged by a NOVA geologist, who observed and logged the exposed soil cuttings and the boring conditions.

Once the boring was drilled to the desired depth, the boring was converted to a percolation test boring by placing an approximately 2-inch layer of ¾-inch gravel on the bottom, then extending 3-inch diameter Schedule 40 perforated PVC pipe to the ground surface. The ¾-inch gravel was used to partially fill the annular space around the perforated pipe below existing finish grade to minimize the potential of soil caving.

The percolation test well was pre-soaked by filling the hole with water to the ground surface level and testing commenced within a 26-hour window. On the day of testing, two 25-minute trials were conducted in the well.

In the percolation borings, the pre-soak water did not percolate over 6 inches into the soil unit within 25 minutes. Based on the results of the trials, water levels were recorded every 30 minutes for 6 hours. At the beginning of each test interval, the water level was raised to approximately the same level as the previous tests, in order to maintain a near-constant head during all test periods.

The percolation rate of a soil profile is not the same as its infiltration rate ('I'). Therefore, the field percolation rate was converted to an estimated infiltration rate utilizing the Porchet Method in accordance with guidance contained in the BMP Manual. The table below provides a summary of the infiltration rates determined by the percolation testing.

Table 8-1. Infiltration Rate Test Results

Test Location	Test Depth (feet)	Material at Test Depth	Infiltration Rate (in/hr, FS=2)
P-1	5	Very Old Paralic Deposits: Silty Sandstone	0.01

Note: 'FS' indicates 'Factor of Safety'

As shown in Table 8-1, a factor of safety (FS) is applied to the infiltration rate (I) determined by the percolation testing. This factor of safety, at least FS = 2 in local practice, considers the nature and variability of subsurface materials, as well as the natural tendency of infiltration structures to become less efficient with time. The infiltration rate after applying FS = 2 is I < 0.05 inch per hour.

Full and partial BMPs are typically not required on sites with infiltration rates of less than 0.05 inch per hour.

Appendix D presents Worksheet C.4-1: Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions. The tested infiltration rates do not support reliable stormwater infiltration in any appreciable quantity. Based on the test results, the infiltration feasibility condition category is “No Infiltration.” BMP facilities should be lined throughout with an impermeable geomembrane to reduce the potential for water-related distress to adjacent structures or improvements. A subdrain system should be installed at the bottom of BMP facilities. Additionally, BMP facilities should be kept at least 10 feet from structural foundations.

9. CLOSURE

NOVA should review project plans and specifications prior to bidding and construction to check that the intent of the recommendations in this report has been incorporated. Observations and tests should be performed during construction. If the conditions encountered during construction differ from those anticipated based on the subsurface exploration program, the presence of personnel from NOVA during construction will enable an evaluation of the exposed conditions and modifications of the recommendations in this report or development of additional recommendations in a timely manner.

NOVA should be advised of changes in the project scope so that the recommendations contained in this report can be evaluated with respect to the revised plans. Changes in recommendations will be verified in writing. The findings in this report are valid as of the date of this report. Changes in the condition of the site can, however, occur with the passage of time, whether they are due to natural processes or work on this or adjacent areas. In addition, changes in the standards of practice and government regulations can occur. Thus, the findings in this report may be invalidated wholly or in part by changes beyond NOVA's control. This report should not be relied upon after a period of two years without a review by NOVA verifying the suitability of the conclusions and recommendations to site conditions at that time.

In the performance of professional services, NOVA exercises the level of care and skill ordinarily exercised by members of the geotechnical profession currently practicing under similar conditions and in the same locality. The client recognizes that subsurface conditions may vary from those encountered at the boring locations and that the data, interpretations, and recommendations reported herein are based solely on the information obtained by NOVA. NOVA will be responsible for those data, interpretations, and recommendations, but shall not be responsible for interpretations by others of the information developed. Our services consist of professional consultation and observation only, and no warranty whatsoever, express or implied, is made or intended in connection with the work performed or to be performed by us, or by our proposal for consulting or other services, or by our furnishing of oral or written reports or findings.

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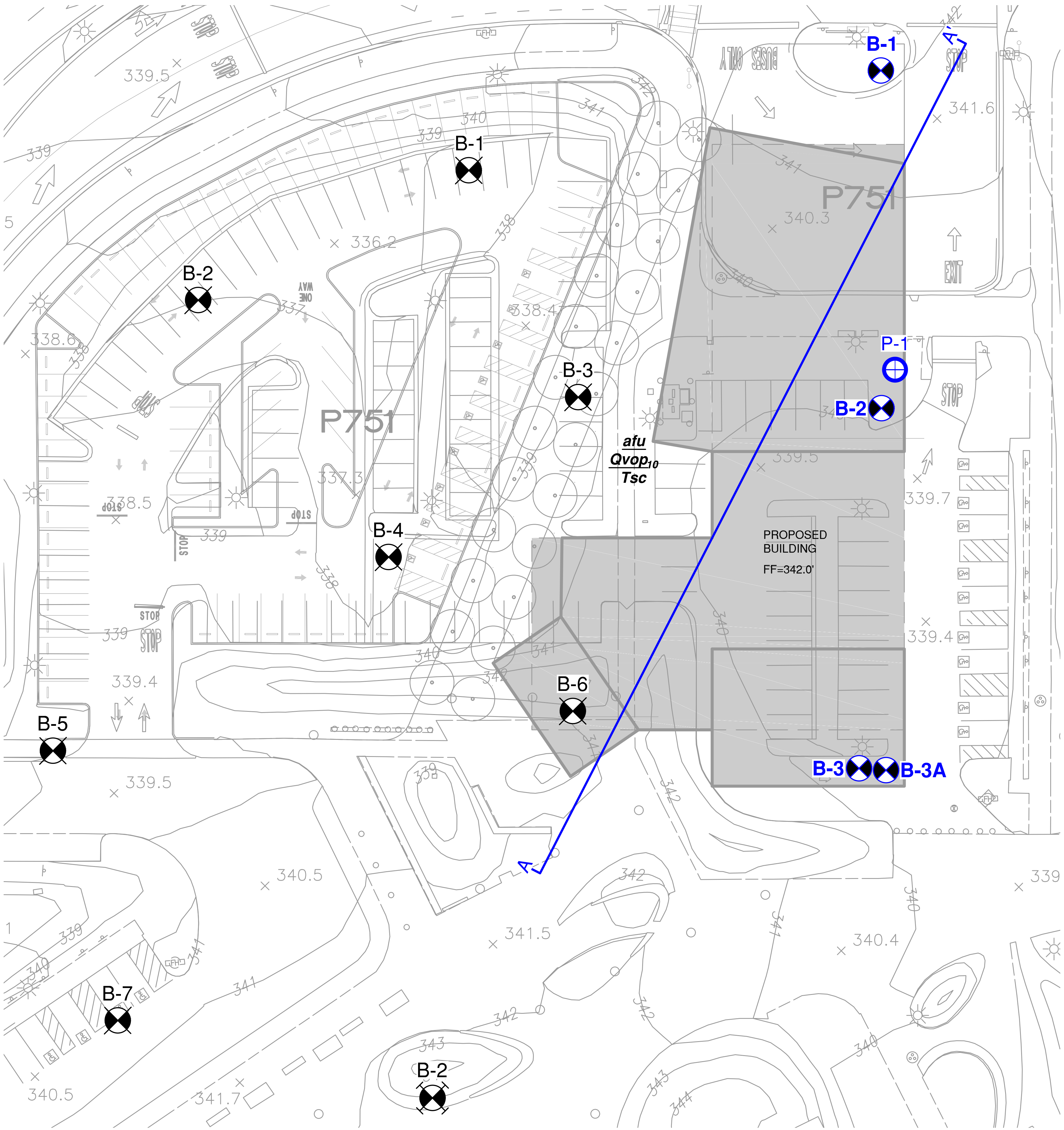
PLATES



KEY TO SYMBOLS

afu	FILL
$Qvop_{10}$	VERY OLD PARALIC DEPOSITS
Tsc	SCRIPPS FORMATION
B-3	CURRENT BORING (NOVA, 2021)
P-1	CURRENT PERCOLATION TEST BORING (NOVA, 2021)
B-7	PREVIOUS BORING (SCS&T, 2013)
B-2	PREVIOUS BORING (SCS&T, 2014)
A A'	GEOLOGIC CROSS-SECTION

0 40' 80'

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5301 VITERBI FAMILY VISION RESEARCH CENTER

CAMPUS POINT DRIVE AND MEDICAL CENTER DRIVE
LA JOLLA, CA 92037

PROJECT NO.:	2021183
DATE:	SEPTEMBER 2021
DRAWN BY:	DTJ
REVIEWED BY:	MS
SCALE:	1"=40'

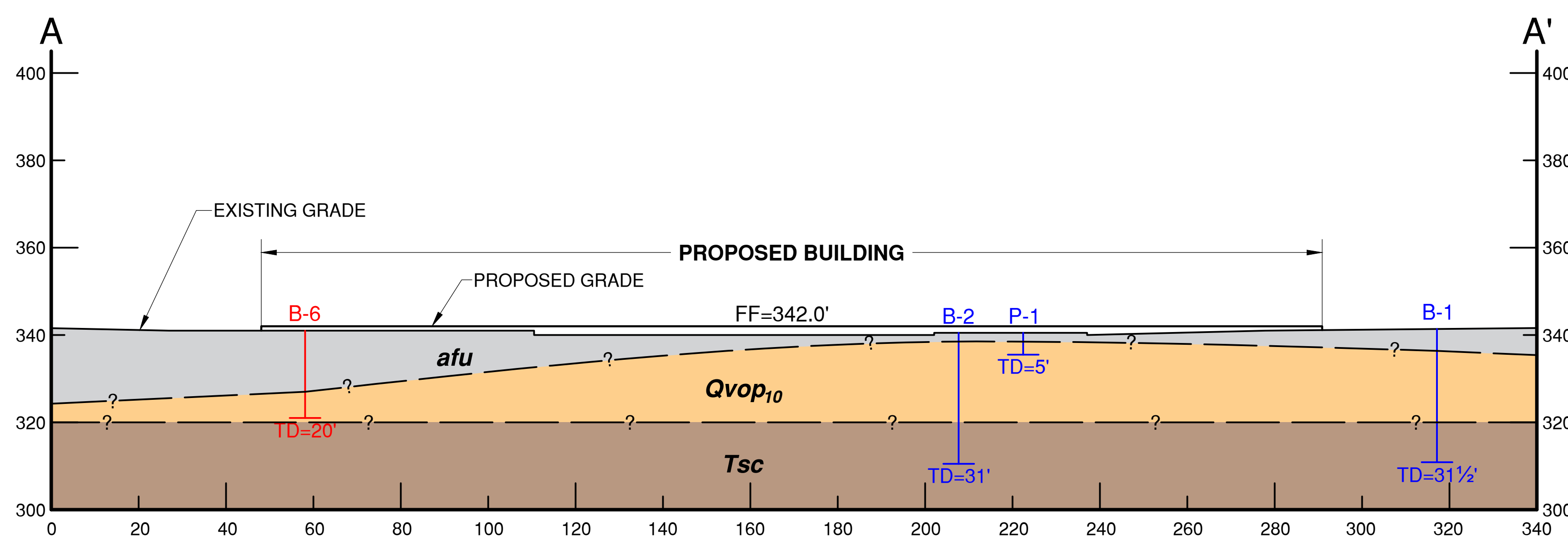
DRAWING TITLE:

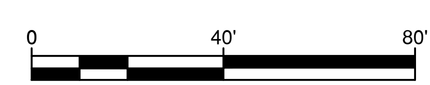
SUBSURFACE INVESTIGATION MAP

PLATE NO. 1 OF 2

KEY TO SYMBOLS

afu	FILL
Qvop$_{10}$	VERY OLD PARALIC DEPOSITS
Tsc	SCRIPPS FORMATION
B-3	CURRENT BORING (NOVA, 2021)
P-1	CURRENT PERCOLATION TEST BORING (NOVA, 2021)
B-6	PREVIOUS BORING (SCS&T, 2013)





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DATE:	SEPTEMBER 2021
DRAWN BY:	DTJ
REVIEWED BY:	MS
SCALE:	1"=40'
DRAWING TITLE:	

GEOLOGIC
CROSS-SECTION AA'

PLATE NO. 2 OF 2

APPENDIX A
USE OF THE GEOTECHNICAL REPORT

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely, on Your ASFE-Member Geotechncial Engineer for Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE-member geotechnical engineer for more information.

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e-mail: info@asfe.org www.asfe.org

IIGER06045.0M

APPENDIX B
CURRENT BORING LOGS

MAJOR DIVISIONS				TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVEL MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVEL WITH LESS THAN 15% FINES	GW	WELL-GRADED GRAVEL WITH OR WITHOUT SAND
			GP	POORLY GRADED GRAVEL WITH OR WITHOUT SAND
		GRAVEL WITH 15% OR MORE FINES	GM	SILTY GRAVEL WITH OR WITHOUT SAND
			GC	CLAYEY GRAVEL WITH OR WITHOUT SAND
	SAND MORE THAN HALF COARSE FRACTION IS FINER THAN NO. 4 SIEVE SIZE	CLEAN SAND WITH LESS THAN 15% FINES	SW	WELL-GRADED SAND WITH OR WITHOUT GRAVEL
			SP	POORLY GRADED SAND WITH OR WITHOUT GRAVEL
		SAND WITH 15% OR MORE FINES	SM	SILTY SAND WITH OR WITHOUT GRAVEL
			SC	CLAYEY SAND WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML	SILT WITH OR WITHOUT SAND OR GRAVEL
			CL	LEAN CLAY WITH OR WITHOUT SAND OR GRAVEL
			OL	ORGANIC SILT OR CLAY OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH	ELASTIC SILT WITH OR WITHOUT SAND OR GRAVEL
			CH	FAT CLAY WITH OR WITHOUT SAND OR GRAVEL
			OH	ORGANIC SILT OR CLAY OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
HIGHLY ORGANIC SOILS			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

GROUNDWATER / STABILIZED

PERCHED GROUNDWATER

BULK SAMPLE

SPT SAMPLE (ASTM D1586)

MOD. CAL. SAMPLE (ASTM D3550)

* NO SAMPLE RECOVERY

GEOLOGIC CONTACT

SOIL TYPE CHANGE

LAB TEST ABBREVIATIONS

CR	CORROSIVITY
MD	MAXIMUM DENSITY
DS	DIRECT SHEAR
EI	EXPANSION INDEX
AL	ATTERBERG LIMITS
SA	SIEVE ANALYSIS
RV	RESISTANCE VALUE
CN	CONSOLIDATION
SE	SAND EQUIVALENT

RELATIVE DENSITY OF COHESIONLESS SOILS	
RELATIVE DENSITY	SPT N60 BLOWS/FOOT
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

CONSISTENCY OF COHESIVE SOILS		
CONSISTENCY	SPT N60 BLOWS/FOOT	POCKET PENETROMETER MEASUREMENT (TSF)
VERY SOFT	0 - 2	0 - 0.25
SOFT	2 - 4	0.25 - 0.50
MEDIUM STIFF	4 - 8	0.50 - 1.0
STIFF	8 - 15	1.0 - 2.0
VERY STIFF	15 - 30	2.0 - 4.0
HARD	OVER 30	OVER 4.0

NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).
IF THE SEATING INTERVAL (1st 6 INCH INTERVAL) IS NOT ACHEIVED, N IS REPORTED AS REF.

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SUBSURFACE EXPLORATION LEGEND

LOG OF BORING B-1

DATE DRILLED: AUGUST 26, 2021 **DRILLING METHOD:** HOLLOW STEM AUGER

ELEVATION: ± 342 FT MSL **DRILLING EQUP.:** CME 75 **GROUNDWATER DEPTH:** NOT ENCOUNTERED

SAMPLE METHOD: HAMMER: 140 LBS., DROP: 30 IN (AUTOMATIC) **NOTES:** ETR~73.9%, $N_{60} \sim \frac{73.9}{60}$*N~1.23*N

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER FOOT N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION *SUMMARY OF SUBSURFACE CONDITIONS* *(USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0			8	10			SC	**FILL (afu):** *CLAYEY SAND; BROWN, DRY, LOOSE TO MEDIUM DENSE, FINE TO MEDIUM GRAINED, SOME ASPHALT DEBRIS, ABUNDANT GRAVEL*	SA AL EI RV CR
								DARK GRAYISH BROWN, MOIST	
			7	9				*PALE ORANGE BROWN, VERY MOIST TO WET, TRACE GRAVEL,* *WET*	
								DARK GRAY BROWN, LOOSE, FINE GRAINED	SA AL
5			32	39				**VERY OLD PARALIC DEPOSITS ($Qvop_{10}$):** *SILTY SANDSTONE; OLIVE BROWN, VERY WET, DENSE, FINE GRAINED, MICACEOUS, WEAKLY CEMENTED*	
								REDDISH BROWN, MOIST, SCATTERED GRAVEL	
								LIGHT GRAYISH BROWN	
10			64	79				*LIGHT ORANGE BROWN, VERY MOIST, VERY DENSE*	
15			50/6"	40/6"				*SOME BLACK MINERALIZATION*	DS
20			50/3"	40/3"	9.3	116.2		*SOME ORANGE BROWN STAINING*	
								SCRIPPS FORMATION (Tsc): *SILTY SANDSTONE; LIGHT GRAYISH BROWN, MOIST, VERY DENSE, FINE GRAINED, VERY MICACEOUS, WEAKLY TO MODERATELY CEMENTED*	
25			50/4"	62/4"					
30									

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FIGURE B.1

LOGGED BY: GN | REVIEWED BY: MS | PROJECT NO.: 2021183

LOG OF BORING B-1 (CONTINUED)

DATE DRILLED: AUGUST 26, 2021 **DRILLING METHOD:** HOLLOW STEM AUGER

ELEVATION: ± 342 FT MSL **DRILLING EQUP.:** CME 75 **GROUNDWATER DEPTH:** NOT ENCOUNTERED

SAMPLE METHOD: HAMMER: 140 LBS., DROP: 30 IN (AUTOMATIC) **NOTES:** ETR~73.9%, $N_{60} \sim \frac{73.9}{60}$*N~1.23*N

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER FOOT N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	**SOIL DESCRIPTION** *SUMMARY OF SUBSURFACE CONDITIONS (USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
30			50/6"	62/6"				**SCRIPPS FORMATION (Tsc):** *SILTY SANDSTONE; LIGHT GRAYISH BROWN, MOIST, VERY DENSE, FINE GRAINED, WITH ORANGE STAINING AND ABUNDANT BLACK SAND GRAINS, LESS MICACEOUS, WEAKLY TO MODERATELY CEMENTED*	
								BORING TERMINATED AT 30½ FT DUE. NO GROUNDWATER ENCOUNTERED.	
35									
40									
45									
50									
55									
60									

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FIGURE B.2

LOGGED BY: GN | REVIEWED BY: MS | PROJECT NO.: 2021183

LOG OF BORING B-2

DATE DRILLED: AUGUST 26, 2021 **DRILLING METHOD:** HOLLOW STEM AUGER

ELEVATION: ± 340 FT MSL **DRILLING EQUP.:** CME 75 **GROUNDWATER DEPTH:** NOT ENCOUNTERED

SAMPLE METHOD: HAMMER: 140 LBS., DROP: 30 IN (AUTOMATIC) **NOTES:** ETR~73.9%, $N_{60} \sim \frac{73.9}{60} * N \sim 1.23 * N$

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER FOOT N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	**SOIL DESCRIPTION** SUMMARY OF SUBSURFACE CONDITIONS (USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)	LAB TESTS
0			14	17			SC	**FILL (afu):** *CLAYEY SAND; BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, SCATTERED GRAVEL*	SA AL EI
								DARK GRAYISH BROWN, VERY MOIST, FINE GRAINED, ORGANIC ODOR	
			26	32				**VERY OLD PARALIC DEPOSITS ($Qvop_{10}$):** *SILTY SANDSTONE; REDDISH BROWN, MOIST, DENSE, FINE TO MEDIUM GRAINED, WEAKLY CEMENTED*	
								PALE REDDISH BROWN	
5			14	17				*LIGHT ORANGE BROWN, VERY MOIST, MEDIUM DENSE, TRACE GRAVEL, MICACEOUS*	SA AL
								LIGHT ORANGE GRAYISH BROWN	
								DARK GRAYISH BROWN	
10			50/6"	40/6"	10.1	121.4		*LIGHT ORANGE BROWN, MOIST, VERY DENSE, WITH SOME BLACK MINERALIZATION*	
15			86/11"	106/11"				*LIGHT GRAYISH BROWN WITH ORANGE BROWN INTERBEDDING, MOIST, REDDISH BROWN STAINING*	CR
20			50/6"	62/6"				**SCRIPPS FORMATION (Tsc):** *SILTY SANDSTONE; LIGHT ORANGE BROWN, MOIST, VERY DENSE, FINE GRAINED, SLIGHTLY MICACEOUS, WEAKLY TO MODERATELY CEMENTED*	
25			50/6"	62/6"				*LIGHT ORANGE BROWN WITH LIGHT GRAYISH INTERBEDDING, FINE TO MEDIUM GRAINED*	
30									

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FIGURE B.3

LOGGED BY: GN | REVIEWED BY: MS | PROJECT NO.: 2021183

LOG OF BORING B-2 (CONTINUED)

DATE DRILLED: AUGUST 26, 2021 **DRILLING METHOD:** HOLLOW STEM AUGER

ELEVATION: ± 340 FT MSL **DRILLING EQUP.:** CME 75 **GROUNDWATER DEPTH:** NOT ENCOUNTERED

SAMPLE METHOD: HAMMER: 140 LBS., DROP: 30 IN (AUTOMATIC) **NOTES:** ETR~73.9%, $N_{60} \sim \frac{73.9}{60}$*N~1.23*N

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER FOOT N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	**SOIL DESCRIPTION** *SUMMARY OF SUBSURFACE CONDITIONS (USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
30			50/6"	62/6"				**SCRIPPS FORMATION (Tsc):** *SILTY SANDSTONE; LIGHT GRAYISH BROWN, MOIST, VERY DENSE, FINE GRAINED, WEAKLY TO MODERATELY CEMENTED*	
								BORING TERMINATED AT 31 FT. NO GROUNDWATER ENCOUNTERED.	
35									
40									
45									
50									
55									
60									

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FIGURE B.4

LOGGED BY: GN | REVIEWED BY: MS | PROJECT NO.: 2021183

LOG OF BORING B-3

DATE DRILLED: AUGUST 26, 2021 **DRILLING METHOD:** HOLLOW STEM AUGER

ELEVATION: ± 340 FT MSL **DRILLING EQUP.:** CME 75 **GROUNDWATER DEPTH:** NOT ENCOUNTERED

SAMPLE METHOD: HAMMER: 140 LBS., DROP: 30 IN (AUTOMATIC) **NOTES:** ETR~73.9%, $N_{60} \sim \frac{73.9}{60}*N \sim 1.23*N$

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER FOOT N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	SOIL DESCRIPTION SUMMARY OF SUBSURFACE CONDITIONS (USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)	LAB TESTS
0								*6 INCHES OF ASPHALT CONCRETE OVER 18 INCHES OF CEMENT TREATED BASE*	
	X	X	4	5			SC	**FILL (afu):** *CLAYEY SAND; PALE ORANGE BROWN, VERY MOIST TO WET, LOOSE, FINE GRAINED, SCATTERED GRAVEL*	
5	X	X	2	2				*VERY LOOSE,* *$\frac{3}{4}$ INCH GRAVEL IN CUTTINGS*	
								BORING TERMINATED AT 7 FT DUE TO PIPE BEDDING GRAVEL IN CUTTINGS. NO GROUNDWATER ENCOUNTERED.	
10									
15									
20									
25									
30									

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FIGURE B.5

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LOG OF BORING B-3A

DATE DRILLED: AUGUST 26, 2021 **DRILLING METHOD:** HOLLOW STEM AUGER

ELEVATION: ± 340 FT MSL **DRILLING EQUP.:** HAND AUGER **GROUNDWATER DEPTH:** NOT ENCOUNTERED

SAMPLE METHOD: HAND TOOLS **NOTES:** N/A

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER FOOT N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	**SOIL DESCRIPTION** *SUMMARY OF SUBSURFACE CONDITIONS (USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0								*6 INCHES OF ASPHALT CONCRETE OVER 6 INCHES OF AGGREGATE BASE*	
	☒						SC	**FILL (afu):** *CLAYEY SAND; PALE ORANGE BROWN, VERY MOIST, MEDIUM DENSE, FINE GRAINED, TRACE COBBLES*	
							SM	*SILTY SAND; PALE ORANGE BROWN, VERY MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, TRACE ASPHALT DEBRIS, SOME COBBLES*	
5								*BORING TERMINATED AT 3½ FT DUE TO A 3" PURPLE PVC PIPE EXPOSED IN BORING. NO GROUNDWATER ENCOUNTERED.*	
10									
15									
20									
25									
30									

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FIGURE B.6

LOGGED BY: GN | REVIEWED BY: MS | PROJECT NO.: 2021183

LOG OF PERCOLATION BORING P-1

DATE DRILLED: AUGUST 11, 2021 **DRILLING METHOD:** HOLLOW STEM AUGER

ELEVATION: ± 340 FT MSL **DRILLING EQUP.:** CME 75 **GROUNDWATER DEPTH:** NOT ENCOUNTERED

SAMPLE METHOD: HAMMER: 140 LBS., DROP: 30 IN (AUTOMATIC) **NOTES:** ETR~73.9%, $N_{60} \sim \frac{73.9}{60} * N \sim 1.23 * N$

DEPTH (FT)	BULK SAMPLE	CAL/SPT SAMPLE	BLOWS PER FOOT N	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	SOIL CLASS. (USCS)	**SOIL DESCRIPTION** *SUMMARY OF SUBSURFACE CONDITIONS (USCS; COLOR, MOISTURE, DENSITY, GRAIN SIZE, OTHER)*	LAB TESTS
0	X						SC	**FILL (afu):** *CLAYEY SAND; BROWN, MOIST, MEDIUM DENSE, FINE TO MEDIUM GRAINED, SCATERED ASPHALT DEBRIS, ABUNDANT GRAVEL*	
								VERY OLD PARALIC DEPOSITS ($Qvop_{10}$): *SILTY SANDSTONE; REDDISH BROWN, MOIST, DENSE, FINE GRAINED, SCATTERED GRAVEL, WEAKLY CEMENTED*	
5								*BORING TERMINATED AT 5 FT AND CONVERTED TO A PERCOLATION TEST WELL. NO GROUNDWATER ENCOUNTERED.*	
10									
15									
20									
25									
30									

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FIGURE B.7

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PREVIOUS BORING LOGS
(SCS&T, 2013, 2014)

LOG OF EXPLORATORY BORING NUMBER B-1

Date Excavated:	9/21/2013	Logged by:	EAK
Equipment:	M5 Hollow Stem Auger	Project Manager:	TBC
Surface Elevation (ft):	337½	Depth to Water (ft):	N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: UNDISTURBED	SAMPLES: BULK	PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
		3 INCHES ASPHALT CONCRETE OVER 6 INCHES AGGREGATE BASE						
1	SM	**FILL -** Reddish brown, moist, loose, SILTY SAND.		X				
2		**VERY OLD PARALIC DEPOSITS (Qvop)-** Reddish brown, moist, very dense, fine to medium grained, weakly cemented SILTY SANDSTONE.	SPT	X	63			
4				X				
5			CAL		50/5"	15.1	106.7	
6								
8								
9½		… becomes light grayish brown.						
10			SPT		50/4"			
12								
14								
15			SPT		50/4"			
16								
18								
20			SPT		50/6"			

BOTTOM OF BORING AT 20 FEET.

SOUTHERN CALIFORNIA SOIL & TESTING, INC.	4484 MEDICAL CENTER OUTPATIENT PAVILION		
	By: EAK	Date:	10/14/2013
	Job Number: 1314026-1	Figure:	I-2

LOG OF EXPLORATORY BORING NUMBER B-2

Date Excavated:	9/21/2013	Logged by:	EAK
Equipment:	M5 Hollow Stem Auger	Project Manager:	TBC
Surface Elevation (ft):	337½	Depth to Water (ft):	N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: UNDISTURBED	SAMPLES: BULK	PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
		3 INCHES ASPHALT CONCRETE OVER 6 INCHES AGGREGATE BASE						
	SC	**FILL -** Light brown, moist, loose, CLAYEY SAND.		X				
2		**VERY OLD PARALIC DEPOSITS (Qvop)-** Light brown, moist, dense, fine to medium grained, weakly cemented SILTY SANDSTONE.	SPT	X	49			EI, COR
4		… becomes very dense.						
			CAL		50/4"	12.2	106.0	DS
6								
8								
10			SPT		85/11"			
12								
		PRACTICAL REFUSAL AT 13½ FEET.						
14								
16								
18								
20								

SOUTHERN CALIFORNIA SOIL & TESTING, INC.	4484 MEDICAL CENTER OUTPATIENT PAVILION		
	By: EAK	Date:	10/14/2013
	Job Number: 1314026-1	Figure:	I-3

LOG OF EXPLORATORY BORING NUMBER B-3

Date Excavated:	9/21/2013	Logged by:	EAK
Equipment:	M5 Hollow Stem Auger	Project Manager:	TBC
Surface Elevation (ft):	339½	Depth to Water (ft):	N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: UNDISTURBED	SAMPLES: BULK	PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
		3 INCHES ASPHALT CONCRETE OVER 6 INCHES AGGREGATE BASE						
	SM	**FILL -** Dark reddish brown, moist, medium dense, SILTY SAND.		X				
2			SPT		18			
4								
		VERY OLD PARALIC DEPOSITS (Qvop)- Light reddish brown, moist, very dense, fine to medium grained, weakly cemented SILTY SANDSTONE.	CAL		42	11.0	113.0	DS
6								
8								
10			SPT		50/3"			
12								
14			SPT		50/5"			
		PRACTICAL REFUSAL AT 15 FEET.						
16								
18								
20								

SOUTHERN CALIFORNIA SOIL & TESTING, INC.

4484 MEDICAL CENTER OUTPATIENT PAVILION			
By:	EAK	Date:	10/14/2013
Job Number:	1314026-1	Figure:	I-4

LOG OF EXPLORATORY BORING NUMBER B-4

Date Excavated:	9/21/2013	Logged by:	EAK
Equipment:	M5 Hollow Stem Auger	Project Manager:	TBC
Surface Elevation (ft):	338	Depth to Water (ft):	N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: UNDISTURBED	SAMPLES: BULK	PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
		2 INCHES ASPHALT CONCRETE OVER 6 INCHES AGGREGATE BASE						
	SC	**FILL -** Light reddish brown, moist, medium dense, CLAYEY SAND.		X				
2			SPT		18			AL, SA, EI, COR
4								
		VERY OLD PARALIC DEPOSITS (Qvop)- Light brown, moist, very dense, fine to medium grained, weakly cemented SILTY SANDSTONE.	CAL		50/6"	9.5	102.9	
6								
8								
10		… becomes fine grained.	SPT		50/6"			
12			SPT		50/5"			AL, SA
		PRACTICAL REFUSAL AT 13 FEET.						
14								
16								
18								
20								

SOUTHERN CALIFORNIA SOIL & TESTING, INC.	4484 MEDICAL CENTER OUTPATIENT PAVILION			
	By:	EAK	Date:	10/14/2013
	Job Number:	1314026-1	Figure:	I-5

LOG OF EXPLORATORY BORING NUMBER B-5

Date Excavated:	9/21/2013	Logged by:	EAK
Equipment:	M5 Hollow Stem Auger	Project Manager:	TBC
Surface Elevation (ft):	340	Depth to Water (ft):	N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: UNDISTURBED	SAMPLES: BULK	PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
		6 INCHES ASPHALT CONCRETE OVER 6 INCHES CEMENT TREATED BASE						
	SC	**FILL -** Reddish brown, moist, medium dense, CLAYEY SAND.		X				
2			SPT		21			
								RV
4								
		VERY OLD PARALIC DEPOSITS (Qvop)- Light brown, moist, very dense, fine to medium grained, weakly cemented SILTY SANDSTONE.	CAL		50/6"	9.6	102.3	
6								
8								
10			SPT		88			
12								
		… No Sample Recovery.	CAL		50/3"			
		PRACTICAL REFUSAL AT 13 FEET.						
14								
16								
18								
20								

SOUTHERN CALIFORNIA SOIL & TESTING, INC.	4484 MEDICAL CENTER OUTPATIENT PAVILION		
	By: EAK	Date:	10/14/2013
	Job Number: 1314026-1	Figure:	I-6

LOG OF EXPLORATORY BORING NUMBER B-6

Date Excavated:	9/21/2013	Logged by:	EAK
Equipment:	M5 Hollow Stem Auger	Project Manager:	TBC
Surface Elevation (ft):	341½	Depth to Water (ft):	N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: UNDISTURBED	SAMPLES: BULK	PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
		3 INCHES ASPHALT CONCRETE OVER 6 INCHES AGGREGATE BASE						
	SC	**FILL -** Light reddish brown, moist, medium dense, CLAYEY SAND.		X				
2			SPT	X	20			AL, SA, EI, RV
4				X				
			CAL		19	12.8	107.3	
6								
8								
		… becomes grayish brown, dense.						
10			SPT		37			
12								
14		**VERY OLD PARALIC DEPOSITS (Qvop)-** Light reddish brown, moist, very dense, fine to medium grained, weakly cemented SILTY SANDSTONE.						
			SPT		50/6"			
16								
18								
20			SPT		50/5"			

BOTTOM OF BORING AT 20 FEET.

SOUTHERN CALIFORNIA SOIL & TESTING, INC.	4484 MEDICAL CENTER OUTPATIENT PAVILION		
	By: EAK	Date:	10/14/2013
	Job Number: 1314026-1	Figure:	I-7

LOG OF EXPLORATORY BORING NUMBER B-7

Date Excavated:	9/21/2013	Logged by:	EAK
Equipment:	M5 Hollow Stem Auger	Project Manager:	TBC
Surface Elevation (ft):	341½	Depth to Water (ft):	N/A

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: UNDISTURBED	SAMPLES: BULK	PENETRATION (blows/ ft. of drive)	MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
		4 INCHES ASPHALT CONCRETE OVER 4 INCHES CEMENT TREATED BASE						
1	SC	**FILL -** Dark grayish brown, moist, medium dense, CLAYEY SAND.		X (1–5 ft)				
2			SPT		13			
4								
5			CAL		42	11.8	110.9	
6								
8								
10	CL	Dark grayish brown, moist, stiff, CLAY.	SPT		11			
11	SC	Light brown, moist, medium dense, CLAYEY SAND.						
12								
14		**VERY OLD PARALIC DEPOSITS (Qvop)-** Light grayish brown, moist, very dense, fine to medium grained, weakly cemented SILTY SANDSTONE.						
15			SPT		76			
16								
17		**PRACTICAL REFUSAL AT 17 FEET.**						
18								
20								

SOUTHERN CALIFORNIA SOIL & TESTING, INC.

4484 MEDICAL CENTER OUTPATIENT PAVILION			
By:	EAK	Date:	10/14/2013
Job Number:	1314026-1	Figure:	I-8

LOG OF BORING B-2

Date Drilled:	5/21/2014	Logged by:	AKN
Equipment:	Diedrich D-50, 6-inch Hollow Stem Auger	Project Manager:	TBC
Surface Elevation (ft):	339½	Depth to Groundwater (ft):	Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES DRIVEN	SAMPLES BULK	DRIVING RESISTANCE (blows/foot of drive)	N_{60}	MOISTURE (%)	DRY UNIT WT. (pcf)	LABORATORY TESTS
		3 inches Asphalt Concrete over 6 inches Aggregate Base.							
	SC	**FILL (af)-** CLAYEY SAND, brown and orangish brown, fine to medium grained, moist, medium dense to dense.		X					
2			CAL	X	39		13.1	107.2	
4				X					
		… becomes medium dense.	SPT	X	17	23			
6									
8									
10		…becomes dense.	CAL		32		12.3	107.7	
12		… gravel encountered.							
14									
		SCRIPPS FORMATION (Tsc)- SILTY SANDSTONE, gray, fine to medium grained, moist, very dense, strongly cemented. No sample recovery, sampler bouncing on formation.	SPT	X	-	-			
16				X					
18				X					
20		...No sample recovery, sampler bouncing on formation.	SPT	X	-	-			

BORING TERMINATED AT 20 FEET.

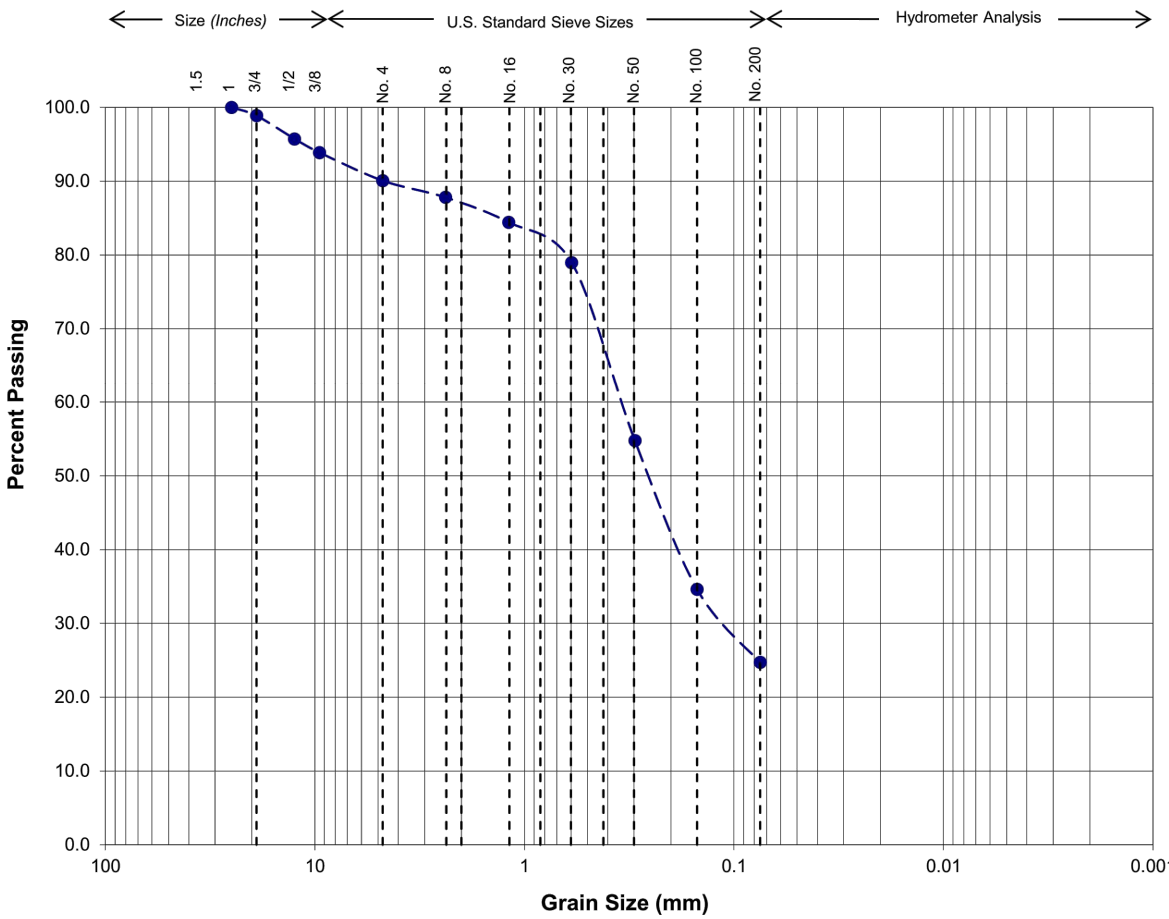
SOUTHERN CALIFORNIA SOIL & TESTING, INC.

4484 MCLJ OUTPATIENT PAVILION			
By:	EAK	Date:	6/19/2014
Job Number:	14-0252P3-1	Figure:	I-3

APPENDIX C
LABORATORY TESTING

Laboratory tests were performed in accordance with the generally accepted American Society for Testing and Materials (ASTM) test methods or suggested procedures. Brief descriptions of the tests performed are presented below:

- **CLASSIFICATION:** *Field classifications were verified in the laboratory by visual examination. The final soil classifications are in accordance with the Unified Soils Classification System and are presented on the exploration logs in Appendix B.*
- **GRADATION ANALYSIS (ASTM D6913):** *Tests were performed on selected representative soil samples in general accordance with ASTM D422. The grain size distributions of selected samples were determined in accordance with ASTM D6913. The results of the tests are summarized on Appendix C.2 through Appendix C.4.*
- **ATTERBERG LIMITS (ASTM D 4318):** *Tests were performed on selected representative fine-grained soil samples to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D 4318. These test results were utilized to evaluate the soil classification in accordance with the Unified Soil Classification System.*
- **DENSITY OF SOIL IN PLACE (ASTM D2937):** *In-place moisture contents and dry densities were determined for representative soil samples. This information was an aid to classification and permitted recognition of variations in material consistency with depth. The dry unit weight is determined in pounds per cubic foot, and the in-place moisture content is determined as a percentage of the soil's dry weight. The results are summarized in the exploration logs presented in Appendix B.*
- **EXPANSION INDEX (ASTM D4829):** *The expansion index of selected materials was evaluated in general accordance with ASTM D4829. Specimens were molded under a specified compactive energy at approximately 50 percent saturation (plus or minus 1 percent). The prepared 1-inch thick by 4-inch diameter specimens were loaded with a surcharge of 144 pounds per square foot and were inundated with tap water. Readings of volumetric swell were made for a period of 24 hours.*
- **DIRECT SHEAR TEST (ASTM D3080):** *Direct shear tests were performed on relatively undisturbed samples in general accordance with ASTM D3080 to evaluate the shear stregth characteristics of selected materials. The samples were inundated during shearing to represent adverse field conditions.*
- **R-VALUE (CT 301 and ASTM D2844):** *The resistance Value, or R-Value, for near-surface site soils were evaluated in general accordance with California Test (CT) 301 and ASTM D2844. Samples were prepared and evaluated for exudation pressure and expansion pressure. The equilibrium R-value is reported as the lesser or more conservative of the two calculated results.*
- **CORROSIVITY TEST (CAL. TEST METHOD 417, 422, 643):** *Soil PH, and minimum resistivity tests were performed on a representative soil sample in general accordance with test method CT 643. The sulfate and chloride content of the selected sample were evaluated in general accordance with CT 417 and CT 422, respectively.*



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location:	B - 1	Atterberg Limits (ASTM D4318):	
Depth (ft):	0 - 2	Liquid Limit, LL:	27
USCS Soil Type:	SC	Plastic Limit, PL:	19
Passing No. 200 (%):	25	Plasticity Index, PI:	8

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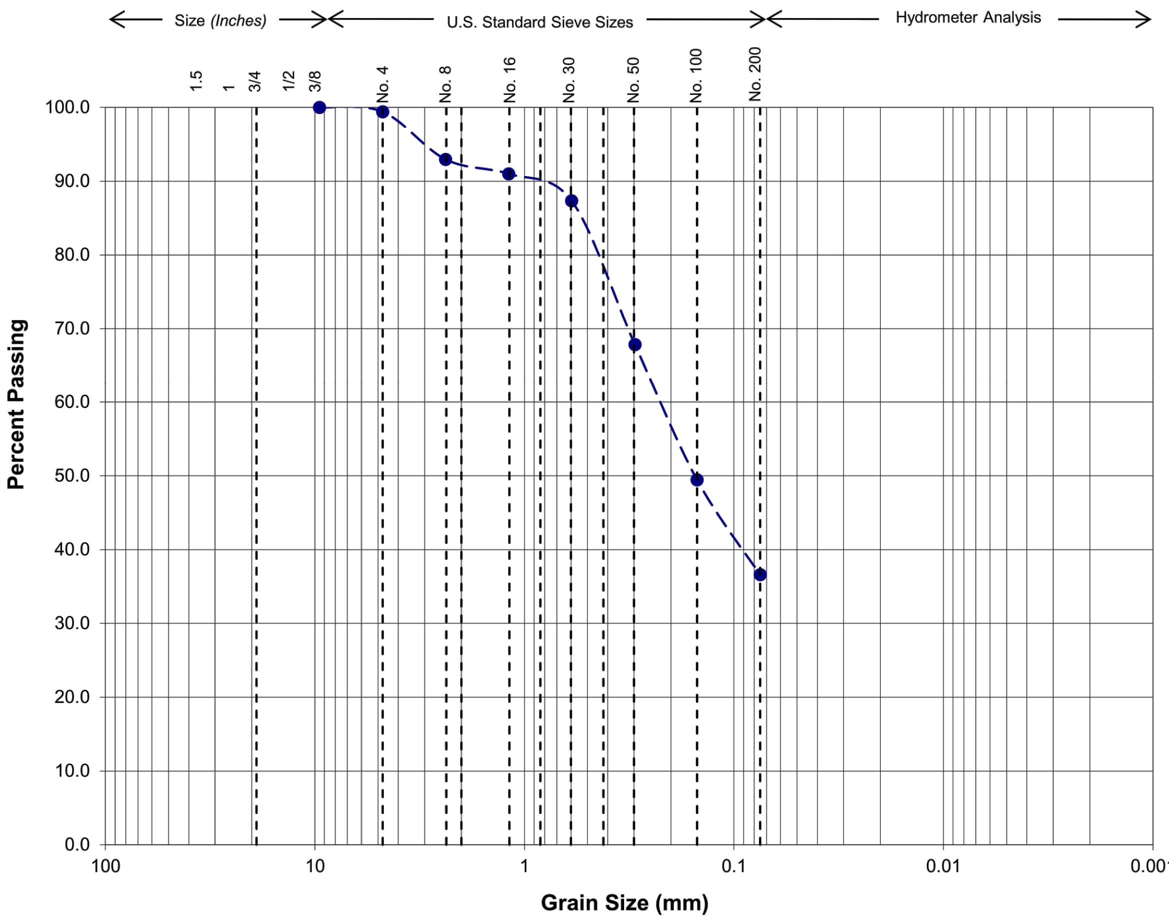
GRADATION ANALYSIS TEST RESULTS

5301 VITERBI FAMILY VISION RESEARCH CENTER

CAMPUS POINT DRIVE AND MEDICAL CENTER DRIVE

LA JOLLA, CA 92037

BY: GN	DATE: SEPT 2021	PROJECT: 2021183	APPENDIX: C.2



<table>
<tr><td colspan="2">Gravel</td><td colspan="3">Sand</td><td rowspan="2">Silt or Clay</td></tr>
<tr><td>Coarse</td><td>Fine</td><td>Coarse</td><td>Medium</td><td>Fine</td></tr>
</table>

Sample Location:	B - 1	Atterberg Limits (ASTM D4318):	
Depth (ft):	$2\frac{1}{2}$-3	Liquid Limit, LL:	32
USCS Soil Type:	SC	Plastic Limit, PL:	18
Passing No. 200 (%):	37	Plasticity Index, PI:	14

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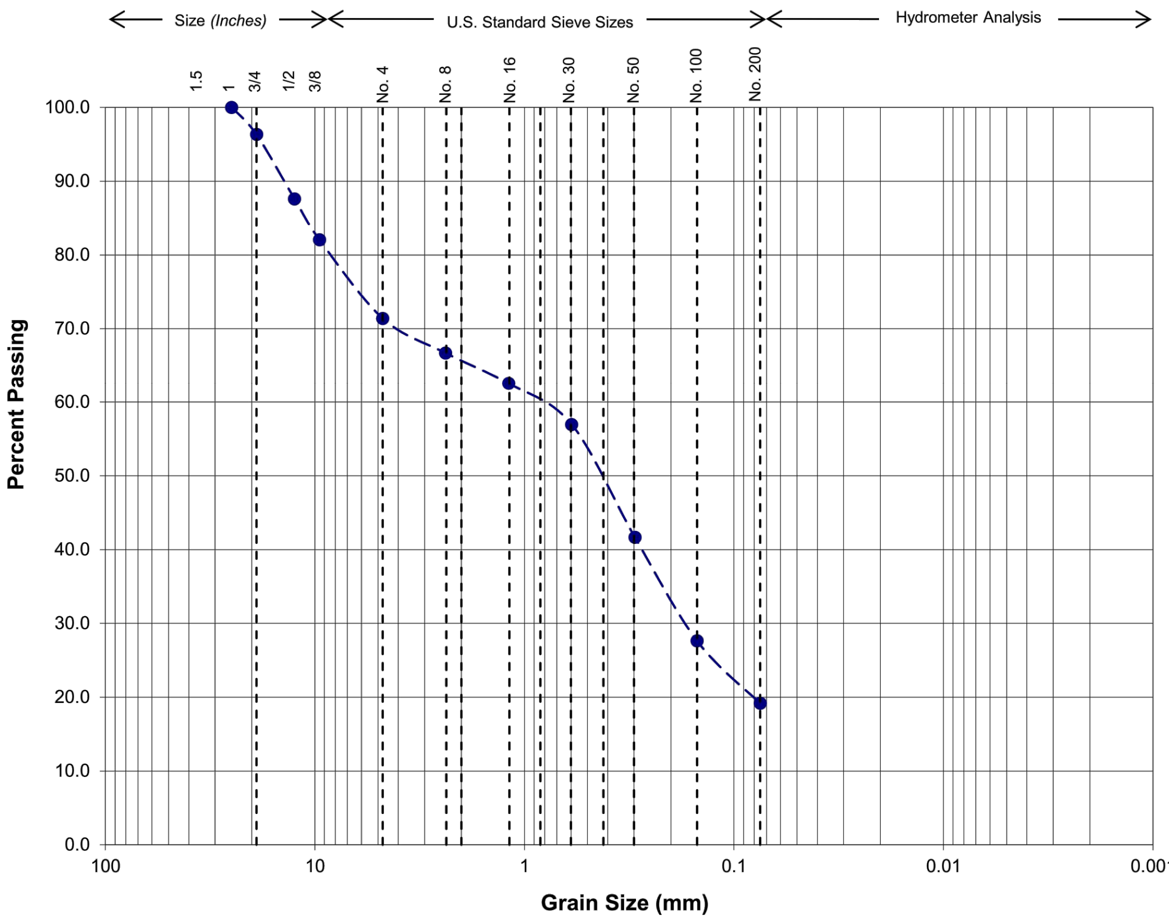
GRADATION ANALYSIS TEST RESULTS

5301 VITERBI FAMILY VISION RESEARCH CENTER

CAMPUS POINT DRIVE AND MEDICAL CENTER DRIVE

LA JOLLA, CA 92037

BY: GN	DATE: SEPT 2021	PROJECT: 2021183	APPENDIX: C.3



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B - 2

Depth (ft): 0 - 2

USCS Soil Type: SC

Passing No. 200 (%): 19

Atterberg Limits (ASTM D4318):

Liquid Limit, LL: 32

Plastic Limit, PL: 21

Plasticity Index, PI: 11

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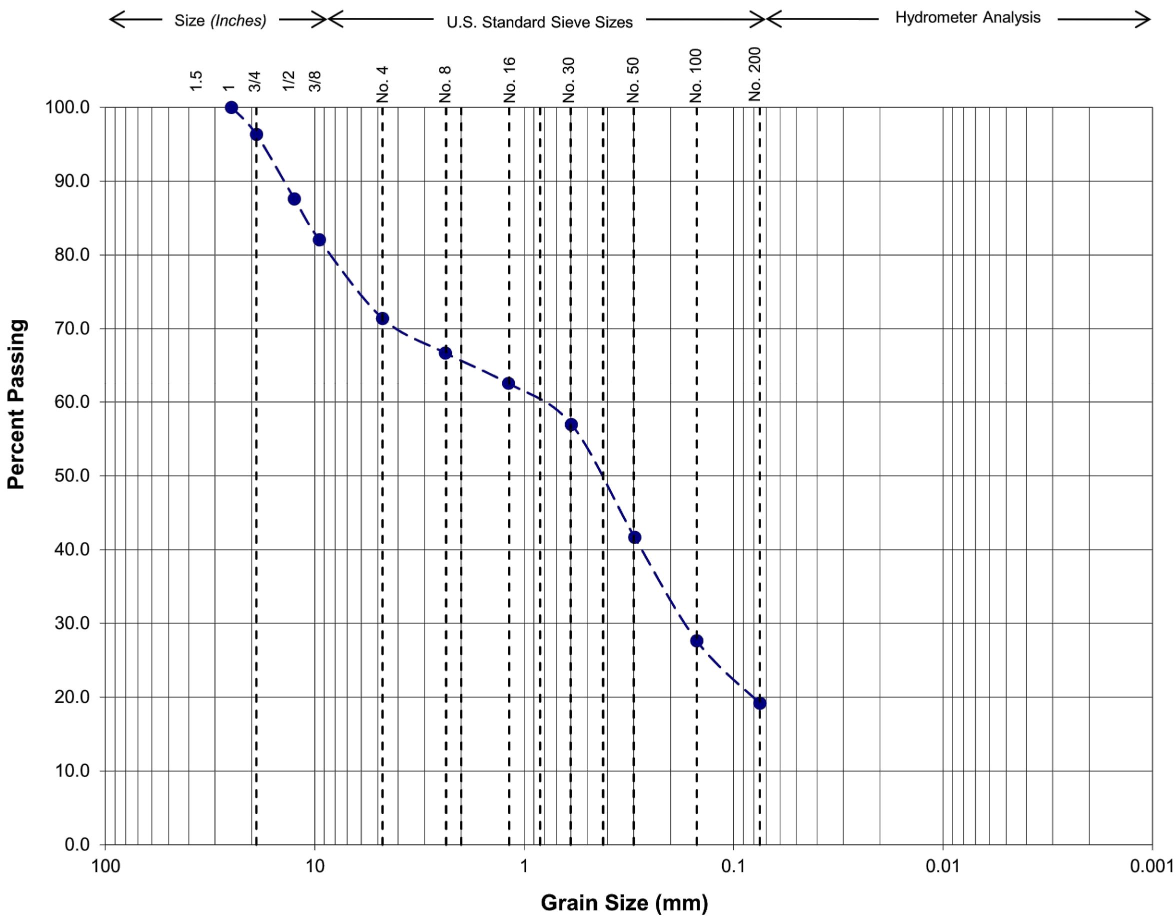
GRADATION ANALYSIS TEST RESULTS

5301 VITERBI FAMILY VISION RESEARCH CENTER

CAMPUS POINT DRIVE AND MEDICAL CENTER DRIVE

LA JOLLA, CA 92037

BY: GN	DATE: SEPT 2021	PROJECT: 2021183	APPENDIX: C.4



Gravel		Sand			Silt or Clay
Coarse	Fine	Coarse	Medium	Fine	

Sample Location: B - 2

Depth (ft): 5 - 6 $\frac{1}{2}$

USCS Soil Type: SM

Passing No. 200 (%): 19

Atterberg Limits (ASTM D4318):

Liquid Limit, LL: NP

Plastic Limit, PL: NP

Plasticity Index, PI: NP

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GRADATION ANALYSIS TEST RESULTS

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CAMPUS POINT DRIVE AND MEDICAL CENTER DRIVE

LA JOLLA, CA 92037

BY: GN	DATE: SEPT 2021	PROJECT: 2021183	APPENDIX: C.5

Expansion Index (ASTM D4829)

Sample Location	Sample Depth (ft.)	Expansion Index	Expansion Potential
B - 1	0 - 2	4	Very Low
B - 1	2 $\frac{1}{2}$ - 3	16	Very Low
B - 2	0 - 2	0	Very Low

Resistance Value (Cal. Test Method 301 & ASTM D2844)

Sample Location	Sample Depth (ft.)	R-Value
B -1	0 - 2	28

Corrosivity (Cal. Test Method 417,422,643)

Sample Location	Sample Depth (ft.)	pH	Resistivity (Ohm-cm)	Sulfate Content (ppm)	Sulfate Content (%)	Chloride Content (ppm)	Chloride Content (%)
B - 1	0 - 2	7.9	450	420	0.042	450	0.045
B - 2	15 - 16 $\frac{1}{2}$	7.8	2600	33	0.003	64	0.006

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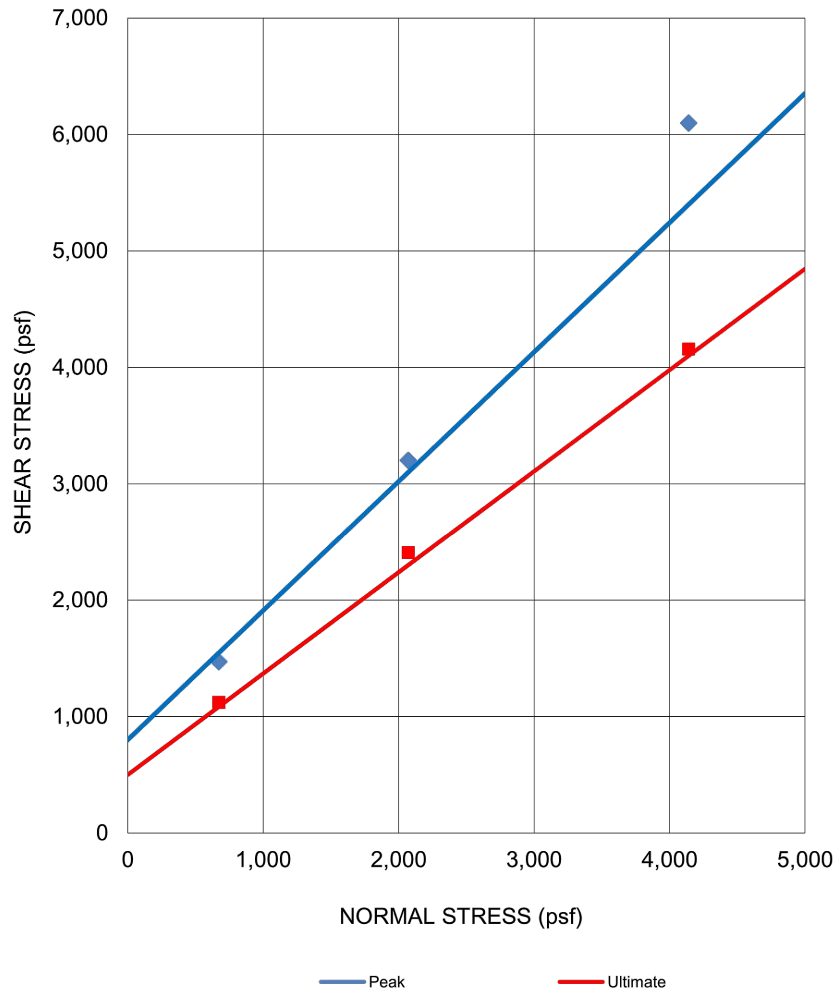
LAB TEST RESULTS

5301 VITERBI FAMILY VISION RESEARCH CENTER
CAMPUS POINT DRIVE AND MEDICAL CENTER DRIVE
LA JOLLA, CA 92037

BY: GN | DATE: SEPT 2021 | PROJECT: 2021183 | APPENDIX: C.6



Friction Angle (Φ):	48 °	41 °
Apparent Cohesion (C):	800 psf	500 psf

Soil Description: Very Old Paralic Deposits ($Qvop_{10}$): Silty Sandstone

Sample Location: B - 1

Sample Depth (ft): 15

Notes: In-Situ

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DIRECT SHEAR TEST RESULTS

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CAMPUS POINT DRIVE AND MEDICAL CENTER DRIVE

LA JOLLA, CA 92037

BY: GN	DATE: SEPT 2021	PROJECT: 2021183	FIGURE: C.7

APPENDIX D

WORKSHEET C.4-1: CATEGORIZATION OF INFILTRATION FEASIBILITY

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions[9]

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1: Form I-8A[10]
Part 1 - Full Infiltration Feasibility Screening Criteria	
DMA(s) Being Analyzed:	Project Phase:
Location at P-1	Planning Phase
Criteria 1: Infiltration Rate Screening	

1A	Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper Type A or B and corroborated by available site soil data[11]? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result or continue to Step 1B if the applicant elects to perform infiltration testing. ☐ No; the mapped soil types are A or B but is not corroborated by available site soil data (continue to Step 1B). ☒ No; the mapped soil types are C, D, or "urban/unclassified" and is corroborated by available site soil data. Answer "No" to Criteria 1 Result. ☐ No; the mapped soil types are C, D, or "urban/unclassified" but is not corroborated by available site soil data (continue to Step 1B).
1B	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1? ☐ Yes; Continue to Step 1C. ☐ No; Skip to Step 1D.
1C	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1 greater than 0.5 inches per hour? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result. ☐ No; full infiltration is not required. Answer "No" to Criteria 1 Result.
1D	**Infiltration Testing Method.** Is the selected infiltration testing method suitable during the design phase (see Appendix D.3)? Note: Alternative testing standards may be allowed with appropriate rationales and documentation. ☐ Yes; continue to Step 1E. ☐ No; select an appropriate infiltration testing method.

[9] Note that it is not required to investigate each and every criterion in the worksheet, a single "no" answer in Part 1, Part 2, Part 3, or Part 4 determines a full, partial, or no infiltration condition.

[10] This form must be completed each time there is a change to the site layout that would affect the infiltration feasibility condition. Previously completed forms shall be retained to document the evolution of the site storm water design.

[11] Available data includes site-specific sampling or observation of soil types or texture classes, such as obtained from borings or test pits necessary to support other design elements.

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]
1E	**Number of Percolation/Infiltration Tests.** Does the infiltration testing method performed satisfy the minimum number of tests specified in Table D.3-2? ☐ Yes; continue to Step 1F. ☐ No; conduct appropriate number of tests.	
IF	**Factor of Safety.** Is the suitable Factor of Safety selected for full infiltration design? See guidance in D.5; Tables D.5-1 and D.5-2; and Worksheet D.5-1 (Form I-9). ☐ Yes; continue to Step 1G. ☐ No; select appropriate factor of safety.	
1G	**Full Infiltration Feasibility.** Is the average measured infiltration rate divided by the Factor of Safety greater than 0.5 inches per hour? ☐ Yes; answer "Yes" to Criteria 1 Result. ☐ No; answer "No" to Criteria 1 Result.	
Criteria 1 Result	Is the estimated reliable infiltration rate greater than 0.5 inches per hour within the DMA where runoff can reasonably be routed to a BMP? ☐ Yes; the DMA may feasibly support full infiltration. Continue to Criteria 2. ☒ No; full infiltration is not required. Skip to Part 1 Result.	
Summarize infiltration testing methods, testing locations, replicates, and results and summarize estimates of reliable infiltration rates according to procedures outlined in D.5. Documentation should be included in project geotechnical report. The findings of this geotechnical investigation and infiltration assessment are detailed in NOVA 2021. A qualified representative of NOVA Services directed the drilling of one percolation test boring to a depths of approximately 5 ft below ground surface (bgs) with a continuously sampled exploratory boring to accompany each test to at least 10 feet below the bottom of the potential BMP bottom. The tests were conducted in compliance with the Borehole Percolation Tests method (D.3.3.2) of the BMP Manual. The percolation rates were converted to infiltration rates by the Porchet Method. Percolation testing indicated infiltration rates of 0.01-inches per hour utilizing a factor of safety of FS=2.		

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
Criteria 2: Geologic/Geotechnical Screening			
2A	If all questions in Step 2A are answered "Yes," continue to Step 2B. For any "No" answer in Step 2A answer "No" to Criteria 2, and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.		
2A-1	Can the proposed full infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick below the infiltrating surface?	☐ Yes	☐ No
2A-2	Can the proposed full infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☐ Yes	☐ No
2A-3	Can the proposed full infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐ Yes	☐ No
2B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1. If all questions in Step 2B are answered "Yes," then answer "Yes" to Criteria 2 Result. If there are "No" answers continue to Step 2C.		
2B-1	**Hydroconsolidation.** Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can full infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐ Yes	☐ No
2B-2	**Expansive Soils.** Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can full infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
2B-3	**Liquefaction**. If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011 or most recent edition). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can full infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐ Yes	☐ No
2B-4	**Slope Stability**. If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can full infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐ Yes	☐ No
2B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can full infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐ Yes	☐ No
2B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can full infiltration BMPs be proposed within the DMA using established setbacks from underground utilities, structures, and/or retaining walls?	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
2C	**Mitigation Measures.** Propose mitigation measures for each geologic/geotechnical hazard identified in Step 2B. Provide a discussion of geologic/geotechnical hazards that would prevent full infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures. Can mitigation measures be proposed to allow for full infiltration BMPs? If the question in Step 2 is answered "Yes," then answer "Yes" to Criteria 2 Result. If the question in Step 2C is answered "No," then answer "No" to Criteria 2 Result.	☐ Yes	☐ No
Criteria 2 Result	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?	☐ Yes	☐ No
Summarize findings and basis; provide references to related reports or exhibits.			

Part 1 Result – Full Infiltration Geotechnical Screening [12]	Result
If answers to both Criteria 1 and Criteria 2 are "Yes", a full infiltration design is potentially feasible based on Geotechnical conditions only. If either answer to Criteria 1 or Criteria 2 is "No", a full infiltration design is not required.	☐ Full infiltration Condition ☒ Complete Part 2

[12] To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]
Part 2 – Partial vs. No Infiltration Feasibility Screening Criteria		
DMA(s) Being Analyzed:		Project Phase:
Locations at P-1 and P-2		Planning Phase
Criteria 3 : Infiltration Rate Screening		
3A	**NRCS Type C, D, or "urban/unclassified":** Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper is Type C, D, or "urban/unclassified" and corroborated by available site soil data? ☐ Yes; the site is mapped as C soils and a reliable infiltration rate of 0.15 in/hr. is used to size partial infiltration BMPS. Answer "Yes" to Criteria 3 Result. ☐ Yes; the site is mapped as D soils or "urban/unclassified" and a reliable infiltration rate of 0.05 in/hr. is used to size partial infiltration BMPS. Answer "Yes" to Criteria 3 Result. ☒ No; infiltration testing is conducted (refer to Table D.3-1), continue to Step 3B.	
3B	**Infiltration Testing Result:** Is the reliable infiltration rate (i.e. average measured infiltration rate/2) greater than 0.05 in/hr. and less than or equal to 0.5 in/hr? ☐ Yes; the site may support partial infiltration. Answer "Yes" to Criteria 3 Result. ☒ No; the reliable infiltration rate (i.e. average measured rate/2) is less than 0.05 in/hr., partial infiltration is not required. Answer "No" to Criteria 3 Result.	
Criteria 3 Result	Is the estimated reliable infiltration rate (i.e., average measured infiltration rate/2) greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour at any location within each DMA where runoff can reasonably be routed to a BMP? ☐ Yes; Continue to Criteria 4. ☒ No: Skip to Part 2 Result.	
Summarize infiltration testing and/or mapping results (i.e. soil maps and series description used for infiltration rate). Percolation test methods and infiltration results are detailed in a geotechnical investigation report (NOVA 2021). Percolation testing indicated infiltration rates of 0.01-inches per hour utilizing a factor of safety of FS=2. Full and partial BMPs are not required on sites with infiltration rates less than 0.05 inches per hour.		

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
Criteria 4: Geologic/Geotechnical Screening			
4A	If all questions in Step 4A are answered "Yes," continue to Step 2B. For any "No" answer in Step 4A answer "No" to Criteria 4 Result, and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.		
4A-1	Can the proposed partial infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick?	☐ Yes	☐ No
4A-2	Can the proposed partial infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☐ Yes	☐ No
4A-3	Can the proposed partial infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐ Yes	☐ No
4B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1 If all questions in Step 4B are answered "Yes," then answer "Yes" to Criteria 4 Result. If there are any "No" answers continue to Step 4C.		
4B-1	**Hydroconsolidation.** Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can partial infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐ Yes	☐ No
4B-2	**Expansive Soils.** Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can partial infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
4B-3	**Liquefaction**. If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can partial infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐ Yes	☐ No
4B-4	**Slope Stability**. If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can partial infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐ Yes	☐ No
4B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can partial infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐ Yes	☐ No
4B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can partial infiltration BMPs be proposed within the DMA using recommended setbacks from underground utilities, structures, and/or retaining walls?	☐ Yes	☐ No
4C	**Mitigation Measures.** Propose mitigation measures for each geologic/geotechnical hazard identified in Step 4B. Provide a discussion on geologic/geotechnical hazards that would prevent partial infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures. Can mitigation measures be proposed to allow for partial infiltration BMPs? If the question in Step 4C is answered "Yes," then answer "Yes" to Criteria 4 Result. If the question in Step 4C is answered "No," then answer "No" to Criteria 4 Result.	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
Criteria 4 Result	Can infiltration of greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour be allowed without increasing the risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?	☐ Yes	☐ No
Summarize findings and basis; provide references to related reports or exhibits. See Report, Geotechnical Investigation, Proposed Viterbi Family Vision Research Center, NOVA Services. NOVA Project No. 2021183. September 2021.			

Part 2 – Partial Infiltration Geotechnical Screening Result[13]	Result
If answers to both Criteria 3 and Criteria 4 are “Yes”, a partial infiltration design is potentially feasible based on geotechnical conditions only. If answers to either Criteria 3 or Criteria 4 is “No”, then infiltration of any volume is considered to be infeasible within the site.	☐ Partial Infiltration Condition ☒ No Infiltration Condition

[13] To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

APPENDIX E
ENVIRONMENTAL SOILS TESTING

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ANALYTICAL REPORT

Eurofins Calscience LLC
7440 Lincoln Way
Garden Grove, CA 92841
Tel: (714)895-5494

Laboratory Job ID: 570-68615-1

Client Project/Site: 5301 Viterbi Family Vision Research Center/2021183

For:
NOVA Services
4373 Viewridge Avenue, Suite B
San Diego, California 92123

Attn: Tom Canady

Authorized for release by:
9/13/2021 11:59:36 PM

Terri Chang, Project Manager I
(714)895-5494
Terri.Chang@eurofinset.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: NOVA Services | Job ID: 570-68615-1

Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F1	MS and/or MSD recovery exceeds control limits.
L	A negative instrument reading had an absolute value greater than the reporting limit

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 570-68615-1

Laboratory: Eurofins Calscience LLC

Narrative

Job Narrative
570-68615-1

Comments
No additional comments.

Receipt
The samples were received on 8/27/2021 7:45 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.3º C.

GC Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Metals
Method 6010B: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 570-178133 and analytical batch 570-178743 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 6010B: Due to the high concentration of Barium and Copper the matrix spike / matrix spike duplicate (MS/MSD) for preparation batch 570-178133 and analytical batch 570-178743 could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria.

Method 6010B: The absolute response for Selenium was greater than the method reporting limit (RL) in the following samples: B-2 @ 2' (570-68615-8) and B-2 @ 25' (570-68615-13).
The instrument raw data has been manually reviewed and the result can be reported as ND.

Method 6010B: The absolute response for Beryllium was greater than the method reporting limit (RL) in the following sample: B-2 @ 30' (570-68615-14).
The instrument raw data has been manually reviewed and the result can be reported as ND.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Detection Summary

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Client Sample ID: B-1 @ 2'

Lab Sample ID: 570-68615-1

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
C21-C22	6.0		5.0		mg/Kg	1		8015B	Total/NA
C23-C24	6.9		5.0		mg/Kg	1		8015B	Total/NA
C25-C28	16		5.0		mg/Kg	1		8015B	Total/NA
C29-C32	14		5.0		mg/Kg	1		8015B	Total/NA
C33-C36	6.9		5.0		mg/Kg	1		8015B	Total/NA
C37-C40	5.1		5.0		mg/Kg	1		8015B	Total/NA
C8-C40	56		5.0		mg/Kg	1		8015B	Total/NA
Arsenic	3.09		2.46		mg/Kg	1		6010B	Total/NA
Barium	151		0.493		mg/Kg	1		6010B	Total/NA
Beryllium	0.475		0.246		mg/Kg	1		6010B	Total/NA
Cadmium	0.640		0.493		mg/Kg	1		6010B	Total/NA
Chromium	7.67		0.985		mg/Kg	1		6010B	Total/NA
Cobalt	3.42		0.985		mg/Kg	1		6010B	Total/NA
Copper	132		0.985		mg/Kg	1		6010B	Total/NA
Lead	17.8		4.93		mg/Kg	1		6010B	Total/NA
Nickel	4.93		0.493		mg/Kg	1		6010B	Total/NA
Vanadium	16.5		0.985		mg/Kg	1		6010B	Total/NA
Zinc	21.6		9.85		mg/Kg	1		6010B	Total/NA

Client Sample ID: B-1 @ 5'

Lab Sample ID: 570-68615-2

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
C33-C36	5.0		5.0		mg/Kg	1		8015B	Total/NA
C37-C40	5.8		5.0		mg/Kg	1		8015B	Total/NA
C8-C40	19		5.0		mg/Kg	1		8015B	Total/NA
Barium	33.6		0.503		mg/Kg	1		6010B	Total/NA
Beryllium	0.325		0.251		mg/Kg	1		6010B	Total/NA
Cadmium	0.546		0.503		mg/Kg	1		6010B	Total/NA
Chromium	6.96		1.01		mg/Kg	1		6010B	Total/NA
Cobalt	2.05		1.01		mg/Kg	1		6010B	Total/NA
Copper	4.01		1.01		mg/Kg	1		6010B	Total/NA
Nickel	2.44		0.503		mg/Kg	1		6010B	Total/NA
Vanadium	15.9		1.01		mg/Kg	1		6010B	Total/NA
Zinc	13.8		10.1		mg/Kg	1		6010B	Total/NA

Client Sample ID: B-1 @ 10'

Lab Sample ID: 570-68615-3

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Barium	22.1		0.513		mg/Kg	1		6010B	Total/NA
Beryllium	0.387		0.256		mg/Kg	1		6010B	Total/NA
Chromium	4.57		1.03		mg/Kg	1		6010B	Total/NA
Cobalt	2.41		1.03		mg/Kg	1		6010B	Total/NA
Copper	1.74		1.03		mg/Kg	1		6010B	Total/NA
Nickel	2.89		0.513		mg/Kg	1		6010B	Total/NA
Vanadium	8.76		1.03		mg/Kg	1		6010B	Total/NA
Zinc	18.8		10.3		mg/Kg	1		6010B	Total/NA

Client Sample ID: B-1 @ 15'

Lab Sample ID: 570-68615-4

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Barium	33.4		0.481		mg/Kg	1		6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: B-1 @ 15' (Continued)
Lab Sample ID: 570-68615-4

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Beryllium	0.545		0.240		mg/Kg	1		6010B	Total/NA
Chromium	5.50		0.962		mg/Kg	1		6010B	Total/NA
Cobalt	9.61		0.962		mg/Kg	1		6010B	Total/NA
Copper	3.52		0.962		mg/Kg	1		6010B	Total/NA
Nickel	3.71		0.481		mg/Kg	1		6010B	Total/NA
Vanadium	8.74		0.962		mg/Kg	1		6010B	Total/NA
Zinc	23.0		9.62		mg/Kg	1		6010B	Total/NA

Client Sample ID: B-1 @ 20'
Lab Sample ID: 570-68615-5

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Barium	35.1		0.508		mg/Kg	1		6010B	Total/NA
Beryllium	0.574		0.254		mg/Kg	1		6010B	Total/NA
Chromium	5.83		1.02		mg/Kg	1		6010B	Total/NA
Cobalt	10.2		1.02		mg/Kg	1		6010B	Total/NA
Copper	3.75		1.02		mg/Kg	1		6010B	Total/NA
Nickel	3.89		0.508		mg/Kg	1		6010B	Total/NA
Vanadium	9.21		1.02		mg/Kg	1		6010B	Total/NA
Zinc	24.6		10.2		mg/Kg	1		6010B	Total/NA

Client Sample ID: B-1 @ 25'
Lab Sample ID: 570-68615-6

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Barium	56.6		0.476		mg/Kg	1		6010B	Total/NA
Beryllium	0.436		0.238		mg/Kg	1		6010B	Total/NA
Chromium	3.27		0.952		mg/Kg	1		6010B	Total/NA
Cobalt	1.84		0.952		mg/Kg	1		6010B	Total/NA
Copper	1.83		0.952		mg/Kg	1		6010B	Total/NA
Nickel	2.83		0.476		mg/Kg	1		6010B	Total/NA
Vanadium	6.50		0.952		mg/Kg	1		6010B	Total/NA
Zinc	17.2		9.52		mg/Kg	1		6010B	Total/NA

Client Sample ID: B-1 @ 30'
Lab Sample ID: 570-68615-7

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Barium	80.5		0.485		mg/Kg	1		6010B	Total/NA
Beryllium	0.296		0.243		mg/Kg	1		6010B	Total/NA
Chromium	4.02		0.971		mg/Kg	1		6010B	Total/NA
Cobalt	1.99		0.971		mg/Kg	1		6010B	Total/NA
Copper	1.63		0.971		mg/Kg	1		6010B	Total/NA
Nickel	3.00		0.485		mg/Kg	1		6010B	Total/NA
Vanadium	6.58		0.971		mg/Kg	1		6010B	Total/NA
Zinc	18.5		9.71		mg/Kg	1		6010B	Total/NA

Client Sample ID: B-2 @ 2'
Lab Sample ID: 570-68615-8

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Barium	17.8		0.495		mg/Kg	1		6010B	Total/NA
Beryllium	0.283		0.248		mg/Kg	1		6010B	Total/NA
Chromium	4.25		0.990		mg/Kg	1		6010B	Total/NA
Cobalt	1.84		0.990		mg/Kg	1		6010B	Total/NA
Copper	1.81		0.990		mg/Kg	1		6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: B-2 @ 2' (Continued)

Lab Sample ID: 570-68615-8

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Nickel	1.87		0.495		mg/Kg	1		6010B	Total/NA
Vanadium	9.58		0.990		mg/Kg	1		6010B	Total/NA
Zinc	13.8		9.90		mg/Kg	1		6010B	Total/NA

Client Sample ID: B-2 @ 5'

Lab Sample ID: 570-68615-9

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Barium	15.5		0.490		mg/Kg	1		6010B	Total/NA
Chromium	3.36		0.980		mg/Kg	1		6010B	Total/NA
Cobalt	0.990		0.980		mg/Kg	1		6010B	Total/NA
Nickel	1.11		0.490		mg/Kg	1		6010B	Total/NA
Vanadium	7.32		0.980		mg/Kg	1		6010B	Total/NA

Client Sample ID: B-2 @ 10'

Lab Sample ID: 570-68615-10

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
C8-C40	9.1		5.0		mg/Kg	1		8015B	Total/NA
Barium	42.3		0.515		mg/Kg	1		6010B	Total/NA
Beryllium	0.501		0.258		mg/Kg	1		6010B	Total/NA
Chromium	5.18		1.03		mg/Kg	1		6010B	Total/NA
Cobalt	5.22		1.03		mg/Kg	1		6010B	Total/NA
Copper	3.40		1.03		mg/Kg	1		6010B	Total/NA
Lead	6.22		5.15		mg/Kg	1		6010B	Total/NA
Nickel	3.00		0.515		mg/Kg	1		6010B	Total/NA
Vanadium	12.2		1.03		mg/Kg	1		6010B	Total/NA
Zinc	20.3		10.3		mg/Kg	1		6010B	Total/NA

Client Sample ID: B-2 @ 15'

Lab Sample ID: 570-68615-11

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Barium	17.5		0.503		mg/Kg	1		6010B	Total/NA
Beryllium	0.753		0.251		mg/Kg	1		6010B	Total/NA
Chromium	3.52		1.01		mg/Kg	1		6010B	Total/NA
Cobalt	2.07		1.01		mg/Kg	1		6010B	Total/NA
Copper	1.74		1.01		mg/Kg	1		6010B	Total/NA
Nickel	3.46		0.503		mg/Kg	1		6010B	Total/NA
Vanadium	7.28		1.01		mg/Kg	1		6010B	Total/NA
Zinc	19.9		10.1		mg/Kg	1		6010B	Total/NA

Client Sample ID: B-2 @ 20'

Lab Sample ID: 570-68615-12

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Barium	33.0		0.485		mg/Kg	1		6010B	Total/NA
Beryllium	0.486		0.243		mg/Kg	1		6010B	Total/NA
Chromium	3.41		0.971		mg/Kg	1		6010B	Total/NA
Cobalt	1.59		0.971		mg/Kg	1		6010B	Total/NA
Copper	1.23		0.971		mg/Kg	1		6010B	Total/NA
Nickel	3.28		0.485		mg/Kg	1		6010B	Total/NA
Vanadium	7.60		0.971		mg/Kg	1		6010B	Total/NA
Zinc	19.4		9.71		mg/Kg	1		6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Client Sample ID: B-2 @ 25'

Lab Sample ID: 570-68615-13

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
Barium	57.5		0.526		mg/Kg	1		6010B	Total/NA
Beryllium	0.334		0.263		mg/Kg	1		6010B	Total/NA
Chromium	4.51		1.05		mg/Kg	1		6010B	Total/NA
Cobalt	1.80		1.05		mg/Kg	1		6010B	Total/NA
Copper	1.75		1.05		mg/Kg	1		6010B	Total/NA
Nickel	3.44		0.526		mg/Kg	1		6010B	Total/NA
Vanadium	7.75		1.05		mg/Kg	1		6010B	Total/NA
Zinc	19.5		10.5		mg/Kg	1		6010B	Total/NA

Client Sample ID: B-2 @ 30'

Lab Sample ID: 570-68615-14

No Detections.

Client Sample ID: B-3 @ 2'

Lab Sample ID: 570-68615-15

Analyte	Result	Qualifier	RL		Unit	Dil Fac	D	Method	Prep Type
C8-C40	12		5.0		mg/Kg	1		8015B	Total/NA
Barium	41.2		0.476		mg/Kg	1		6010B	Total/NA
Beryllium	0.344		0.238		mg/Kg	1		6010B	Total/NA
Chromium	5.02		0.952		mg/Kg	1		6010B	Total/NA
Cobalt	2.49		0.952		mg/Kg	1		6010B	Total/NA
Copper	4.79		0.952		mg/Kg	1		6010B	Total/NA
Lead	5.49		4.76		mg/Kg	1		6010B	Total/NA
Nickel	3.01		0.476		mg/Kg	1		6010B	Total/NA
Vanadium	11.2		0.952		mg/Kg	1		6010B	Total/NA
Zinc	16.4		9.52		mg/Kg	1		6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Method: 8015B - Diesel Range Organics (DRO) (GC)

Client Sample ID: B-1 @ 2'
Date Collected: 08/26/21 13:00
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-1
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C8 as C8	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 21:06	1
C9-C10	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 21:06	1
C11-C12	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 21:06	1
C13-C14	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 21:06	1
C15-C16	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 21:06	1
C17-C18	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 21:06	1
C19-C20	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 21:06	1
C21-C22	**6.0**		5.0		mg/Kg		09/09/21 10:40	09/09/21 21:06	1
C23-C24	**6.9**		5.0		mg/Kg		09/09/21 10:40	09/09/21 21:06	1
C25-C28	**16**		5.0		mg/Kg		09/09/21 10:40	09/09/21 21:06	1
C29-C32	**14**		5.0		mg/Kg		09/09/21 10:40	09/09/21 21:06	1
C33-C36	**6.9**		5.0		mg/Kg		09/09/21 10:40	09/09/21 21:06	1
C37-C40	**5.1**		5.0		mg/Kg		09/09/21 10:40	09/09/21 21:06	1
C8-C40	**56**		5.0		mg/Kg		09/09/21 10:40	09/09/21 21:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*110*		*60 - 138*	*09/09/21 10:40*	*09/09/21 21:06*	*1*

Client Sample ID: B-1 @ 5'
Date Collected: 08/26/21 13:07
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-2
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C8 as C8	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 03:43	1
C9-C10	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 03:43	1
C11-C12	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 03:43	1
C13-C14	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 03:43	1
C15-C16	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 03:43	1
C17-C18	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 03:43	1
C19-C20	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 03:43	1
C21-C22	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 03:43	1
C23-C24	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 03:43	1
C25-C28	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 03:43	1
C29-C32	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 03:43	1
C33-C36	**5.0**		5.0		mg/Kg		09/09/21 10:40	09/11/21 03:43	1
C37-C40	**5.8**		5.0		mg/Kg		09/09/21 10:40	09/11/21 03:43	1
C8-C40	**19**		5.0		mg/Kg		09/09/21 10:40	09/11/21 03:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*109*		*60 - 138*	*09/09/21 10:40*	*09/11/21 03:43*	*1*

Client Sample ID: B-1 @ 10'
Date Collected: 08/26/21 13:16
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-3
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C8 as C8	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:05	1
C9-C10	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:05	1
C11-C12	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:05	1
C13-C14	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:05	1
C15-C16	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:05	1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Method: 8015B - Diesel Range Organics (DRO) (GC) (Continued)

Client Sample ID: B-1 @ 10'
Date Collected: 08/26/21 13:16
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-3
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C17-C18	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:05	1
C19-C20	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:05	1
C21-C22	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:05	1
C23-C24	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:05	1
C25-C28	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:05	1
C29-C32	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:05	1
C33-C36	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:05	1
C37-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:05	1
C8-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*111*		*60 - 138*	*09/09/21 10:40*	*09/11/21 04:05*	*1*

Client Sample ID: B-1 @ 15'
Date Collected: 08/26/21 13:24
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-4
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C8 as C8	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:27	1
C9-C10	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:27	1
C11-C12	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:27	1
C13-C14	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:27	1
C15-C16	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:27	1
C17-C18	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:27	1
C19-C20	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:27	1
C21-C22	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:27	1
C23-C24	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:27	1
C25-C28	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:27	1
C29-C32	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:27	1
C33-C36	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:27	1
C37-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:27	1
C8-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*107*		*60 - 138*	*09/09/21 10:40*	*09/11/21 04:27*	*1*

Client Sample ID: B-1 @ 20'
Date Collected: 08/26/21 13:40
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-5
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C8 as C8	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:49	1
C9-C10	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:49	1
C11-C12	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:49	1
C13-C14	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:49	1
C15-C16	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:49	1
C17-C18	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:49	1
C19-C20	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:49	1
C21-C22	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:49	1
C23-C24	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:49	1
C25-C28	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:49	1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Method: 8015B - Diesel Range Organics (DRO) (GC) (Continued)

Client Sample ID: B-1 @ 20'
Date Collected: 08/26/21 13:40
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-5
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C29-C32	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:49	1
C33-C36	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:49	1
C37-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:49	1
C8-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 04:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*111*		*60 - 138*	*09/09/21 10:40*	*09/11/21 04:49*	*1*

Client Sample ID: B-1 @ 25'
Date Collected: 08/26/21 13:49
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-6
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C8 as C8	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:11	1
C9-C10	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:11	1
C11-C12	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:11	1
C13-C14	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:11	1
C15-C16	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:11	1
C17-C18	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:11	1
C19-C20	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:11	1
C21-C22	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:11	1
C23-C24	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:11	1
C25-C28	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:11	1
C29-C32	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:11	1
C33-C36	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:11	1
C37-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:11	1
C8-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*113*		*60 - 138*	*09/09/21 10:40*	*09/11/21 05:11*	*1*

Client Sample ID: B-1 @ 30'
Date Collected: 08/26/21 14:07
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-7
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C8 as C8	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:32	1
C9-C10	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:32	1
C11-C12	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:32	1
C13-C14	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:32	1
C15-C16	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:32	1
C17-C18	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:32	1
C19-C20	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:32	1
C21-C22	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:32	1
C23-C24	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:32	1
C25-C28	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:32	1
C29-C32	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:32	1
C33-C36	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:32	1
C37-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:32	1
C8-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:32	1

Method: 8015B - Diesel Range Organics (DRO) (GC) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*114*		*60 - 138*	*09/09/21 10:40*	*09/11/21 05:32*	*1*

Client Sample ID: B-2 @ 2' **Lab Sample ID: 570-68615-8**
Date Collected: 08/26/21 06:55 **Matrix: Solid**
Date Received: 08/27/21 19:45

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C8 as C8	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:55	1
C9-C10	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:55	1
C11-C12	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:55	1
C13-C14	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:55	1
C15-C16	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:55	1
C17-C18	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:55	1
C19-C20	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:55	1
C21-C22	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:55	1
C23-C24	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:55	1
C25-C28	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:55	1
C29-C32	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:55	1
C33-C36	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:55	1
C37-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:55	1
C8-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 05:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*113*		*60 - 138*	*09/09/21 10:40*	*09/11/21 05:55*	*1*

Client Sample ID: B-2 @ 5' **Lab Sample ID: 570-68615-9**
Date Collected: 08/26/21 07:07 **Matrix: Solid**
Date Received: 08/27/21 19:45

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C8 as C8	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:17	1
C9-C10	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:17	1
C11-C12	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:17	1
C13-C14	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:17	1
C15-C16	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:17	1
C17-C18	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:17	1
C19-C20	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:17	1
C21-C22	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:17	1
C23-C24	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:17	1
C25-C28	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:17	1
C29-C32	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:17	1
C33-C36	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:17	1
C37-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:17	1
C8-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*110*		*60 - 138*	*09/09/21 10:40*	*09/11/21 06:17*	*1*

Client Sample ID: B-2 @ 10' **Lab Sample ID: 570-68615-10**
Date Collected: 08/26/21 07:15 **Matrix: Solid**
Date Received: 08/27/21 19:45

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C8 as C8	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:38	1
C9-C10	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:38	1

Method: 8015B - Diesel Range Organics (DRO) (GC) (Continued)

Client Sample ID: B-2 @ 10'
Lab Sample ID: 570-68615-10
Date Collected: 08/26/21 07:15
Matrix: Solid
Date Received: 08/27/21 19:45

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C11-C12	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:38	1
C13-C14	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:38	1
C15-C16	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:38	1
C17-C18	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:38	1
C19-C20	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:38	1
C21-C22	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:38	1
C23-C24	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:38	1
C25-C28	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:38	1
C29-C32	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:38	1
C33-C36	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:38	1
C37-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:38	1
C8-C40	**9.1**		5.0		mg/Kg		09/09/21 10:40	09/11/21 06:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*114*		*60 - 138*	*09/09/21 10:40*	*09/11/21 06:38*	*1*

Client Sample ID: B-2 @ 15'
Lab Sample ID: 570-68615-11
Date Collected: 08/26/21 07:37
Matrix: Solid
Date Received: 08/27/21 19:45

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C8 as C8	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:00	1
C9-C10	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:00	1
C11-C12	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:00	1
C13-C14	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:00	1
C15-C16	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:00	1
C17-C18	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:00	1
C19-C20	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:00	1
C21-C22	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:00	1
C23-C24	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:00	1
C25-C28	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:00	1
C29-C32	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:00	1
C33-C36	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:00	1
C37-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:00	1
C8-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*111*		*60 - 138*	*09/09/21 10:40*	*09/11/21 07:00*	*1*

Client Sample ID: B-2 @ 20'
Lab Sample ID: 570-68615-12
Date Collected: 08/26/21 07:45
Matrix: Solid
Date Received: 08/27/21 19:45

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C8 as C8	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:22	1
C9-C10	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:22	1
C11-C12	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:22	1
C13-C14	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:22	1
C15-C16	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:22	1
C17-C18	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:22	1
C19-C20	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:22	1

Method: 8015B - Diesel Range Organics (DRO) (GC) (Continued)

Client Sample ID: B-2 @ 20'
Date Collected: 08/26/21 07:45
Date Received: 08/27/21 19:45
Lab Sample ID: 570-68615-12
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C21-C22	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:22	1
C23-C24	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:22	1
C25-C28	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:22	1
C29-C32	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:22	1
C33-C36	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:22	1
C37-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:22	1
C8-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*110*		*60 - 138*	*09/09/21 10:40*	*09/11/21 07:22*	*1*

Client Sample ID: B-2 @ 25'
Date Collected: 08/26/21 07:58
Date Received: 08/27/21 19:45
Lab Sample ID: 570-68615-13
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C8 as C8	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:44	1
C9-C10	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:44	1
C11-C12	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:44	1
C13-C14	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:44	1
C15-C16	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:44	1
C17-C18	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:44	1
C19-C20	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:44	1
C21-C22	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:44	1
C23-C24	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:44	1
C25-C28	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:44	1
C29-C32	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:44	1
C33-C36	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:44	1
C37-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:44	1
C8-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 07:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*111*		*60 - 138*	*09/09/21 10:40*	*09/11/21 07:44*	*1*

Client Sample ID: B-2 @ 30'
Date Collected: 08/26/21 08:15
Date Received: 08/27/21 19:45
Lab Sample ID: 570-68615-14
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C8 as C8	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:05	1
C9-C10	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:05	1
C11-C12	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:05	1
C13-C14	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:05	1
C15-C16	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:05	1
C17-C18	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:05	1
C19-C20	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:05	1
C21-C22	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:05	1
C23-C24	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:05	1
C25-C28	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:05	1
C29-C32	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:05	1
C33-C36	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:05	1

Method: 8015B - Diesel Range Organics (DRO) (GC) (Continued)

Client Sample ID: B-2 @ 30'
Date Collected: 08/26/21 08:15
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-14
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C37-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:05	1
C8-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*109*		*60 - 138*	*09/09/21 10:40*	*09/11/21 08:05*	*1*

Client Sample ID: B-3 @ 2'
Date Collected: 08/26/21 09:40
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-15
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C8 as C8	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:28	1
C9-C10	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:28	1
C11-C12	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:28	1
C13-C14	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:28	1
C15-C16	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:28	1
C17-C18	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:28	1
C19-C20	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:28	1
C21-C22	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:28	1
C23-C24	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:28	1
C25-C28	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:28	1
C29-C32	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:28	1
C33-C36	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:28	1
C37-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:28	1
C8-C40	**12**		5.0		mg/Kg		09/09/21 10:40	09/11/21 08:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*107*		*60 - 138*	*09/09/21 10:40*	*09/11/21 08:28*	*1*

Client: NOVA Services
Job ID: 570-68615-1
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Method: 6010B - Metals (ICP)

Client Sample ID: B-1 @ 2'
Lab Sample ID: 570-68615-1
Date Collected: 08/26/21 13:00
Matrix: Solid
Date Received: 08/27/21 19:45

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND	F1	2.96		mg/Kg		09/10/21 08:00	09/10/21 17:49	1
Arsenic	**3.09**		2.46		mg/Kg		09/10/21 08:00	09/10/21 17:49	1
Barium	**151**		0.493		mg/Kg		09/10/21 08:00	09/10/21 17:49	1
Beryllium	**0.475**		0.246		mg/Kg		09/10/21 08:00	09/10/21 17:49	1
Cadmium	**0.640**		0.493		mg/Kg		09/10/21 08:00	09/10/21 17:49	1
Chromium	**7.67**		0.985		mg/Kg		09/10/21 08:00	09/10/21 17:49	1
Cobalt	**3.42**		0.985		mg/Kg		09/10/21 08:00	09/10/21 17:49	1
Copper	**132**		0.985		mg/Kg		09/10/21 08:00	09/10/21 17:49	1
Lead	**17.8**		4.93		mg/Kg		09/10/21 08:00	09/10/21 17:49	1
Molybdenum	ND	F1	0.493		mg/Kg		09/10/21 08:00	09/10/21 17:49	1
Nickel	**4.93**		0.493		mg/Kg		09/10/21 08:00	09/10/21 17:49	1
Selenium	ND	F1	4.93		mg/Kg		09/10/21 08:00	09/10/21 17:49	1
Silver	ND	F1	0.985		mg/Kg		09/10/21 08:00	09/10/21 17:49	1
Thallium	ND		4.93		mg/Kg		09/10/21 08:00	09/10/21 17:49	1
Vanadium	**16.5**		0.985		mg/Kg		09/10/21 08:00	09/10/21 17:49	1
Zinc	**21.6**		9.85		mg/Kg		09/10/21 08:00	09/10/21 17:49	1

Client Sample ID: B-1 @ 5'
Lab Sample ID: 570-68615-2
Date Collected: 08/26/21 13:07
Matrix: Solid
Date Received: 08/27/21 19:45

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		3.02		mg/Kg		09/10/21 08:00	09/10/21 17:55	1
Arsenic	ND		2.51		mg/Kg		09/10/21 08:00	09/10/21 17:55	1
Barium	**33.6**		0.503		mg/Kg		09/10/21 08:00	09/10/21 17:55	1
Beryllium	**0.325**		0.251		mg/Kg		09/10/21 08:00	09/10/21 17:55	1
Cadmium	**0.546**		0.503		mg/Kg		09/10/21 08:00	09/10/21 17:55	1
Chromium	**6.96**		1.01		mg/Kg		09/10/21 08:00	09/10/21 17:55	1
Cobalt	**2.05**		1.01		mg/Kg		09/10/21 08:00	09/10/21 17:55	1
Copper	**4.01**		1.01		mg/Kg		09/10/21 08:00	09/10/21 17:55	1
Lead	ND		5.03		mg/Kg		09/10/21 08:00	09/10/21 17:55	1
Molybdenum	ND		0.503		mg/Kg		09/10/21 08:00	09/10/21 17:55	1
Nickel	**2.44**		0.503		mg/Kg		09/10/21 08:00	09/10/21 17:55	1
Selenium	ND		5.03		mg/Kg		09/10/21 08:00	09/10/21 17:55	1
Silver	ND		1.01		mg/Kg		09/10/21 08:00	09/10/21 17:55	1
Thallium	ND		5.03		mg/Kg		09/10/21 08:00	09/10/21 17:55	1
Vanadium	**15.9**		1.01		mg/Kg		09/10/21 08:00	09/10/21 17:55	1
Zinc	**13.8**		10.1		mg/Kg		09/10/21 08:00	09/10/21 17:55	1

Client Sample ID: B-1 @ 10'
Lab Sample ID: 570-68615-3
Date Collected: 08/26/21 13:16
Matrix: Solid
Date Received: 08/27/21 19:45

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		3.08		mg/Kg		09/10/21 08:00	09/10/21 17:57	1
Arsenic	ND		2.56		mg/Kg		09/10/21 08:00	09/10/21 17:57	1
Barium	**22.1**		0.513		mg/Kg		09/10/21 08:00	09/10/21 17:57	1
Beryllium	**0.387**		0.256		mg/Kg		09/10/21 08:00	09/10/21 17:57	1
Cadmium	ND		0.513		mg/Kg		09/10/21 08:00	09/10/21 17:57	1
Chromium	**4.57**		1.03		mg/Kg		09/10/21 08:00	09/10/21 17:57	1
Cobalt	**2.41**		1.03		mg/Kg		09/10/21 08:00	09/10/21 17:57	1

Method: 6010B - Metals (ICP) (Continued)

Client Sample ID: B-1 @ 10'
Date Collected: 08/26/21 13:16
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-3
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Copper	**1.74**		1.03		mg/Kg		09/10/21 08:00	09/10/21 17:57	1
Lead	ND		5.13		mg/Kg		09/10/21 08:00	09/10/21 17:57	1
Molybdenum	ND		0.513		mg/Kg		09/10/21 08:00	09/10/21 17:57	1
Nickel	**2.89**		0.513		mg/Kg		09/10/21 08:00	09/10/21 17:57	1
Selenium	ND		5.13		mg/Kg		09/10/21 08:00	09/10/21 17:57	1
Silver	ND		1.03		mg/Kg		09/10/21 08:00	09/10/21 17:57	1
Thallium	ND		5.13		mg/Kg		09/10/21 08:00	09/10/21 17:57	1
Vanadium	**8.76**		1.03		mg/Kg		09/10/21 08:00	09/10/21 17:57	1
Zinc	**18.8**		10.3		mg/Kg		09/10/21 08:00	09/10/21 17:57	1

Client Sample ID: B-1 @ 15'
Date Collected: 08/26/21 13:24
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-4
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		2.88		mg/Kg		09/10/21 08:00	09/10/21 17:59	1
Arsenic	ND		2.40		mg/Kg		09/10/21 08:00	09/10/21 17:59	1
Barium	**33.4**		0.481		mg/Kg		09/10/21 08:00	09/10/21 17:59	1
Beryllium	**0.545**		0.240		mg/Kg		09/10/21 08:00	09/10/21 17:59	1
Cadmium	ND		0.481		mg/Kg		09/10/21 08:00	09/10/21 17:59	1
Chromium	**5.50**		0.962		mg/Kg		09/10/21 08:00	09/10/21 17:59	1
Cobalt	**9.61**		0.962		mg/Kg		09/10/21 08:00	09/10/21 17:59	1
Copper	**3.52**		0.962		mg/Kg		09/10/21 08:00	09/10/21 17:59	1
Lead	ND		4.81		mg/Kg		09/10/21 08:00	09/10/21 17:59	1
Molybdenum	ND		0.481		mg/Kg		09/10/21 08:00	09/10/21 17:59	1
Nickel	**3.71**		0.481		mg/Kg		09/10/21 08:00	09/10/21 17:59	1
Selenium	ND		4.81		mg/Kg		09/10/21 08:00	09/10/21 17:59	1
Silver	ND		0.962		mg/Kg		09/10/21 08:00	09/10/21 17:59	1
Thallium	ND		4.81		mg/Kg		09/10/21 08:00	09/10/21 17:59	1
Vanadium	**8.74**		0.962		mg/Kg		09/10/21 08:00	09/10/21 17:59	1
Zinc	**23.0**		9.62		mg/Kg		09/10/21 08:00	09/10/21 17:59	1

Client Sample ID: B-1 @ 20'
Date Collected: 08/26/21 13:40
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-5
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		3.05		mg/Kg		09/10/21 08:00	09/10/21 18:01	1
Arsenic	ND		2.54		mg/Kg		09/10/21 08:00	09/10/21 18:01	1
Barium	**35.1**		0.508		mg/Kg		09/10/21 08:00	09/10/21 18:01	1
Beryllium	**0.574**		0.254		mg/Kg		09/10/21 08:00	09/10/21 18:01	1
Cadmium	ND		0.508		mg/Kg		09/10/21 08:00	09/10/21 18:01	1
Chromium	**5.83**		1.02		mg/Kg		09/10/21 08:00	09/10/21 18:01	1
Cobalt	**10.2**		1.02		mg/Kg		09/10/21 08:00	09/10/21 18:01	1
Copper	**3.75**		1.02		mg/Kg		09/10/21 08:00	09/10/21 18:01	1
Lead	ND		5.08		mg/Kg		09/10/21 08:00	09/10/21 18:01	1
Molybdenum	ND		0.508		mg/Kg		09/10/21 08:00	09/10/21 18:01	1
Nickel	**3.89**		0.508		mg/Kg		09/10/21 08:00	09/10/21 18:01	1
Selenium	ND		5.08		mg/Kg		09/10/21 08:00	09/10/21 18:01	1
Silver	ND		1.02		mg/Kg		09/10/21 08:00	09/10/21 18:01	1
Thallium	ND		5.08		mg/Kg		09/10/21 08:00	09/10/21 18:01	1

Method: 6010B - Metals (ICP) (Continued)

Client Sample ID: B-1 @ 20'
Lab Sample ID: 570-68615-5
Date Collected: 08/26/21 13:40
Matrix: Solid
Date Received: 08/27/21 19:45

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	**9.21**		1.02		mg/Kg		09/10/21 08:00	09/10/21 18:01	1
Zinc	**24.6**		10.2		mg/Kg		09/10/21 08:00	09/10/21 18:01	1

Client Sample ID: B-1 @ 25'
Lab Sample ID: 570-68615-6
Date Collected: 08/26/21 13:49
Matrix: Solid
Date Received: 08/27/21 19:45

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		2.86		mg/Kg		09/10/21 08:00	09/10/21 18:13	1
Arsenic	ND		2.38		mg/Kg		09/10/21 08:00	09/10/21 18:13	1
Barium	**56.6**		0.476		mg/Kg		09/10/21 08:00	09/10/21 18:13	1
Beryllium	**0.436**		0.238		mg/Kg		09/10/21 08:00	09/10/21 18:13	1
Cadmium	ND		0.476		mg/Kg		09/10/21 08:00	09/10/21 18:13	1
Chromium	**3.27**		0.952		mg/Kg		09/10/21 08:00	09/10/21 18:13	1
Cobalt	**1.84**		0.952		mg/Kg		09/10/21 08:00	09/10/21 18:13	1
Copper	**1.83**		0.952		mg/Kg		09/10/21 08:00	09/10/21 18:13	1
Lead	ND		4.76		mg/Kg		09/10/21 08:00	09/10/21 18:13	1
Molybdenum	ND		0.476		mg/Kg		09/10/21 08:00	09/10/21 18:13	1
Nickel	**2.83**		0.476		mg/Kg		09/10/21 08:00	09/10/21 18:13	1
Selenium	ND		4.76		mg/Kg		09/10/21 08:00	09/10/21 18:13	1
Silver	ND		0.952		mg/Kg		09/10/21 08:00	09/10/21 18:13	1
Thallium	ND		4.76		mg/Kg		09/10/21 08:00	09/10/21 18:13	1
Vanadium	**6.50**		0.952		mg/Kg		09/10/21 08:00	09/10/21 18:13	1
Zinc	**17.2**		9.52		mg/Kg		09/10/21 08:00	09/10/21 18:13	1

Client Sample ID: B-1 @ 30'
Lab Sample ID: 570-68615-7
Date Collected: 08/26/21 14:07
Matrix: Solid
Date Received: 08/27/21 19:45

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		2.91		mg/Kg		09/10/21 08:00	09/10/21 18:15	1
Arsenic	ND		2.43		mg/Kg		09/10/21 08:00	09/10/21 18:15	1
Barium	**80.5**		0.485		mg/Kg		09/10/21 08:00	09/10/21 18:15	1
Beryllium	**0.296**		0.243		mg/Kg		09/10/21 08:00	09/10/21 18:15	1
Cadmium	ND		0.485		mg/Kg		09/10/21 08:00	09/10/21 18:15	1
Chromium	**4.02**		0.971		mg/Kg		09/10/21 08:00	09/10/21 18:15	1
Cobalt	**1.99**		0.971		mg/Kg		09/10/21 08:00	09/10/21 18:15	1
Copper	**1.63**		0.971		mg/Kg		09/10/21 08:00	09/10/21 18:15	1
Lead	ND		4.85		mg/Kg		09/10/21 08:00	09/10/21 18:15	1
Molybdenum	ND		0.485		mg/Kg		09/10/21 08:00	09/10/21 18:15	1
Nickel	**3.00**		0.485		mg/Kg		09/10/21 08:00	09/10/21 18:15	1
Selenium	ND		4.85		mg/Kg		09/10/21 08:00	09/10/21 18:15	1
Silver	ND		0.971		mg/Kg		09/10/21 08:00	09/10/21 18:15	1
Thallium	ND		4.85		mg/Kg		09/10/21 08:00	09/10/21 18:15	1
Vanadium	**6.58**		0.971		mg/Kg		09/10/21 08:00	09/10/21 18:15	1
Zinc	**18.5**		9.71		mg/Kg		09/10/21 08:00	09/10/21 18:15	1

Client: NOVA Services
Job ID: 570-68615-1
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Method: 6010B - Metals (ICP)

Client Sample ID: B-2 @ 2'
Lab Sample ID: 570-68615-8
Date Collected: 08/26/21 06:55
Matrix: Solid
Date Received: 08/27/21 19:45

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		2.97		mg/Kg		09/10/21 08:00	09/10/21 18:17	1
Arsenic	ND		2.48		mg/Kg		09/10/21 08:00	09/10/21 18:17	1
Barium	**17.8**		0.495		mg/Kg		09/10/21 08:00	09/10/21 18:17	1
Beryllium	**0.283**		0.248		mg/Kg		09/10/21 08:00	09/10/21 18:17	1
Cadmium	ND		0.495		mg/Kg		09/10/21 08:00	09/10/21 18:17	1
Chromium	**4.25**		0.990		mg/Kg		09/10/21 08:00	09/10/21 18:17	1
Cobalt	**1.84**		0.990		mg/Kg		09/10/21 08:00	09/10/21 18:17	1
Copper	**1.81**		0.990		mg/Kg		09/10/21 08:00	09/10/21 18:17	1
Lead	ND		4.95		mg/Kg		09/10/21 08:00	09/10/21 18:17	1
Molybdenum	ND		0.495		mg/Kg		09/10/21 08:00	09/10/21 18:17	1
Nickel	**1.87**		0.495		mg/Kg		09/10/21 08:00	09/10/21 18:17	1
Selenium	ND	L	4.95		mg/Kg		09/10/21 08:00	09/10/21 18:17	1
Silver	ND		0.990		mg/Kg		09/10/21 08:00	09/10/21 18:17	1
Thallium	ND		4.95		mg/Kg		09/10/21 08:00	09/10/21 18:17	1
Vanadium	**9.58**		0.990		mg/Kg		09/10/21 08:00	09/10/21 18:17	1
Zinc	**13.8**		9.90		mg/Kg		09/10/21 08:00	09/10/21 18:17	1

Client Sample ID: B-2 @ 5'
Lab Sample ID: 570-68615-9
Date Collected: 08/26/21 07:07
Matrix: Solid
Date Received: 08/27/21 19:45

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		2.94		mg/Kg		09/10/21 08:00	09/10/21 18:19	1
Arsenic	ND		2.45		mg/Kg		09/10/21 08:00	09/10/21 18:19	1
Barium	**15.5**		0.490		mg/Kg		09/10/21 08:00	09/10/21 18:19	1
Beryllium	ND		0.245		mg/Kg		09/10/21 08:00	09/10/21 18:19	1
Cadmium	ND		0.490		mg/Kg		09/10/21 08:00	09/10/21 18:19	1
Chromium	**3.36**		0.980		mg/Kg		09/10/21 08:00	09/10/21 18:19	1
Cobalt	**0.990**		0.980		mg/Kg		09/10/21 08:00	09/10/21 18:19	1
Copper	ND		0.980		mg/Kg		09/10/21 08:00	09/10/21 18:19	1
Lead	ND		4.90		mg/Kg		09/10/21 08:00	09/10/21 18:19	1
Molybdenum	ND		0.490		mg/Kg		09/10/21 08:00	09/10/21 18:19	1
Nickel	**1.11**		0.490		mg/Kg		09/10/21 08:00	09/10/21 18:19	1
Selenium	ND		4.90		mg/Kg		09/10/21 08:00	09/10/21 18:19	1
Silver	ND		0.980		mg/Kg		09/10/21 08:00	09/10/21 18:19	1
Thallium	ND		4.90		mg/Kg		09/10/21 08:00	09/10/21 18:19	1
Vanadium	**7.32**		0.980		mg/Kg		09/10/21 08:00	09/10/21 18:19	1
Zinc	ND		9.80		mg/Kg		09/10/21 08:00	09/10/21 18:19	1

Client Sample ID: B-2 @ 10'
Lab Sample ID: 570-68615-10
Date Collected: 08/26/21 07:15
Matrix: Solid
Date Received: 08/27/21 19:45

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		3.09		mg/Kg		09/10/21 08:00	09/10/21 18:21	1
Arsenic	ND		2.58		mg/Kg		09/10/21 08:00	09/10/21 18:21	1
Barium	**42.3**		0.515		mg/Kg		09/10/21 08:00	09/10/21 18:21	1
Beryllium	**0.501**		0.258		mg/Kg		09/10/21 08:00	09/10/21 18:21	1
Cadmium	ND		0.515		mg/Kg		09/10/21 08:00	09/10/21 18:21	1
Chromium	**5.18**		1.03		mg/Kg		09/10/21 08:00	09/10/21 18:21	1
Cobalt	**5.22**		1.03		mg/Kg		09/10/21 08:00	09/10/21 18:21	1

Method: 6010B - Metals (ICP) (Continued)

Client Sample ID: B-2 @ 10'
Date Collected: 08/26/21 07:15
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-10
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Copper	**3.40**		1.03		mg/Kg		09/10/21 08:00	09/10/21 18:21	1
Lead	**6.22**		5.15		mg/Kg		09/10/21 08:00	09/10/21 18:21	1
Molybdenum	ND		0.515		mg/Kg		09/10/21 08:00	09/10/21 18:21	1
Nickel	**3.00**		0.515		mg/Kg		09/10/21 08:00	09/10/21 18:21	1
Selenium	ND		5.15		mg/Kg		09/10/21 08:00	09/10/21 18:21	1
Silver	ND		1.03		mg/Kg		09/10/21 08:00	09/10/21 18:21	1
Thallium	ND		5.15		mg/Kg		09/10/21 08:00	09/10/21 18:21	1
Vanadium	**12.2**		1.03		mg/Kg		09/10/21 08:00	09/10/21 18:21	1
Zinc	**20.3**		10.3		mg/Kg		09/10/21 08:00	09/10/21 18:21	1

Client Sample ID: B-2 @ 15'
Date Collected: 08/26/21 07:37
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-11
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		3.02		mg/Kg		09/10/21 08:00	09/10/21 18:23	1
Arsenic	ND		2.51		mg/Kg		09/10/21 08:00	09/10/21 18:23	1
Barium	**17.5**		0.503		mg/Kg		09/10/21 08:00	09/10/21 18:23	1
Beryllium	**0.753**		0.251		mg/Kg		09/10/21 08:00	09/10/21 18:23	1
Cadmium	ND		0.503		mg/Kg		09/10/21 08:00	09/10/21 18:23	1
Chromium	**3.52**		1.01		mg/Kg		09/10/21 08:00	09/10/21 18:23	1
Cobalt	**2.07**		1.01		mg/Kg		09/10/21 08:00	09/10/21 18:23	1
Copper	**1.74**		1.01		mg/Kg		09/10/21 08:00	09/10/21 18:23	1
Lead	ND		5.03		mg/Kg		09/10/21 08:00	09/10/21 18:23	1
Molybdenum	ND		0.503		mg/Kg		09/10/21 08:00	09/10/21 18:23	1
Nickel	**3.46**		0.503		mg/Kg		09/10/21 08:00	09/10/21 18:23	1
Selenium	ND		5.03		mg/Kg		09/10/21 08:00	09/10/21 18:23	1
Silver	ND		1.01		mg/Kg		09/10/21 08:00	09/10/21 18:23	1
Thallium	ND		5.03		mg/Kg		09/10/21 08:00	09/10/21 18:23	1
Vanadium	**7.28**		1.01		mg/Kg		09/10/21 08:00	09/10/21 18:23	1
Zinc	**19.9**		10.1		mg/Kg		09/10/21 08:00	09/10/21 18:23	1

Client Sample ID: B-2 @ 20'
Date Collected: 08/26/21 07:45
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-12
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		2.91		mg/Kg		09/10/21 08:00	09/10/21 18:25	1
Arsenic	ND		2.43		mg/Kg		09/10/21 08:00	09/10/21 18:25	1
Barium	**33.0**		0.485		mg/Kg		09/10/21 08:00	09/10/21 18:25	1
Beryllium	**0.486**		0.243		mg/Kg		09/10/21 08:00	09/10/21 18:25	1
Cadmium	ND		0.485		mg/Kg		09/10/21 08:00	09/10/21 18:25	1
Chromium	**3.41**		0.971		mg/Kg		09/10/21 08:00	09/10/21 18:25	1
Cobalt	**1.59**		0.971		mg/Kg		09/10/21 08:00	09/10/21 18:25	1
Copper	**1.23**		0.971		mg/Kg		09/10/21 08:00	09/10/21 18:25	1
Lead	ND		4.85		mg/Kg		09/10/21 08:00	09/10/21 18:25	1
Molybdenum	ND		0.485		mg/Kg		09/10/21 08:00	09/10/21 18:25	1
Nickel	**3.28**		0.485		mg/Kg		09/10/21 08:00	09/10/21 18:25	1
Selenium	ND		4.85		mg/Kg		09/10/21 08:00	09/10/21 18:25	1
Silver	ND		0.971		mg/Kg		09/10/21 08:00	09/10/21 18:25	1
Thallium	ND		4.85		mg/Kg		09/10/21 08:00	09/10/21 18:25	1

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Method: 6010B - Metals (ICP) (Continued)

Client Sample ID: B-2 @ 20'
Date Collected: 08/26/21 07:45
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-12
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	**7.60**		0.971		mg/Kg		09/10/21 08:00	09/10/21 18:25	1
Zinc	**19.4**		9.71		mg/Kg		09/10/21 08:00	09/10/21 18:25	1

Client Sample ID: B-2 @ 25'
Date Collected: 08/26/21 07:58
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-13
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		3.16		mg/Kg		09/10/21 08:00	09/10/21 18:27	1
Arsenic	ND		2.63		mg/Kg		09/10/21 08:00	09/10/21 18:27	1
Barium	**57.5**		0.526		mg/Kg		09/10/21 08:00	09/10/21 18:27	1
Beryllium	**0.334**		0.263		mg/Kg		09/10/21 08:00	09/10/21 18:27	1
Cadmium	ND		0.526		mg/Kg		09/10/21 08:00	09/10/21 18:27	1
Chromium	**4.51**		1.05		mg/Kg		09/10/21 08:00	09/10/21 18:27	1
Cobalt	**1.80**		1.05		mg/Kg		09/10/21 08:00	09/10/21 18:27	1
Copper	**1.75**		1.05		mg/Kg		09/10/21 08:00	09/10/21 18:27	1
Lead	ND		5.26		mg/Kg		09/10/21 08:00	09/10/21 18:27	1
Molybdenum	ND		0.526		mg/Kg		09/10/21 08:00	09/10/21 18:27	1
Nickel	**3.44**		0.526		mg/Kg		09/10/21 08:00	09/10/21 18:27	1
Selenium	ND	L	5.26		mg/Kg		09/10/21 08:00	09/10/21 18:27	1
Silver	ND		1.05		mg/Kg		09/10/21 08:00	09/10/21 18:27	1
Thallium	ND		5.26		mg/Kg		09/10/21 08:00	09/10/21 18:27	1
Vanadium	**7.75**		1.05		mg/Kg		09/10/21 08:00	09/10/21 18:27	1
Zinc	**19.5**		10.5		mg/Kg		09/10/21 08:00	09/10/21 18:27	1

Client Sample ID: B-2 @ 30'
Date Collected: 08/26/21 08:15
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-14
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		2.90		mg/Kg		09/10/21 08:00	09/10/21 18:29	1
Arsenic	ND		2.42		mg/Kg		09/10/21 08:00	09/10/21 18:29	1
Barium	ND		0.483		mg/Kg		09/10/21 08:00	09/10/21 18:29	1
Beryllium	ND	L	0.242		mg/Kg		09/10/21 08:00	09/10/21 18:29	1
Cadmium	ND		0.483		mg/Kg		09/10/21 08:00	09/10/21 18:29	1
Chromium	ND		0.966		mg/Kg		09/10/21 08:00	09/10/21 18:29	1
Cobalt	ND		0.966		mg/Kg		09/10/21 08:00	09/10/21 18:29	1
Copper	ND		0.966		mg/Kg		09/10/21 08:00	09/10/21 18:29	1
Lead	ND		4.83		mg/Kg		09/10/21 08:00	09/10/21 18:29	1
Molybdenum	ND		0.483		mg/Kg		09/10/21 08:00	09/10/21 18:29	1
Nickel	ND		0.483		mg/Kg		09/10/21 08:00	09/10/21 18:29	1
Selenium	ND		4.83		mg/Kg		09/10/21 08:00	09/10/21 18:29	1
Silver	ND		0.966		mg/Kg		09/10/21 08:00	09/10/21 18:29	1
Thallium	ND		4.83		mg/Kg		09/10/21 08:00	09/10/21 18:29	1
Vanadium	ND		0.966		mg/Kg		09/10/21 08:00	09/10/21 18:29	1
Zinc	ND		9.66		mg/Kg		09/10/21 08:00	09/10/21 18:29	1

Client Sample Results

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Method: 6010B - Metals (ICP)

Client Sample ID: B-3 @ 2'
Date Collected: 08/26/21 09:40
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-15
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		2.86		mg/Kg		09/10/21 08:00	09/10/21 18:31	1
Arsenic	ND		2.38		mg/Kg		09/10/21 08:00	09/10/21 18:31	1
Barium	**41.2**		0.476		mg/Kg		09/10/21 08:00	09/10/21 18:31	1
Beryllium	**0.344**		0.238		mg/Kg		09/10/21 08:00	09/10/21 18:31	1
Cadmium	ND		0.476		mg/Kg		09/10/21 08:00	09/10/21 18:31	1
Chromium	**5.02**		0.952		mg/Kg		09/10/21 08:00	09/10/21 18:31	1
Cobalt	**2.49**		0.952		mg/Kg		09/10/21 08:00	09/10/21 18:31	1
Copper	**4.79**		0.952		mg/Kg		09/10/21 08:00	09/10/21 18:31	1
Lead	**5.49**		4.76		mg/Kg		09/10/21 08:00	09/10/21 18:31	1
Molybdenum	ND		0.476		mg/Kg		09/10/21 08:00	09/10/21 18:31	1
Nickel	**3.01**		0.476		mg/Kg		09/10/21 08:00	09/10/21 18:31	1
Selenium	ND		4.76		mg/Kg		09/10/21 08:00	09/10/21 18:31	1
Silver	ND		0.952		mg/Kg		09/10/21 08:00	09/10/21 18:31	1
Thallium	ND		4.76		mg/Kg		09/10/21 08:00	09/10/21 18:31	1
Vanadium	**11.2**		0.952		mg/Kg		09/10/21 08:00	09/10/21 18:31	1
Zinc	**16.4**		9.52		mg/Kg		09/10/21 08:00	09/10/21 18:31	1

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Method: 7471A - Mercury (CVAA)

Client Sample ID: B-1 @ 2'
Date Collected: 08/26/21 13:00
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-1
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0847		mg/Kg		09/10/21 07:19	09/10/21 11:16	1

Client Sample ID: B-1 @ 5'
Date Collected: 08/26/21 13:07
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-2
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0862		mg/Kg		09/10/21 07:19	09/10/21 11:22	1

Client Sample ID: B-1 @ 10'
Date Collected: 08/26/21 13:16
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-3
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0862		mg/Kg		09/10/21 07:19	09/10/21 11:24	1

Client Sample ID: B-1 @ 15'
Date Collected: 08/26/21 13:24
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-4
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0820		mg/Kg		09/10/21 07:19	09/10/21 11:25	1

Client Sample ID: B-1 @ 20'
Date Collected: 08/26/21 13:40
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-5
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0833		mg/Kg		09/10/21 07:19	09/10/21 11:27	1

Client Sample ID: B-1 @ 25'
Date Collected: 08/26/21 13:49
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-6
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0945		mg/Kg		09/10/21 07:19	09/10/21 11:33	1

Client Sample ID: B-1 @ 30'
Date Collected: 08/26/21 14:07
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-7
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0794		mg/Kg		09/10/21 07:19	09/10/21 11:35	1

Client Sample ID: B-2 @ 2'
Date Collected: 08/26/21 06:55
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-8
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0877		mg/Kg		09/10/21 07:19	09/10/21 11:37	1

Client Sample ID: B-2 @ 5'
Date Collected: 08/26/21 07:07
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-9
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0833		mg/Kg		09/10/21 07:19	09/10/21 11:38	1

Client Sample Results

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Method: 7471A - Mercury (CVAA)

Client Sample ID: B-2 @ 10'
Date Collected: 08/26/21 07:15
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-10
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0847		mg/Kg		09/10/21 07:19	09/10/21 11:40	1

Client Sample ID: B-2 @ 15'
Date Collected: 08/26/21 07:37
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-11
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0820		mg/Kg		09/10/21 07:19	09/10/21 11:42	1

Client Sample ID: B-2 @ 20'
Date Collected: 08/26/21 07:45
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-12
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0847		mg/Kg		09/10/21 07:19	09/10/21 11:44	1

Client Sample ID: B-2 @ 25'
Date Collected: 08/26/21 07:58
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-13
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0877		mg/Kg		09/10/21 07:19	09/10/21 11:46	1

Client Sample ID: B-2 @ 30'
Date Collected: 08/26/21 08:15
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-14
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0833		mg/Kg		09/10/21 07:19	09/10/21 11:48	1

Client Sample ID: B-3 @ 2'
Date Collected: 08/26/21 09:40
Date Received: 08/27/21 19:45

Lab Sample ID: 570-68615-15
Matrix: Solid

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0820		mg/Kg		09/10/21 07:19	09/10/21 11:50	1

Surrogate Summary

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Method: 8015B - Diesel Range Organics (DRO) (GC)

Matrix: Solid **Prep Type: Total/NA**

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	OTCSN1 (60-138)
570-68615-1	B-1 @ 2'	110
570-68615-1 MS	B-1 @ 2'	111
570-68615-1 MSD	B-1 @ 2'	112
570-68615-2	B-1 @ 5'	109
570-68615-3	B-1 @ 10'	111
570-68615-4	B-1 @ 15'	107
570-68615-5	B-1 @ 20'	111
570-68615-6	B-1 @ 25'	113
570-68615-7	B-1 @ 30'	114
570-68615-8	B-2 @ 2'	113
570-68615-9	B-2 @ 5'	110
570-68615-10	B-2 @ 10'	114
570-68615-11	B-2 @ 15'	111
570-68615-12	B-2 @ 20'	110
570-68615-13	B-2 @ 25'	111
570-68615-14	B-2 @ 30'	109
570-68615-15	B-3 @ 2'	107
LCS 570-177864/2-A	Lab Control Sample	108
LCSD 570-177864/3-A	Lab Control Sample Dup	110
MB 570-177864/1-A	Method Blank	121

Surrogate Legend

OTCSN = n-Octacosane (Surr)

QC Sample Results

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Method: 8015B - Diesel Range Organics (DRO) (GC)

Lab Sample ID: MB 570-177864/1-A
Matrix: Solid
Analysis Batch: 177993

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 177864

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
C8 as C8	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 19:18	1
C9-C10	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 19:18	1
C11-C12	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 19:18	1
C13-C14	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 19:18	1
C15-C16	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 19:18	1
C17-C18	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 19:18	1
C19-C20	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 19:18	1
C21-C22	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 19:18	1
C23-C24	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 19:18	1
C25-C28	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 19:18	1
C29-C32	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 19:18	1
C33-C36	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 19:18	1
C37-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 19:18	1
C8-C40	ND		5.0		mg/Kg		09/09/21 10:40	09/09/21 19:18	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
n-Octacosane (Surr)	*121*		*60 - 138*	*09/09/21 10:40*	*09/09/21 19:18*	*1*

Lab Sample ID: LCS 570-177864/2-A
Matrix: Solid
Analysis Batch: 177993

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 177864

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics [C10-C28]	400	408.0		mg/Kg		102	80 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
n-Octacosane (Surr)	*108*		*60 - 138*

Lab Sample ID: LCSD 570-177864/3-A
Matrix: Solid
Analysis Batch: 177993

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 177864

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diesel Range Organics [C10-C28]	400	421.1		mg/Kg		105	80 - 130	3	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
n-Octacosane (Surr)	*110*		*60 - 138*

Lab Sample ID: 570-68615-1 MS
Matrix: Solid
Analysis Batch: 177993

Client Sample ID: B-1 @ 2'
Prep Type: Total/NA
Prep Batch: 177864

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics [C10-C28]	30		399	428.8		mg/Kg		100	43 - 165

Method: 8015B - Diesel Range Organics (DRO) (GC) (Continued)

Lab Sample ID: 570-68615-1 MS
Matrix: Solid
Analysis Batch: 177993

Client Sample ID: B-1 @ 2'
Prep Type: Total/NA
Prep Batch: 177864

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
n-Octacosane (Surr)	*111*		*60 - 138*

Lab Sample ID: 570-68615-1 MSD
Matrix: Solid
Analysis Batch: 177993

Client Sample ID: B-1 @ 2'
Prep Type: Total/NA
Prep Batch: 177864

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diesel Range Organics [C10-C28]	30		400	420.9		mg/Kg		98	43 - 165	2	35

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
n-Octacosane (Surr)	*112*		*60 - 138*

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 570-178133/1-A
Matrix: Solid
Analysis Batch: 178743

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 178133

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		3.16		mg/Kg		09/10/21 08:00	09/10/21 17:42	1
Arsenic	ND		2.63		mg/Kg		09/10/21 08:00	09/10/21 17:42	1
Barium	ND		0.526		mg/Kg		09/10/21 08:00	09/10/21 17:42	1
Beryllium	ND		0.263		mg/Kg		09/10/21 08:00	09/10/21 17:42	1
Cadmium	ND		0.526		mg/Kg		09/10/21 08:00	09/10/21 17:42	1
Chromium	ND		1.05		mg/Kg		09/10/21 08:00	09/10/21 17:42	1
Cobalt	ND		1.05		mg/Kg		09/10/21 08:00	09/10/21 17:42	1
Copper	ND		1.05		mg/Kg		09/10/21 08:00	09/10/21 17:42	1
Lead	ND		5.26		mg/Kg		09/10/21 08:00	09/10/21 17:42	1
Molybdenum	ND		0.526		mg/Kg		09/10/21 08:00	09/10/21 17:42	1
Nickel	ND		0.526		mg/Kg		09/10/21 08:00	09/10/21 17:42	1
Selenium	ND		5.26		mg/Kg		09/10/21 08:00	09/10/21 17:42	1
Silver	ND		1.05		mg/Kg		09/10/21 08:00	09/10/21 17:42	1
Thallium	ND		5.26		mg/Kg		09/10/21 08:00	09/10/21 17:42	1
Vanadium	ND		1.05		mg/Kg		09/10/21 08:00	09/10/21 17:42	1
Zinc	ND		10.5		mg/Kg		09/10/21 08:00	09/10/21 17:42	1

Lab Sample ID: LCS 570-178133/2-A
Matrix: Solid
Analysis Batch: 178743

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 178133

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	24.4	23.89		mg/Kg		98	80 - 120
Arsenic	24.4	22.17		mg/Kg		91	80 - 120
Barium	24.4	24.70		mg/Kg		101	80 - 120
Beryllium	24.4	23.82		mg/Kg		98	80 - 120
Cadmium	24.4	23.80		mg/Kg		98	80 - 120
Chromium	24.4	24.52		mg/Kg		101	80 - 120

QC Sample Results

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LCS 570-178133/2-A
Matrix: Solid
Analysis Batch: 178743

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 178133

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cobalt	24.4	24.63		mg/Kg		101	80 - 120
Copper	24.4	24.82		mg/Kg		102	80 - 120
Lead	24.4	24.50		mg/Kg		100	80 - 120
Molybdenum	24.4	23.45		mg/Kg		96	80 - 120
Nickel	24.4	25.11		mg/Kg		103	80 - 120
Selenium	24.4	22.17		mg/Kg		91	80 - 120
Silver	12.2	11.91		mg/Kg		98	80 - 120
Thallium	24.4	25.92		mg/Kg		106	80 - 120
Vanadium	24.4	23.88		mg/Kg		98	80 - 120
Zinc	24.4	24.24		mg/Kg		99	80 - 120

Lab Sample ID: LCSD 570-178133/3-A
Matrix: Solid
Analysis Batch: 178743

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 178133

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	24.9	23.48		mg/Kg		94	80 - 120	2	20
Arsenic	24.9	24.06		mg/Kg		97	80 - 120	8	20
Barium	24.9	25.07		mg/Kg		101	80 - 120	1	20
Beryllium	24.9	24.41		mg/Kg		98	80 - 120	2	20
Cadmium	24.9	24.21		mg/Kg		97	80 - 120	2	20
Chromium	24.9	24.95		mg/Kg		100	80 - 120	2	20
Cobalt	24.9	24.91		mg/Kg		100	80 - 120	1	20
Copper	24.9	25.47		mg/Kg		102	80 - 120	3	20
Lead	24.9	25.31		mg/Kg		102	80 - 120	3	20
Molybdenum	24.9	24.13		mg/Kg		97	80 - 120	3	20
Nickel	24.9	25.51		mg/Kg		103	80 - 120	2	20
Selenium	24.9	23.05		mg/Kg		93	80 - 120	4	20
Silver	12.4	12.08		mg/Kg		97	80 - 120	1	20
Thallium	24.9	26.26		mg/Kg		106	80 - 120	1	20
Vanadium	24.9	24.40		mg/Kg		98	80 - 120	2	20
Zinc	24.9	24.49		mg/Kg		98	80 - 120	1	20

Lab Sample ID: 570-68615-1 MS
Matrix: Solid
Analysis Batch: 178743

Client Sample ID: B-1 @ 2'
Prep Type: Total/NA
Prep Batch: 178133

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	ND	F1	25.0	ND	F1	mg/Kg		0	75 - 125
Arsenic	3.09		25.0	23.06		mg/Kg		80	75 - 125
Barium	151		25.0	216.0	4	mg/Kg		260	75 - 125
Beryllium	0.475		25.0	24.77		mg/Kg		97	75 - 125
Cadmium	0.640		25.0	23.42		mg/Kg		91	75 - 125
Chromium	7.67		25.0	32.94		mg/Kg		101	75 - 125
Cobalt	3.42		25.0	26.30		mg/Kg		92	75 - 125
Copper	132		25.0	84.24	4	mg/Kg		-190	75 - 125
Lead	17.8		25.0	43.95		mg/Kg		105	75 - 125
Molybdenum	ND	F1	25.0	9.653	F1	mg/Kg		39	75 - 125

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: 570-68615-1 MS
Matrix: Solid
Analysis Batch: 178743

Client Sample ID: B-1 @ 2'
Prep Type: Total/NA
Prep Batch: 178133

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nickel	4.93		25.0	28.44		mg/Kg		94	75 - 125
Selenium	ND	F1	25.0	14.86	F1	mg/Kg		59	75 - 125
Silver	ND	F1	12.5	2.915	F1	mg/Kg		23	75 - 125
Thallium	ND		25.0	24.11		mg/Kg		86	75 - 125
Vanadium	16.5		25.0	41.44		mg/Kg		100	75 - 125
Zinc	21.6		25.0	44.11		mg/Kg		90	75 - 125

Lab Sample ID: 570-68615-1 MSD
Matrix: Solid
Analysis Batch: 178743

Client Sample ID: B-1 @ 2'
Prep Type: Total/NA
Prep Batch: 178133

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	ND	F1	26.3	ND	F1	mg/Kg		0	75 - 125	NC	20
Arsenic	3.09		26.3	23.16		mg/Kg		76	75 - 125	0	20
Barium	151		26.3	229.8	4	mg/Kg		300	75 - 125	6	20
Beryllium	0.475		26.3	26.57		mg/Kg		99	75 - 125	7	20
Cadmium	0.640		26.3	25.02		mg/Kg		93	75 - 125	7	20
Chromium	7.67		26.3	35.10		mg/Kg		104	75 - 125	6	20
Cobalt	3.42		26.3	28.05		mg/Kg		94	75 - 125	6	20
Copper	132		26.3	89.59	4	mg/Kg		-161	75 - 125	6	20
Lead	17.8		26.3	46.48		mg/Kg		109	75 - 125	6	20
Molybdenum	ND	F1	26.4	10.79	F1	mg/Kg		41	75 - 125	11	20
Nickel	4.93		26.3	30.26		mg/Kg		96	75 - 125	6	20
Selenium	ND	F1	26.3	13.43	F1	mg/Kg		51	75 - 125	10	20
Silver	ND	F1	13.2	3.114	F1	mg/Kg		24	75 - 125	7	20
Thallium	ND		26.3	25.71		mg/Kg		88	75 - 125	6	20
Vanadium	16.5		26.3	44.03		mg/Kg		105	75 - 125	6	20
Zinc	21.6		26.3	47.29		mg/Kg		98	75 - 125	7	20

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 570-178121/1-A
Matrix: Solid
Analysis Batch: 178229

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 178121

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0847	mg/Kg		09/10/21 07:19	09/10/21 11:11	1

Lab Sample ID: LCS 570-178121/2-A
Matrix: Solid
Analysis Batch: 178229

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 178121

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.833	0.8682		mg/Kg		104	85 - 121

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Method: 7471A - Mercury (CVAA) (Continued)

Lab Sample ID: LCSD 570-178121/3-A
Matrix: Solid
Analysis Batch: 178229

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 178121

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury			0.820	0.8602		mg/Kg		105	85 - 121	1	10

Lab Sample ID: 570-68615-1 MS
Matrix: Solid
Analysis Batch: 178229

Client Sample ID: B-1 @ 2'
Prep Type: Total/NA
Prep Batch: 178121

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		0.794	0.6976		mg/Kg		88	71 - 137

Lab Sample ID: 570-68615-1 MSD
Matrix: Solid
Analysis Batch: 178229

Client Sample ID: B-1 @ 2'
Prep Type: Total/NA
Prep Batch: 178121

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.877	0.7559		mg/Kg		86	71 - 137	8	14

QC Association Summary

GC Semi VOA

Prep Batch: 177864

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-68615-1	B-1 @ 2'	Total/NA	Solid	3550C	
570-68615-2	B-1 @ 5'	Total/NA	Solid	3550C	
570-68615-3	B-1 @ 10'	Total/NA	Solid	3550C	
570-68615-4	B-1 @ 15'	Total/NA	Solid	3550C	
570-68615-5	B-1 @ 20'	Total/NA	Solid	3550C	
570-68615-6	B-1 @ 25'	Total/NA	Solid	3550C	
570-68615-7	B-1 @ 30'	Total/NA	Solid	3550C	
570-68615-8	B-2 @ 2'	Total/NA	Solid	3550C	
570-68615-9	B-2 @ 5'	Total/NA	Solid	3550C	
570-68615-10	B-2 @ 10'	Total/NA	Solid	3550C	
570-68615-11	B-2 @ 15'	Total/NA	Solid	3550C	
570-68615-12	B-2 @ 20'	Total/NA	Solid	3550C	
570-68615-13	B-2 @ 25'	Total/NA	Solid	3550C	
570-68615-14	B-2 @ 30'	Total/NA	Solid	3550C	
570-68615-15	B-3 @ 2'	Total/NA	Solid	3550C	
MB 570-177864/1-A	Method Blank	Total/NA	Solid	3550C	
LCS 570-177864/2-A	Lab Control Sample	Total/NA	Solid	3550C	
LCSD 570-177864/3-A	Lab Control Sample Dup	Total/NA	Solid	3550C	
570-68615-1 MS	B-1 @ 2'	Total/NA	Solid	3550C	
570-68615-1 MSD	B-1 @ 2'	Total/NA	Solid	3550C	

Analysis Batch: 177993

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-68615-1	B-1 @ 2'	Total/NA	Solid	8015B	177864
MB 570-177864/1-A	Method Blank	Total/NA	Solid	8015B	177864
LCS 570-177864/2-A	Lab Control Sample	Total/NA	Solid	8015B	177864
LCSD 570-177864/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B	177864
570-68615-1 MS	B-1 @ 2'	Total/NA	Solid	8015B	177864
570-68615-1 MSD	B-1 @ 2'	Total/NA	Solid	8015B	177864

Analysis Batch: 178351

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-68615-2	B-1 @ 5'	Total/NA	Solid	8015B	177864
570-68615-3	B-1 @ 10'	Total/NA	Solid	8015B	177864
570-68615-4	B-1 @ 15'	Total/NA	Solid	8015B	177864
570-68615-5	B-1 @ 20'	Total/NA	Solid	8015B	177864
570-68615-6	B-1 @ 25'	Total/NA	Solid	8015B	177864
570-68615-7	B-1 @ 30'	Total/NA	Solid	8015B	177864
570-68615-8	B-2 @ 2'	Total/NA	Solid	8015B	177864
570-68615-9	B-2 @ 5'	Total/NA	Solid	8015B	177864
570-68615-10	B-2 @ 10'	Total/NA	Solid	8015B	177864
570-68615-11	B-2 @ 15'	Total/NA	Solid	8015B	177864
570-68615-12	B-2 @ 20'	Total/NA	Solid	8015B	177864
570-68615-13	B-2 @ 25'	Total/NA	Solid	8015B	177864
570-68615-14	B-2 @ 30'	Total/NA	Solid	8015B	177864
570-68615-15	B-3 @ 2'	Total/NA	Solid	8015B	177864

Metals

Prep Batch: 178121

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-68615-1	B-1 @ 2'	Total/NA	Solid	7471A	
570-68615-2	B-1 @ 5'	Total/NA	Solid	7471A	
570-68615-3	B-1 @ 10'	Total/NA	Solid	7471A	
570-68615-4	B-1 @ 15'	Total/NA	Solid	7471A	
570-68615-5	B-1 @ 20'	Total/NA	Solid	7471A	
570-68615-6	B-1 @ 25'	Total/NA	Solid	7471A	
570-68615-7	B-1 @ 30'	Total/NA	Solid	7471A	
570-68615-8	B-2 @ 2'	Total/NA	Solid	7471A	
570-68615-9	B-2 @ 5'	Total/NA	Solid	7471A	
570-68615-10	B-2 @ 10'	Total/NA	Solid	7471A	
570-68615-11	B-2 @ 15'	Total/NA	Solid	7471A	
570-68615-12	B-2 @ 20'	Total/NA	Solid	7471A	
570-68615-13	B-2 @ 25'	Total/NA	Solid	7471A	
570-68615-14	B-2 @ 30'	Total/NA	Solid	7471A	
570-68615-15	B-3 @ 2'	Total/NA	Solid	7471A	
MB 570-178121/1-A	Method Blank	Total/NA	Solid	7471A	
LCS 570-178121/2-A	Lab Control Sample	Total/NA	Solid	7471A	
LCSD 570-178121/3-A	Lab Control Sample Dup	Total/NA	Solid	7471A	
570-68615-1 MS	B-1 @ 2'	Total/NA	Solid	7471A	
570-68615-1 MSD	B-1 @ 2'	Total/NA	Solid	7471A	

Prep Batch: 178133

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-68615-1	B-1 @ 2'	Total/NA	Solid	3050B	
570-68615-2	B-1 @ 5'	Total/NA	Solid	3050B	
570-68615-3	B-1 @ 10'	Total/NA	Solid	3050B	
570-68615-4	B-1 @ 15'	Total/NA	Solid	3050B	
570-68615-5	B-1 @ 20'	Total/NA	Solid	3050B	
570-68615-6	B-1 @ 25'	Total/NA	Solid	3050B	
570-68615-7	B-1 @ 30'	Total/NA	Solid	3050B	
570-68615-8	B-2 @ 2'	Total/NA	Solid	3050B	
570-68615-9	B-2 @ 5'	Total/NA	Solid	3050B	
570-68615-10	B-2 @ 10'	Total/NA	Solid	3050B	
570-68615-11	B-2 @ 15'	Total/NA	Solid	3050B	
570-68615-12	B-2 @ 20'	Total/NA	Solid	3050B	
570-68615-13	B-2 @ 25'	Total/NA	Solid	3050B	
570-68615-14	B-2 @ 30'	Total/NA	Solid	3050B	
570-68615-15	B-3 @ 2'	Total/NA	Solid	3050B	
MB 570-178133/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 570-178133/2-A	Lab Control Sample	Total/NA	Solid	3050B	
LCSD 570-178133/3-A	Lab Control Sample Dup	Total/NA	Solid	3050B	
570-68615-1 MS	B-1 @ 2'	Total/NA	Solid	3050B	
570-68615-1 MSD	B-1 @ 2'	Total/NA	Solid	3050B	

Analysis Batch: 178229

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-68615-1	B-1 @ 2'	Total/NA	Solid	7471A	178121
570-68615-2	B-1 @ 5'	Total/NA	Solid	7471A	178121
570-68615-3	B-1 @ 10'	Total/NA	Solid	7471A	178121
570-68615-4	B-1 @ 15'	Total/NA	Solid	7471A	178121

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Metals (Continued)

Analysis Batch: 178229 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-68615-5	B-1 @ 20'	Total/NA	Solid	7471A	178121
570-68615-6	B-1 @ 25'	Total/NA	Solid	7471A	178121
570-68615-7	B-1 @ 30'	Total/NA	Solid	7471A	178121
570-68615-8	B-2 @ 2'	Total/NA	Solid	7471A	178121
570-68615-9	B-2 @ 5'	Total/NA	Solid	7471A	178121
570-68615-10	B-2 @ 10'	Total/NA	Solid	7471A	178121
570-68615-11	B-2 @ 15'	Total/NA	Solid	7471A	178121
570-68615-12	B-2 @ 20'	Total/NA	Solid	7471A	178121
570-68615-13	B-2 @ 25'	Total/NA	Solid	7471A	178121
570-68615-14	B-2 @ 30'	Total/NA	Solid	7471A	178121
570-68615-15	B-3 @ 2'	Total/NA	Solid	7471A	178121
MB 570-178121/1-A	Method Blank	Total/NA	Solid	7471A	178121
LCS 570-178121/2-A	Lab Control Sample	Total/NA	Solid	7471A	178121
LCSD 570-178121/3-A	Lab Control Sample Dup	Total/NA	Solid	7471A	178121
570-68615-1 MS	B-1 @ 2'	Total/NA	Solid	7471A	178121
570-68615-1 MSD	B-1 @ 2'	Total/NA	Solid	7471A	178121

Analysis Batch: 178743

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
570-68615-1	B-1 @ 2'	Total/NA	Solid	6010B	178133
570-68615-2	B-1 @ 5'	Total/NA	Solid	6010B	178133
570-68615-3	B-1 @ 10'	Total/NA	Solid	6010B	178133
570-68615-4	B-1 @ 15'	Total/NA	Solid	6010B	178133
570-68615-5	B-1 @ 20'	Total/NA	Solid	6010B	178133
570-68615-6	B-1 @ 25'	Total/NA	Solid	6010B	178133
570-68615-7	B-1 @ 30'	Total/NA	Solid	6010B	178133
570-68615-8	B-2 @ 2'	Total/NA	Solid	6010B	178133
570-68615-9	B-2 @ 5'	Total/NA	Solid	6010B	178133
570-68615-10	B-2 @ 10'	Total/NA	Solid	6010B	178133
570-68615-11	B-2 @ 15'	Total/NA	Solid	6010B	178133
570-68615-12	B-2 @ 20'	Total/NA	Solid	6010B	178133
570-68615-13	B-2 @ 25'	Total/NA	Solid	6010B	178133
570-68615-14	B-2 @ 30'	Total/NA	Solid	6010B	178133
570-68615-15	B-3 @ 2'	Total/NA	Solid	6010B	178133
MB 570-178133/1-A	Method Blank	Total/NA	Solid	6010B	178133
LCS 570-178133/2-A	Lab Control Sample	Total/NA	Solid	6010B	178133
LCSD 570-178133/3-A	Lab Control Sample Dup	Total/NA	Solid	6010B	178133
570-68615-1 MS	B-1 @ 2'	Total/NA	Solid	6010B	178133
570-68615-1 MSD	B-1 @ 2'	Total/NA	Solid	6010B	178133

Lab Chronicle

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Client Sample ID: B-1 @ 2'

Lab Sample ID: 570-68615-1

Date Collected: 08/26/21 13:00

Matrix: Solid

Date Received: 08/27/21 19:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			10.01 g	10 mL	177864	09/09/21 10:40	USUL	ECL 1
Total/NA	Analysis	8015B		1			177993	09/09/21 21:06	A1W	ECL 1
	Instrument ID: GC48									
Total/NA	Prep	3050B			2.03 g	100 mL	178133	09/10/21 08:00	WL8G	ECL 1
Total/NA	Analysis	6010B		1			178743	09/10/21 17:49	ULPF	ECL 1
	Instrument ID: ICP8									
Total/NA	Prep	7471A			.59 g	100 mL	178121	09/10/21 07:19	WL8G	ECL 1
Total/NA	Analysis	7471A		1			178229	09/10/21 11:16	VWJ7	ECL 1
	Instrument ID: HG8									

Client Sample ID: B-1 @ 5'

Lab Sample ID: 570-68615-2

Date Collected: 08/26/21 13:07

Matrix: Solid

Date Received: 08/27/21 19:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			9.99 g	10 mL	177864	09/09/21 10:40	USUL	ECL 1
Total/NA	Analysis	8015B		1			178351	09/11/21 03:43	A1W	ECL 1
	Instrument ID: GC48									
Total/NA	Prep	3050B			1.99 g	100 mL	178133	09/10/21 08:00	WL8G	ECL 1
Total/NA	Analysis	6010B		1			178743	09/10/21 17:55	ULPF	ECL 1
	Instrument ID: ICP8									
Total/NA	Prep	7471A			.58 g	100 mL	178121	09/10/21 07:19	WL8G	ECL 1
Total/NA	Analysis	7471A		1			178229	09/10/21 11:22	VWJ7	ECL 1
	Instrument ID: HG8									

Client Sample ID: B-1 @ 10'

Lab Sample ID: 570-68615-3

Date Collected: 08/26/21 13:16

Matrix: Solid

Date Received: 08/27/21 19:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			10.02 g	10 mL	177864	09/09/21 10:40	USUL	ECL 1
Total/NA	Analysis	8015B		1			178351	09/11/21 04:05	A1W	ECL 1
	Instrument ID: GC48									
Total/NA	Prep	3050B			1.95 g	100 mL	178133	09/10/21 08:00	WL8G	ECL 1
Total/NA	Analysis	6010B		1			178743	09/10/21 17:57	ULPF	ECL 1
	Instrument ID: ICP8									
Total/NA	Prep	7471A			.58 g	100 mL	178121	09/10/21 07:19	WL8G	ECL 1
Total/NA	Analysis	7471A		1			178229	09/10/21 11:24	VWJ7	ECL 1
	Instrument ID: HG8									

Client Sample ID: B-1 @ 15'

Lab Sample ID: 570-68615-4

Date Collected: 08/26/21 13:24
Date Received: 08/27/21 19:45

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			9.99 g	10 mL	177864	09/09/21 10:40	USUL	ECL 1
Total/NA	Analysis	8015B		1			178351	09/11/21 04:27	A1W	ECL 1
	Instrument ID: GC48									
Total/NA	Prep	3050B			2.08 g	100 mL	178133	09/10/21 08:00	WL8G	ECL 1
Total/NA	Analysis	6010B		1			178743	09/10/21 17:59	ULPF	ECL 1
	Instrument ID: ICP8									
Total/NA	Prep	7471A			.61 g	100 mL	178121	09/10/21 07:19	WL8G	ECL 1
Total/NA	Analysis	7471A		1			178229	09/10/21 11:25	VWJ7	ECL 1
	Instrument ID: HG8									

Client Sample ID: B-1 @ 20'

Lab Sample ID: 570-68615-5

Date Collected: 08/26/21 13:40
Date Received: 08/27/21 19:45

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			10.00 g	10 mL	177864	09/09/21 10:40	USUL	ECL 1
Total/NA	Analysis	8015B		1			178351	09/11/21 04:49	A1W	ECL 1
	Instrument ID: GC48									
Total/NA	Prep	3050B			1.97 g	100 mL	178133	09/10/21 08:00	WL8G	ECL 1
Total/NA	Analysis	6010B		1			178743	09/10/21 18:01	ULPF	ECL 1
	Instrument ID: ICP8									
Total/NA	Prep	7471A			.60 g	100 mL	178121	09/10/21 07:19	WL8G	ECL 1
Total/NA	Analysis	7471A		1			178229	09/10/21 11:27	VWJ7	ECL 1
	Instrument ID: HG8									

Client Sample ID: B-1 @ 25'

Lab Sample ID: 570-68615-6

Date Collected: 08/26/21 13:49
Date Received: 08/27/21 19:45

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			10.00 g	10 mL	177864	09/09/21 10:40	USUL	ECL 1
Total/NA	Analysis	8015B		1			178351	09/11/21 05:11	A1W	ECL 1
	Instrument ID: GC48									
Total/NA	Prep	3050B			2.10 g	100 mL	178133	09/10/21 08:00	WL8G	ECL 1
Total/NA	Analysis	6010B		1			178743	09/10/21 18:13	ULPF	ECL 1
	Instrument ID: ICP8									
Total/NA	Prep	7471A			.529 g	100 mL	178121	09/10/21 07:19	WL8G	ECL 1
Total/NA	Analysis	7471A		1			178229	09/10/21 11:33	VWJ7	ECL 1
	Instrument ID: HG8									

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Client Sample ID: B-1 @ 30'
Lab Sample ID: 570-68615-7
Date Collected: 08/26/21 14:07
Matrix: Solid
Date Received: 08/27/21 19:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			10.00 g	10 mL	177864	09/09/21 10:40	USUL	ECL 1
Total/NA	Analysis	8015B		1			178351	09/11/21 05:32	A1W	ECL 1
	Instrument ID: GC48									
Total/NA	Prep	3050B			2.06 g	100 mL	178133	09/10/21 08:00	WL8G	ECL 1
Total/NA	Analysis	6010B		1			178743	09/10/21 18:15	ULPF	ECL 1
	Instrument ID: ICP8									
Total/NA	Prep	7471A			.63 g	100 mL	178121	09/10/21 07:19	WL8G	ECL 1
Total/NA	Analysis	7471A		1			178229	09/10/21 11:35	VWJ7	ECL 1
	Instrument ID: HG8									

Client Sample ID: B-2 @ 2'
Lab Sample ID: 570-68615-8
Date Collected: 08/26/21 06:55
Matrix: Solid
Date Received: 08/27/21 19:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			9.99 g	10 mL	177864	09/09/21 10:40	USUL	ECL 1
Total/NA	Analysis	8015B		1			178351	09/11/21 05:55	A1W	ECL 1
	Instrument ID: GC48									
Total/NA	Prep	3050B			2.02 g	100 mL	178133	09/10/21 08:00	WL8G	ECL 1
Total/NA	Analysis	6010B		1			178743	09/10/21 18:17	ULPF	ECL 1
	Instrument ID: ICP8									
Total/NA	Prep	7471A			.57 g	100 mL	178121	09/10/21 07:19	WL8G	ECL 1
Total/NA	Analysis	7471A		1			178229	09/10/21 11:37	VWJ7	ECL 1
	Instrument ID: HG8									

Client Sample ID: B-2 @ 5'
Lab Sample ID: 570-68615-9
Date Collected: 08/26/21 07:07
Matrix: Solid
Date Received: 08/27/21 19:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			10.03 g	10 mL	177864	09/09/21 10:40	USUL	ECL 1
Total/NA	Analysis	8015B		1			178351	09/11/21 06:17	A1W	ECL 1
	Instrument ID: GC48									
Total/NA	Prep	3050B			2.04 g	100 mL	178133	09/10/21 08:00	WL8G	ECL 1
Total/NA	Analysis	6010B		1			178743	09/10/21 18:19	ULPF	ECL 1
	Instrument ID: ICP8									
Total/NA	Prep	7471A			.60 g	100 mL	178121	09/10/21 07:19	WL8G	ECL 1
Total/NA	Analysis	7471A		1			178229	09/10/21 11:38	VWJ7	ECL 1
	Instrument ID: HG8									

Lab Chronicle

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Client Sample ID: B-2 @ 10'

Lab Sample ID: 570-68615-10
Date Collected: 08/26/21 07:15
Matrix: Solid
Date Received: 08/27/21 19:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			10.00 g	10 mL	177864	09/09/21 10:40	USUL	ECL 1
Total/NA	Analysis	8015B		1			178351	09/11/21 06:38	A1W	ECL 1
	Instrument ID: GC48									
Total/NA	Prep	3050B			1.94 g	100 mL	178133	09/10/21 08:00	WL8G	ECL 1
Total/NA	Analysis	6010B		1			178743	09/10/21 18:21	ULPF	ECL 1
	Instrument ID: ICP8									
Total/NA	Prep	7471A			.59 g	100 mL	178121	09/10/21 07:19	WL8G	ECL 1
Total/NA	Analysis	7471A		1			178229	09/10/21 11:40	VWJ7	ECL 1
	Instrument ID: HG8									

Client Sample ID: B-2 @ 15'

Lab Sample ID: 570-68615-11
Date Collected: 08/26/21 07:37
Matrix: Solid
Date Received: 08/27/21 19:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			9.98 g	10 mL	177864	09/09/21 10:40	USUL	ECL 1
Total/NA	Analysis	8015B		1			178351	09/11/21 07:00	A1W	ECL 1
	Instrument ID: GC48									
Total/NA	Prep	3050B			1.99 g	100 mL	178133	09/10/21 08:00	WL8G	ECL 1
Total/NA	Analysis	6010B		1			178743	09/10/21 18:23	ULPF	ECL 1
	Instrument ID: ICP8									
Total/NA	Prep	7471A			.61 g	100 mL	178121	09/10/21 07:19	WL8G	ECL 1
Total/NA	Analysis	7471A		1			178229	09/10/21 11:42	VWJ7	ECL 1
	Instrument ID: HG8									

Client Sample ID: B-2 @ 20'

Lab Sample ID: 570-68615-12
Date Collected: 08/26/21 07:45
Matrix: Solid
Date Received: 08/27/21 19:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			9.99 g	10 mL	177864	09/09/21 10:40	USUL	ECL 1
Total/NA	Analysis	8015B		1			178351	09/11/21 07:22	A1W	ECL 1
	Instrument ID: GC48									
Total/NA	Prep	3050B			2.06 g	100 mL	178133	09/10/21 08:00	WL8G	ECL 1
Total/NA	Analysis	6010B		1			178743	09/10/21 18:25	ULPF	ECL 1
	Instrument ID: ICP8									
Total/NA	Prep	7471A			.59 g	100 mL	178121	09/10/21 07:19	WL8G	ECL 1
Total/NA	Analysis	7471A		1			178229	09/10/21 11:44	VWJ7	ECL 1
	Instrument ID: HG8									

Lab Chronicle

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Client Sample ID: B-2 @ 25'

Lab Sample ID: 570-68615-13

Date Collected: 08/26/21 07:58
Date Received: 08/27/21 19:45

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			9.97 g	10 mL	177864	09/09/21 10:40	USUL	ECL 1
Total/NA	Analysis	8015B		1			178351	09/11/21 07:44	A1W	ECL 1
	Instrument ID: GC48									
Total/NA	Prep	3050B			1.90 g	100 mL	178133	09/10/21 08:00	WL8G	ECL 1
Total/NA	Analysis	6010B		1			178743	09/10/21 18:27	ULPF	ECL 1
	Instrument ID: ICP8									
Total/NA	Prep	7471A			.57 g	100 mL	178121	09/10/21 07:19	WL8G	ECL 1
Total/NA	Analysis	7471A		1			178229	09/10/21 11:46	VWJ7	ECL 1
	Instrument ID: HG8									

Client Sample ID: B-2 @ 30'

Lab Sample ID: 570-68615-14

Date Collected: 08/26/21 08:15
Date Received: 08/27/21 19:45

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			9.98 g	10 mL	177864	09/09/21 10:40	USUL	ECL 1
Total/NA	Analysis	8015B		1			178351	09/11/21 08:05	A1W	ECL 1
	Instrument ID: GC48									
Total/NA	Prep	3050B			2.07 g	100 mL	178133	09/10/21 08:00	WL8G	ECL 1
Total/NA	Analysis	6010B		1			178743	09/10/21 18:29	ULPF	ECL 1
	Instrument ID: ICP8									
Total/NA	Prep	7471A			.60 g	100 mL	178121	09/10/21 07:19	WL8G	ECL 1
Total/NA	Analysis	7471A		1			178229	09/10/21 11:48	VWJ7	ECL 1
	Instrument ID: HG8									

Client Sample ID: B-3 @ 2'

Lab Sample ID: 570-68615-15

Date Collected: 08/26/21 09:40
Date Received: 08/27/21 19:45

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3550C			9.98 g	10 mL	177864	09/09/21 10:40	USUL	ECL 1
Total/NA	Analysis	8015B		1			178351	09/11/21 08:28	A1W	ECL 1
	Instrument ID: GC48									
Total/NA	Prep	3050B			2.10 g	100 mL	178133	09/10/21 08:00	WL8G	ECL 1
Total/NA	Analysis	6010B		1			178743	09/10/21 18:31	ULPF	ECL 1
	Instrument ID: ICP8									
Total/NA	Prep	7471A			.61 g	100 mL	178121	09/10/21 07:19	WL8G	ECL 1
Total/NA	Analysis	7471A		1			178229	09/10/21 11:50	VWJ7	ECL 1
	Instrument ID: HG8									

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

Accreditation/Certification Summary

Client: NOVA Services
Job ID: 570-68615-1
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Laboratory: Eurofins Calscience LLC

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
California	State	2944	09-30-21
Oregon	NELAP	CA300001	01-30-22

Method Summary

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Method	Method Description	Protocol	Laboratory
8015B	Diesel Range Organics (DRO) (GC)	SW846	ECL 1
6010B	Metals (ICP)	SW846	ECL 1
7471A	Mercury (CVAA)	SW846	ECL 1
3050B	Preparation, Metals	SW846	ECL 1
3550C	Ultrasonic Extraction	SW846	ECL 1
7471A	Preparation, Mercury	SW846	ECL 1

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

ECL 1 = Eurofins Calscience LLC Lincoln, 7440 Lincoln Way, Garden Grove, CA 92841, TEL (714)895-5494

Sample Summary

Client: NOVA Services
Project/Site: 5301 Viterbi Family Vision Research Center/2021183

Job ID: 570-68615-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
570-68615-1	B-1 @ 2'	Solid	08/26/21 13:00	08/27/21 19:45
570-68615-2	B-1 @ 5'	Solid	08/26/21 13:07	08/27/21 19:45
570-68615-3	B-1 @ 10'	Solid	08/26/21 13:16	08/27/21 19:45
570-68615-4	B-1 @ 15'	Solid	08/26/21 13:24	08/27/21 19:45
570-68615-5	B-1 @ 20'	Solid	08/26/21 13:40	08/27/21 19:45
570-68615-6	B-1 @ 25'	Solid	08/26/21 13:49	08/27/21 19:45
570-68615-7	B-1 @ 30'	Solid	08/26/21 14:07	08/27/21 19:45
570-68615-8	B-2 @ 2'	Solid	08/26/21 06:55	08/27/21 19:45
570-68615-9	B-2 @ 5'	Solid	08/26/21 07:07	08/27/21 19:45
570-68615-10	B-2 @ 10'	Solid	08/26/21 07:15	08/27/21 19:45
570-68615-11	B-2 @ 15'	Solid	08/26/21 07:37	08/27/21 19:45
570-68615-12	B-2 @ 20'	Solid	08/26/21 07:45	08/27/21 19:45
570-68615-13	B-2 @ 25'	Solid	08/26/21 07:58	08/27/21 19:45
570-68615-14	B-2 @ 30'	Solid	08/26/21 08:15	08/27/21 19:45
570-68615-15	B-3 @ 2'	Solid	08/26/21 09:40	08/27/21 19:45

68615

eurofins

Calscience

7440 Lincoln Way Garden Grove, CA 92841-1427 (714) 895-5494

570-68615 Chain of Custody

CHAIN OF CUSTODY RECORD

DATE: 8/27/2021

PAGE: 1 OF 2

LABORATORY CLIENT: NOVA Services, Inc	CLIENT PROJECT NAME / NUMBER: 5301 Viterbi Family Vision Research Center / 2021183
ADDRESS: 4373 Viewridge Avenue, Suite B	P O NO:
CITY: San Diego STATE: CA ZIP: 92123	PROJECT CONTACT: Tom Canady
TEL: 858-292-7575 x 406 FAX: E-MAIL: tcanady@usa-nova.com	LAB CONTACT OR QUOTE NO: UCSD
	SAMPLER(S) (SIGNATURE): Giovanni Norman
	LAB USE ONLY: ☐☐-☐☐☐☐

TURNAROUND TIME: ☐ SAME DAY ☐ 24 HR 48 HR ☐ 72 HR ☐ 5 DAYS ☒ STANDARD

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY): ☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION / DESCRIPTION	SAMPLING DATE	SAMPLING TIME	MATRIX	NO OF CONT	TPH (C8-C40) (8015 Modified)	California Toxic Metals Total Concentration
1	B-1 @ 2'		8/26/21	13:00	Soil	1	/	/
2	B-1 @ 5'		8/26/21	13:07	Soil	1	/	/
3	B-1 @ 10'		8/26/21	13 16	Soil	1	/	/
4	B-1 @ 15		8/26/21	13:24	Soil	1	/	/
5	B-1 @ 20'		8/26/21	13.40	Soil	1	/	/
6	B-1 @ 25'		8/26/21	13.49	Soil	1	/	/
7	B-1 @ 30'		8/26/21	14:07	Soil	1	/	/
8	B-2 @ 2		8/26/21	6 55	Soil	1	/	/
9	B-2 @ 5		8/26/21	7.07	Soil	1	/	/
10	B-2 @ 10'		8/26/21	7 15	Soil	1	/	/

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
R. B. G	ECI	08/27/21	1445
[signature]	[signature]	08/27/21	1945

37/31 SG

02/24/10 Revision

C8615

eurofins

Calscience

7440 Lincoln Way Garden Grove CA 92841-1427 (714) 895-5494

CHAIN OF CUSTODY RECORD

DATE: 8/27/2021

PAGE: 2 OF 2

LABORATORY CLIENT: NOVA Services Inc

ADDRESS: 4373 Viewridge Avenue, Suite B

CITY: San Diego STATE: CA ZIP: 92123

TEL: 858-292-7575 x 406 FAX: E-MAIL: tcanady@usa-nova.com

CLIENT PROJECT NAME / NUMBER: 5301 Viterbi Family Vision Research Center / 2021183

P O NO:

PROJECT CONTACT: Tom Canady

LAB CONTACT OR QUOTE NO: UCSD

SAMPLER(S) (SIGNATURE): Giovanni Norman

LAB USE ONLY: ☐☐-☐☐☐☐

TURNAROUND TIME: ☐ SAME DAY ☐ 24 HR 48 HR ☐ 72 HR ☐ 5 DAYS ☒ STANDARD

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY): ☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION / DESCRIPTION	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT	TPH (C8-C40) (8015 Modified)	California Toxic Metals Total Concentration
11	B-2 @ 15		8/26/21	7:37	Soil	1	/	/
12	B-2 @ 20'		8/26/21	7.45	Soil	1	/	/
13	B-2 @ 25		8/26/21	7 58	Soil	1	/	/
14	B-2 @ 30'		8/26/21	8 15	Soil	1	/	/
15	B-3 @ 2'		8/26/21	9:40	Soil	1	/	/

Relinquished by: (Signature)	Received by: (Signature)	Date	Time
B.	ECI	08/27/21	1445
		08/27/21	1945

02/24/10 Revision

Login Sample Receipt Checklist

Client: NOVA Services

Job Number: 570-68615-1

Login Number: 68615
List Number: 1
Creator: Patel, Jayesh

List Source: Eurofins Calscience LLC

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Appendix B: Preliminary Geotechnical Investigation Report – 5548 East Campus Loop Road

GROUP DELTA

PRELIMINARY GEOTECHNICAL RECONNAISSANCE
EAST CAMPUS LOOP ROAD REALIGNMENT
UCSD PROJECT NO. 5548
LA JOLLA, CALIFORNIA

Prepared for

UNIVERSITY OF CALIFORNIA, SAN DIEGO
Facilities Design and Construction
10280 North Torrey Pines Road, Suite 470
La Jolla, California 92037

Prepared by

GROUP DELTA CONSULTANTS, INC.
9245 Activity Road, Suite 103
San Diego, California 92126

Project No. SD736
July 8, 2022

GROUP DELTA

July 8, 2022

University of California, San Diego
Facilities Design & Construction
10280 North Torrey Pines Road, Suite 470
La Jolla, California 92037

Attention: Mr. Roland Bartsch

SUBJECT: PRELIMINARY GEOTECHNICAL RECONNAISSANCE
East Campus Loop Road Realignment (UCSD Project No. 5548)
La Jolla, California

Mr. Bartsch:

We are pleased to submit this Preliminary Geotechnical Reconnaissance for the planned East Campus Loop Road realignment project at the University of California, San Diego. Specific conclusions regarding the potential geotechnical constraints at the site, the findings from our previous exploratory borings and laboratory tests completed in the site vicinity, and preliminary geotechnical recommendations for grading, retaining walls, pavements and subsurface utilities are provided in the following report.

We appreciate this opportunity to be of continued professional service. Feel free to contact the office with any questions or comments, or if you need anything else.

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1.0 INTRODUCTION

The following report summarizes the findings of our Preliminary Geotechnical Reconnaissance for the proposed East Campus Loop Road improvements at the University of California, San Diego. This reconnaissance included a review of several previous investigations we have completed in the site vicinity in the areas shown on the Project Location Map, Figure 1. The preliminary layout of the East Campus Loop Road project is shown on the Proposed Development, Figure 2A. Selected photographs of the site are shown in Figures 2B to 2F. The approximate locations of 18 borings that we have previously completed in site vicinity are shown on the Previous Explorations, Figure 3A.

The purpose of this reconnaissance was to characterize the general geotechnical constraints to site development and provide preliminary geotechnical recommendations for grading and the design of the proposed subsurface improvements, retaining walls, pavements and utilities. The preliminary recommendations provided herein are based on previous subsurface explorations, laboratory tests and analyses, as well as our previous experience with similar geologic conditions. A supplemental subsurface investigation is proposed to aid in the final design of the critical site improvements.

1.1 Scope of Services

This report was prepared in general accordance with the provisions of the referenced proposal (GDC, 2022a). In summary, we provided the following scope of services.

- A review of 18 previous subsurface explorations that we have completed in the site vicinity at the locations shown on the Previous Explorations, Figure 3A. Detailed logs for these borings are provided in Appendix A.

- A review of the various laboratory tests we completed as part of the 18 previous exploratory borings included in Appendix A. These laboratory tests including sieve analysis, Atterberg Limits, Expansion Index, soil corrosivity and R-Value. The previous laboratory test results are reiterated in Appendix B.

- Engineering analysis of the field and laboratory data to develop recommendations for site preparation, earthwork, pavement section and retaining wall design.

- Preparation of this report summarizing our findings and conclusions, and providing preliminary geotechnical recommendations for the planned site development.

1.2 Site Description

The subject site consists of the planned East Campus Loop Road realignment project at the University of California, San Diego (UCSD Project 5548). The approximate location and extent of the road realignment project is shown on the Proposed Development, Figure 2A. Selected photographs showing the current site conditions are provided in Figures 2B to 2F. The approximate locations and orientations of these photographs are shown in both Figures 2A and 3A.

The road realignment project will extend from Campus Point Drive on the north to the intersection between Medical Center Drive and Athena Circle on the south (see Figure 2A). The loop road will also include a new intersection with Health Sciences Drive, which will provide access to Regents Road to the east. The planned roadway realignment will extend from Medical Center Drive directly through the 10 to 15-foot-high fill slope and concrete staircase shown in Figures 2B and 2C. The proposed realignment will then extend to the northeast through Parking Lots P784 and P785 to the intersection with Health Sciences Drive. From that intersection, the proposed road realignment will turn to the northwest and pass through the existing Radiology and Oncology parking lot, and then onto an east-west trending two-lane paved access road (see Figure 2D).

One of the most challenging areas of the planned development consists of the portion of the road alignment located immediately north of the Athena Parking Garage (see Figures 3A through 3C). The new roadway will extend down from a high of about 360-feet above mean sea level (MSL) along the east side of the parking garage, to a low of about 340-feet to the west. The approximate as-graded topography from the Athena Parking Garage record drawings is shown in Figure 3B (UCSD, 2016). Note that the new roadway will be located within the existing 20-foot high 2:1 (horizontal to vertical) cut slope in that area (see Figure 3C). Photographs of the road alignment from both the top and bottom of the subject slope are shown in Figures 2E and 2F, respectively.

1.3 Proposed Development

The approximate layout of the proposed East Campus Loop Road alignment was recently provided by the project civil engineer (Dokken, 2022). Based on our review of these drawings, we understand that much of the new roadway improvements will consist of road widening with grade changes typically on the order of a few feet. New asphalt concrete pavements are planned for the roadway, surrounded by typical concrete curbs, gutters and sidewalks. Substantial utility relocations will be needed throughout the length of the project (e.g. see Figure 3B).

East of the intersection between the planned East Campus Loop Road and Medical Center Drive, we understand that the 10 to 15-foot grade change will be accomplished using cut slopes without the need for retaining walls. For the portion of the roadway that will be located within the slope north of the Athena Parking Garage, we understand that an approximately 15-foot-high cantilever retaining wall will be constructed along the southern edge of the roadway as shown on the Preliminary Road Plan, Figure 3C. Some form of stepped retaining wall and/or shoring system may also be used along the northern edge of the roadway in that portion of the site.

We anticipate that most of the new pavement areas will be reconstructed full depth and will consist of asphalt concrete over untreated aggregate base. We understand that cement treated base per Schedule J will not be required, since the improvements will consist of private roadways within the limits of the UCSD campus. Various bio-retention basins or swales may be added along some portions of the roadway. Details of the planned BMP improvements are not yet available.

2.0 PRIOR FIELD AND LABORATORY INVESTIGATION

Group Delta Consultants personnel completed several field investigations in the site vicinity between April 20th of 2016 and June 7th, 2022. These investigations included 18 exploratory borings. Most of these boring varied from about 5 to 20 feet in depth, although the maximum depth of exploration was 100½ feet below grade. The approximate locations of these 18 borings are shown on the Previous Explorations, Figure 3A. Boring Records are provided in Appendix A.

Various soil samples were collected from the borings for geotechnical testing and analysis. The laboratory testing program included gradation analysis and Atterberg Limits to aid in material classification using the Unified Soil Classification System (USCS). Index tests were also conducted to help evaluate the soil expansion potential and corrosivity. The maximum dry densities and optimum moisture contents of selected samples were also determined. In addition, R-Value tests were conducted to aid in pavement section analysis. The test results are presented in Appendix B.

2.1 Previous Infiltration Testing

As part of our previous field investigations in the site vicinity, we completed several field infiltration tests both along Athena Circle and at the ESIL site (see Figure 1). It should be noted that field infiltration tests should typically be located within about 50-feet of the planned BMP locations. As we have noted, details of the planned BMP improvements are not yet available. Consequently, the previous field infiltration tests may not be directly applicable to the specific BMP locations planned for the East Campus Loop Road project.

The previous field infiltration tests that we have completed in the site vicinity most commonly indicate factored vertical infiltration rates of less than 0.05 inches per hour (including a Safety Factor of 2.0). This factored infiltration rate is indicative of a “No Infiltration” condition per the City of San Diego BMP Design guidelines. Note that a minimum infiltration rate of 0.50 inches per hour is commonly considered the lower limit for effective implementation of “full infiltration” measures, whereas a rate between 0.05 and 0.50 inches per hour indicates “partial infiltration”. Site specific field infiltration testing may be conducted once the precise BMP locations are determined.

3.0 GEOLOGY AND SUBSURFACE CONDITIONS

The site is located within the coastal plain section of the Peninsular Ranges geomorphic province of southern California. The coastal plain generally consists of subdued landforms underlain by marine sedimentary formations. The entire site is believed to be underlain at depth by the Eocene-age Scripps Formation (Map Symbol - Tsc). However, the formational materials are capped throughout most of the site with a relatively thin layer of Pleistocene-age Very Old Paralic Deposits ($Qvop_{10}$), as shown on the Local Geologic Map, Figure 4. Much of the site also contains areas of undocumented fill not shown on the map. The geologic materials observed in the site vicinity are described below.

3.1 Scripps Formation

The Eocene-age Scripps Formation is believed to underlie the entire site at depth. As observed on site, the Scripps Formation most commonly consists of a light yellow and gray-brown silty sandstone (Unified Soil Classification SM) that is frequently interbedded with sandy siltstone (ML), and occasionally lean claystone (CL). The sandstone is typically fine-grained, with zones of moderately cemented material. The claystone is moderately indurated. The corrected Standard Penetration Test (SPT) blow counts (N_{60}) within the formation were typically above 50.

Our previous experience indicates that the sandstone and siltstone beds within the Scripps Formation typically have a very low to low expansion potential based on common criteria (see Figure B-2). These granular materials typically have a negligible soluble sulfate content. However, our previous experience also suggests that the occasional claystone beds within the Scripps Formation be moderately to highly expansive and may contain a *severe* soluble sulfate content.

Direct shear tests suggest that the granular materials within the Scripps Formation typically have a shear strength exceeding 32^o with 200 lb/ft^2 cohesion. The siltstone of the formation is estimated to have a drained strength of about 28^o with 200 lb/ft^2 cohesion. Our previous experience indicates that the claystone beds have a drained shear strength of about 25^o with 200 lb/ft^2 cohesion.

3.2 Very Old Paralic Deposits

Very Old Paralic Deposits (early to middle Pleistocene) were encountered in most of the borings previously conducted in the site vicinity. The paralic deposits overlie the Scripps Formation. Note that the geologic contact between the paralic deposits and the underlying Scripps Formation was estimated to be located at an elevation of roughly 344 to 346 feet MSL at several nearby sites. As observed in our previous local exploratory borings, the Very Old Paralic Deposits most commonly consist of reddish brown silty or clayey sandstone (SM or SC) with occasional fine gravel. In some areas, thin beds of silty sandstone with gravel were encountered directly above the geologic contact with the Scripps Formation. The Very Old Paralic Deposits are dense to very dense, with SPT blow counts typically above 30, and commonly above 50. Laboratory tests indicate that the Very Old Paralic Deposits have a low expansion potential based on common criteria. The Very Old Paralic Deposits also appear to have a *negligible* soluble sulfate content, as shown in Figure B-3.

3.3 Fill

Shallow fill soils were encountered in most of the exploratory borings we have completed in the site vicinity (typically less than about 5 feet deep). Deeper fills were encountered near the planned intersection between the East Campus Loop Road and Medical Center Drive. A maximum of about 16 feet of fill was observed near the Nuevo West parking structure along Athena Circle.

The fill is typically similar to the underlying formational materials from which it was most commonly derived. The fill generally consists of clayey or silty sand (SC or SM), with some gravelly zones. The deeper canyon fills often contain sandy lean clay (CL). The corrected SPT blow counts (N_{60}) indicate that much of the fill is medium dense in consistency, although both loose and dense fill zones were encountered in our previous borings in the site vicinity. Laboratory testing indicates that the fill soils generally have a low expansion potential and negligible soluble sulfate content based on common criteria (see Figures B-2 and B-3 in Appendix B).

3.4 Groundwater

No seepage or groundwater was encountered in most of the exploratory borings that we included in Appendix A of this report. Our previous experience in the site vicinity suggests that the local groundwater table is likely to be located more than 100 feet below site grades throughout the mesa portion of the site. Light to moderate seepage was encountered during excavation of the Student Housing Pedestrian Bridge foundations at the bottom of the canyon southwest of the site. Note that groundwater was also encountered at an elevation of about 256 feet MSL at the location of Boring A-16-12 (see Figure A-12 in Appendix A).

It should be noted that changes in rainfall, excessive irrigation practices, or site drainage issues may produce seepage or locally perched groundwater conditions at any location within the fill soil or formational units underlying the site. Such seepage conditions are difficult to predict, and are typically mitigated if and where they occur.

4.0 CONCLUSIONS

The planned East Campus Loop roadway improvements appear to be feasible from a geotechnical perspective, provided that appropriate measures are implemented during construction. Several geotechnical conditions will need to be addressed during grading of the site.

- Our previous investigations indicate that the planned East Campus Loop Road improvement will primarily be underlain by medium dense granular fill soil as well as dense formational materials. In general, the existing soils appear to be suitable for the support of the proposed improvements. As a minimum, the upper 12-inches of exposed subgrade soil throughout the site should be scarified and compacted immediately prior to placing new fill, aggregate base, wall footings or other surface improvements. Deeper remedial excavations may be needed in some areas, based on the conditions observed by the geotechnical consultant during the remedial earthwork operations.

- Previous R-Value tests indicate that the site soils may provide relatively poor support for the new pavement loads. The test results indicated R-Values ranging from 9 to 51, depending on soil type. Preliminary pavement section recommendations are provided based on an assumed range of Traffic Indices. An average R-Value of 20 was selected to represent the typical design condition, along with an R-Value of 9 for the worst-case clayey subgrade soils. The pavement recommendations provided herein should be considered preliminary and subject to revision based on the results of R-Value tests conducted on the actual pavement subgrade soil during the site improvement operations.

- Previous field infiltration tests indicate that the vertical infiltration rate for shallow BMPs in the site vicinity is typically less than 0.50 inches per hour, and often less than 0.05 inches per hour. The tests suggest that the on-site infiltration measures may be dimensioned based on the “No Infiltration” condition from the City of San Diego BMP Design Manual.

- Previous laboratory tests indicate that the near surface soils at the site primarily consist of silty and clayey (SM and SC) with a very low to low expansion potential. The Expansion Index (EI) test results are shown in Figure B-2. It should be noted that some expansive clays may also exist at the site. If expansive clays (EI>50) are observed by Group Delta near finish subgrade within the new concrete improvement areas, the upper two feet of clayey subgrade soil should be excavated and replaced with a very low expansion soil (EI<20).

- In order to assess the reactivity of the on-site soils in the site vicinity, the pH, resistivity, sulfate and chloride contents were determined (see Figure B-3). These tests indicate that the on-site granular soils typically have a *negligible* potential for sulfate attack. However, the tests also indicate that the on-site soils are *corrosive* to buried metals. A corrosion consultant may be contacted for specific recommendations.

5.0 RECOMMENDATIONS

The remainder of this report presents preliminary recommendations regarding earthwork construction and the design the proposed improvements. These recommendations are based on empirical and analytical methods typical of the standards of practice in southern California. If these recommendations do not cover a specific feature of the project, contact our office for revisions.

5.1 Plan Review

We recommend that grading and improvement plans be reviewed by Group Delta prior to finalization. We anticipate that substantial changes in the development may occur from the preliminary design concepts used for this reconnaissance. Such changes may require additional evaluation, which may result in modification of the preliminary recommendations provided in this report. The approximate locations of several proposed exploratory borings that may be conducted during the design development phase of the project are shown in Figures 3A and 3B.

5.2 Excavation and Grading Observation

Remedial grading and foundation excavations should be observed by the geotechnical consultant. During grading, the geotechnical consultant should provide observation and testing services continuously. Such observations are considered essential to identify field conditions that differ from those anticipated by this investigation, to adjust designs to the actual field conditions, and to determine that the remedial grading is accomplished in general accordance with the recommendations presented in this report. The geotechnical consultant should perform sufficient observation and testing of subgrade during the improvement operations to support their professional opinion as to compliance with the compaction recommendations.

5.3 Earthwork

Grading and earthwork should be conducted in general accordance with the requirements of the current California Building Code, as well as the standard earthwork specifications for the UCSD campus. The following recommendations are provided regarding specific aspects of the anticipated earthwork construction. These recommendations should be considered subject to revision based on the conditions observed by the geotechnical consultant during the earthwork operations.

5.3.1 Site Preparation

General site preparation should begin with the removal of deleterious materials from the site. Deleterious materials include existing structures, foundations, slabs, pavements, trees, vegetation, trash, contaminated soil and other demolition debris. Existing subsurface utilities that will be abandoned should be removed and the excavations backfilled and compacted as described in Section 5.3.3. Alternatively, abandoned pipes may be grouted in place with the approval of UCSD, and under the observation of the geotechnical consultant. Existing utilities that will remain within the vicinity of the planned improvements should be protected in place, where necessary.

5.3.2 Improvement Areas

At least two feet of compacted fill is recommended beneath all new improvement areas, including new fill, pavements, sidewalks and equipment pads. In order to accomplish this objective, the site should be cleared of deleterious materials as described in Section 6.3.1, and the upper 12-inches of soil should then be scarified and observed by the geotechnical consultant to determine if any additional remedial excavations are warranted. Any expansive soils (EI>50) observed in the remedial excavations beneath planned concrete flatwork subgrade should be removed from the site. The exposed subgrade should then be brought to several percentage points above optimum moisture content and compacted per Section 5.3.3.

5.3.3 Fill Compaction

All fill and backfill should be placed at slightly above optimum moisture content using equipment that is capable of producing a uniform product. The minimum recommended relative compaction is 90 percent of the maximum dry density at slightly above optimum moisture content based on ASTM D1557. Sufficient observation and testing of the fill should be performed by the geotechnical consultant so that an opinion can be rendered as to the compaction achieved. Rocks or concrete fragments greater than 6 inches in maximum dimension should not be used in structural fill.

Imported fill sources should be observed prior to hauling onto the site to determine the suitability for use. Imported fill should consist of granular material with less than 35 percent passing the No. 200 sieve based on ASTM C136 and an Expansion Index less than 20 based on ASTM D4829. Samples of the proposed import should be tested in order to evaluate the suitability of these soils for their proposed use. During grading operations, soil types may be encountered by the contractor that do not appear to conform to those discussed within this report. The geotechnical consultant should be notified to evaluate the suitability of these soils for their proposed use.

A two-sack sand and cement slurry may also be used for structural fill as an alternative to compacted soil. Fly ash is not recommended. It has been our experience that slurry is often useful in confined areas which may be difficult to access with compaction equipment. Samples of the slurry should be fabricated and tested for compressive strength for each slurry placement. A minimum 28-day compressive strength of 100 psi is recommended for the 2-sack slurry.

5.3.4 Subgrade Stabilization

All excavation bottoms should be firm and unyielding prior to placing fill. In areas of saturated or "pumping" subgrade, a layer of geogrid such as Tensar BX-1200 or Terragrid RX1200 may be placed directly on the excavation bottom, and then covered with at least 12-inches of open-graded crushed rock (if seepage is present) or base, followed by an additional 12-inches of minus ¾-inch well-graded aggregate base. Once the remedial excavation is firm enough to attain the required compaction, the remainder of the excavation may be backfilled using compacted aggregate base.

5.3.5 Temporary Excavations

Temporary excavations may be needed for demolition and construction of the new improvements. All excavations should conform to Cal-OSHA guidelines. In general, we recommend that temporary slopes be inclined no steeper than 1:1 for heights up to 10 feet. Higher temporary slopes, or any excavations which encounter seepage, should be evaluated by the geotechnical consultant on a case-by-case basis during earthwork construction. Any existing foundations or improvements located within ten feet of the planned excavations should be underpinned, if necessary.

The design, construction, maintenance and monitoring of all temporary slopes is the responsibility of the contractor. The contractor should have a competent person evaluate the geologic conditions encountered during excavation to determine the permissible temporary slope inclinations and other measures as required by Cal-OSHA. Based on the findings of our previous subsurface investigations, the following OSHA Soil Types may be assumed for temporary slope design.

Geologic Unit	Cal/OSHA Soil Type
Undocumented Fill	Type B
Very Old Paralic Deposits	Type A[1]
Scripps Formation	Type A[1]

1. Not subject to vibration, with no fracturing, fissuring or dip into the excavation.

5.3.6 Storm Water Management

We understand that various bioretention basins or swales may be considered as part of the development in order to promote on-site infiltration for storm water Best Management Practice (BMP). Details of the planned storm water BMPs are not yet available. In order to help determine the feasibility of on-site infiltration, the vertical infiltration rates may be estimated using borehole percolation tests conducted at the locations of the planned BMP locations. Previous infiltration tests that we have completed in the site vicinity indicated infiltration rates less than 0.05 inches per hour, indicative of a “No Infiltration” condition per the City of San Diego BMP Design Manual.

5.4 Earth-Retaining Structures

Backfilling retaining walls with expansive soil can increase lateral pressures well beyond normal active or at-rest pressures. We recommend that retaining walls be backfilled with soil that has an Expansion Index of 20 or less. Retaining wall backfill should be compacted to at least 90 percent relative compaction based on ASTM D1557. Backfill should not be placed until the retaining walls have achieved adequate strength. Heavy compaction equipment, which could cause distress to the walls, should not be used. For general wall design, an allowable bearing capacity of 2,500 lbs/ft^2, a coefficient of friction of 0.30, and a passive pressure of 300 psf per foot of depth is recommended. Wall footings should be at least 12-inches wide and 18-inches deep (see Figure 6).

5.4.1 Soldier Pile Shoring

We anticipate that shored excavations may be needed to construct come of the planned wall excavations. The contractor should be responsible for the design of the temporary shoring measures. Both cantilever and tied-back shoring would include steel soldier piles and wood lagging (or shotcrete). Typically, steel I-beams are installed in pre-drilled 2 or 3-foot diameter holes spaced at 8-foot centers. The space between the hole and soldier beam would be filled with structural concrete, up to about 6-inches below the bottom of any planned foundations. A 1½ sack sand-cement slurry would then be used to backfill the remainder of the excavations to facilitate construction. Wood lagging would be placed between the I-beams as the excavation proceeds.

Cantilever shoring with level granular backfill may be designed using an active earth pressure approximated by an equivalent fluid pressure of 35 lbs/ft^3. For 2:1 (horizontal to vertical) sloping backfill conditions, an active earth pressure of 55 lbs/ft^3 may be assumed (see Figure 7A). Note that the actives pressures assume the cantilever shoring is free to yield at the top at least ½ percent of the wall height. These pressures do not include groundwater forces.

5.4.2 Soil Nail Walls

Preliminary geotechnical parameters for the use of soil-nails to shore portions of the planned excavation north of the Athena Parking Structure are also provided herein. For design of soil nail walls with level backfill, we recommend using a rectangular active pressure distribution equal to 22H lb/ft^2, where H is the total depth of the shored excavation in feet. An ultimate bond strength of 2,500 lb/ft^2 may be assumed for preliminary soil nail design purposes. The actual ultimate bond strength of the soil nails should be confirmed by standard load testing of at least three sacrificial test nails prior to proceeding with the construction of the production nails. Additional sacrificial test nails should be installed to provide proof and verification for about 5 percent of the total number of soil nails used on all levels of the shored excavation.

Soil-nail excavations are incrementally constructed from the top down, typically using 5-foot depth increments. During construction, each soil nail should be drilled with an auger at a 10 to 15 degree battered angle down into the temporary backcut, installed per plan, and then grouted. Once the neat-cement grout has achieved the required compressive strength, the sacrificial soil nails should be load tested to confirm the estimated soil to grout bond strength. Once the bond strength has been confirmed, wire mesh and shotcrete may be placed over each of the 5-foot temporary excavation levels, and the process repeated for the entire depth of the excavation. Often, a second layer of shotcrete or cast-in-place concrete may be placed directly over the temporary soil nail wall to provide a uniform finish for the final structure.

Note that the soil nail wall should contain an adequate drainage system to prevent build-up of hydrostatic pressure behind the excavation. Continuous vertical composite panel drains (such as Mirafi G100N or the equivalent) should be placed over the face of the temporary vertical excavations between each column of soil nails. The composite panel drains should outlet to a permanent gravity outlet (or weep holes) at the base of the temporary excavation.

We recommend that the soil nail excavations, the soil nail load tests, and the composite panel drain installation be continuously observed during construction by Group Delta Consultants in order to confirm the anticipated geologic conditions and soil nail capacities, the actual soil nail lengths, and to observe that the wall drains are properly installed.

5.4.3 Braced Shoring

Cantilever shoring may be applicable for excavations up to about 15 feet deep, provided that about 1-inch of lateral deflection at the top of the shoring system is acceptable to the design team. For excavations deeper than 15 feet, or where lateral movements must be limited to protect existing structures or improvements, temporary ground anchors (tie-backs) or internal braces may be needed. One or more levels of temporary ground anchors (tiebacks), walers or braces may be needed to limit deflections. Shoring should be designed to limit deflections to values that are generally tolerable for the existing structures or improvements located within the retained zones.

Where tie-backs are used, a rectangular active pressure distribution would typically be assumed for shoring design with a recommended value of 22H for level backfill and 36H for 2:1 sloping backfill (see Figure 7B). Note that H is the total height of the shored excavation (see Figure 7B). The shoring designer should verify locations of existing foundations and utilities to avoid anchor conflicts and should select appropriate tieback depths and inclinations.

5.4.4 Permanent Retaining Walls

Permanent retaining walls should be designed for a higher global Safety Factor (1.5 or more), whereas temporary shoring is typically deemed adequate with a Safety Factor of 1.2 or more. This will typically result in longer tiebacks for permanent walls. Note that if any tiebacks extend off-site, the City of San Diego may require an encroachment permit, or that the tiebacks be de-tensioned after construction. This may prohibit the use of permanent tiebacks in some areas.

Permanent retaining walls with level granular backfill should be designed using an active earth pressure approximated by an equivalent fluid pressure of 35 lbs/ft^3. For 2:1 sloping backfill conditions, an active earth pressure of 55 lbs/ft^3 may be assumed (see Figure 7C). Again, the active pressures assume that the cantilever retaining walls are free to yield at the top at least ½ percent of the wall height. For walls that are restrained so that such movement is prohibited, at-rest pressures should be used. At-rest earth pressures of 60 lbs/ft^3 and 80 lbs/ft^3 are recommended for permanent retaining walls with level and 2:1 sloping backfill (respectively), as shown in Figure 7D.

Any surcharges located within a 1:1 plane extending back and up from the base of the retaining walls should also be accounted for both temporary shoring and permanent walls, as shown in Figures 7A through 7D. Retaining walls situated adjacent to vehicular traffic areas may be designed to resist a uniform lateral surcharge pressure of 100 lb/ft^2 resulting from a typical 300 lb/ft^2 traffic surcharge acting behind the wall. Note that all of the wall pressures provided previously do not include groundwater forces. All permanent retaining walls should contain adequate backdrains to relieve hydrostatic pressures. Typical cantilever wall drainage details are provided in Figure 7E.

5.4.5 Seismic Wall Design

The locations of known active faults within a 100-kilometer (km) radius of the site were shown on the Regional Fault Map, Figure 5A. The portion of the East Campus Loop Road alignment immediately north of the Athena Parking Garage is roughly located at latitude 32.8799° north and longitude 117.2217° west, as shown on the Local Fault Map, Figure 5B. A "potentially active" fault trace crosses the roadway west of the Athena Parking Garage (see Figure 5B). This fault is believed to be potentially active by the City of San Diego because it has not been shown to offset Holocene geologic formations (City of San Diego, 2008). The State of California does not consider such faults to be active sources of ground shaking or rupture. The nearest known active faults are located within the offshore segment of the Rose Canyon fault zone, about 4 km southwest of the site.

Per the provisions of the 2019 California Building Code (CBC), seismic design is required for retaining structures over 6 feet in height. The Maximum Considered Earthquake (MCE) and Design Basis Earthquake (DBE) acceleration response spectra from the 2019 California Building Code (CBC) are shown on the attached Table 1. The site modified MCE peak ground acceleration (PGA_M) from the 2019 CBC is 0.653g. Design level loads are traditionally used for wall design (PGA_M/1.5~0.435g), as described in Section 1803A.5.12 of the 2019 CBC. A fraction of the Design level peak ground acceleration is used to account for yielding of the walls. We have provided seismic retaining wall design parameters based on a seismic load of 0.28g, corresponding to 1 to 2 inches of deformation. The recommended seismic increment of 26 lb/ft^3 is depicted in the attached Figures 7C and 7D.

5.5 Pavements

Alternatives are provided for either asphalt concrete or Portland cement concrete pavements. Immediately prior to constructing the pavements, the upper 12 inches of subgrade soil should be scarified, brought to optimum moisture, and compacted to at least 95 percent of the maximum dry density per ASTM D1557. Aggregate base should also be compacted to 95 percent of the maximum dry density. Aggregate base should conform to the Standard Specifications for Public Works Construction (*SSPWC),* Section 200-2. Asphalt concrete should conform to Section 400-4 of the *SSPWC*, and should be compacted to between 91 and 97 percent of the Rice density.

5.5.1 Asphalt Concrete

Preliminary asphalt concrete pavement section design was conducted in general accordance with the Caltrans Design Method (Topic 608.4). R-Value tests were previously conducted on samples collected from nearby sites in general accordance with CTM 301. The R-Value test results ranged widely from 9 to 51, as shown in Figures B-5.1 to B-5.7 in Appendix B. Pavement section alternatives are provided below based on the minimum R-Value of 9, as well as a more typical lower bound R-Value of 20 from our previous experience in the site vicinity. Traffic Indices ranging from 6.0 to 9.0 were assumed for preliminary design purposes. The project civil engineer should review the assumed Traffic Indices to determine which pavement sections would apply to the various roadway improvement areas. Based on subgrade R-Values of 20 and 9, and the assumed range of Traffic Indices, the following preliminary pavement sections would apply.

TRAFFIC INDEX	ASPHALT SECTION	BASE SECTION (R_{AVE} ~20)	MAX. BASE SECTION (R_{MIN}~9)
6.0	4 Inches	9 Inches	11 Inches
7.0	4 Inches	12 Inches	15 Inches
8.0	5 Inches	14 Inches	17 Inches
9.0	6 Inches	15 Inches	19 inches

5.5.2 Portland Cement Concrete

Preliminary concrete pavement section design was conducted in general accordance with the simplified procedure of the Portland Cement Association. This methodology is based on a 20-year design life. For design, it was assumed that aggregate interlock would be used for load transfer across control joints. The concrete was assumed to have a minimum flexural strength of 600 psi, corresponding to a good quality mix such as a Greenbook 560-C-3250. This corresponds to a concrete mix containing at least 560 pounds of cement per yard, with a minimum 28-day compressive strength of 3,250 psi. The subgrade materials were assumed to provide “low” support based on the previous R-Value test results described above. Based on these assumptions, and using the same range of Traffic Indices presented previously, we would recommend the following preliminary PCC pavement sections for the site.

TRAFFIC INDEX	CONCRETE SECTION	BASE SECTION
6.0	6 Inches	---
7.0	6 Inches	6 Inches
8.0	7 Inches	6 Inches
9.0	8 Inches	12 Inches

Crack control joints should be constructed for all PCC pavements on a maximum spacing of 10 feet, each way. Concentrated truck traffic areas, such as trash truck aprons and loading docks, should be reinforced with number 4 bars on 18-inch centers, each way.

5.5.3 Subgrade Stabilization Using Geogrid

In areas where the new and existing pavements are at similar grades, or where the new pavements will pass through current landscaping areas, we anticipate that some of the subgrade soils may be moist to wet during construction. Proper compaction cannot be attained in saturated soils, unless several days are allowed to first mix and air dry the upper 12 to 24-inches of subgrade soil back to a moisture content suitable for compaction (near optimum).

As an alternative to air drying wet subgrade areas during the pavement reconstruction operations, yielding subgrade soil may be excavated to a depth of 12 to 24-inches below the planned subgrade elevations. A rigid biaxial geogrid such as Tensar BX1200 may then be placed directly on the subgrade. The remedial excavation should then be backfilled using ¾-inch maximum aggregate base. Once the aggregate base has been properly compacted at subgrade elevations per the project specifications, the pavement section may then be constructed per plan. Note that additional removal and replacement with base and geogrid may be needed for badly yielding areas. In addition, subgrade stabilization with geogrid may not be possible over shallow subsurface utilities, unless the utilities are first relocated or protected in place using slurry encasement or other means dictated by owner of the specific utility. Such conditions should be evaluated on a case-by-case basis during construction.

5.5.4 Cement Stabilized Subgrade

As an alternative to stabilizing areas of wet, yielding subgrade soil using geogrid as described above, cement modification may be used to stabilize the subgrade soils. Prior to cement application, the existing asphalt concrete should be removed, and the site fine graded to approximate finish base elevations (typically 4 to 6 inches below finish grade, depending upon the design Traffic Index). At least 3 percent cement by dry soil weight should then be mixed uniformly with the subgrade to stabilize the upper 12-inches of existing soil and any overlying base.

The average dry unit weight of the compacted fill soil is estimated at roughly 110 lb/ft^3. Therefore, three percent cement within the upper 12-inches of subgrade will equate to 3.3 lb/ft^2. The three percent cement content should be verified during placement by using a pan of known area and weight placed beneath the spreader truck, and weighing the cement collected within the pan. The total weight of cement used should also be confirmed by totaling the Weighmaster's Certificates in pounds, and dividing by the total treatment area in square feet. Daily samples of the cement treated subgrade should be collected during construction, and compacted by the geotechnical consultant in the laboratory for curing and testing at an age of 7-days. Cement treated subgrade should have a minimum 7-day strength of 300 psi. Additional sampling and testing may be conducted to verify the required cement content for any areas where soil-cement is considered.

5.5.5 Existing Subsurface Utilities

There are numerous existing shallow utilities along the road alignment that may prohibit construction of the recommended pavement sections as planned. For example, the portion of the proposed East Campus Loop Road alignment located north of the Athena Parking Garage currently contains existing subsurface potable water, reclaimed water, chilled water, storm drain, electric, and communications conduits that will all likely need to be relocated to accommodate the anticipated grade changes in that area (see Figure 3B).

Any existing utilities that will be located within about 30-inches of planned finish grade for the East Campus Loop Road realignment should be relocated (if possible), such that the existing utilities remain below the 12-inch-deep scarification and compaction of the subgrade soils recommended in Section 5.5. For existing utilities situated within 30-inches of finish grade that cannot otherwise be relocated outside of the pavement section, the utilities may be protected in place by exposing the utilities (with at least 4-inches of clearance on all sides) and encasing them in slurry. Slurry encasement may extend up to 12-inches below finish grade for the new asphalt concrete pavement areas. Any existing utilities located within 12-inches of finish grade should be relocated.

We recommend that a 2-sack sand-cement slurry be used for encasement of any shallow conduits located within the subgrade soil beneath the specified aggregate base section, and that a 3-sack slurry be used for encasement of any utilities that will be located within the planned aggregate base section. The 2-sack slurry should have a minimum 28-day compressive strength of 100 psi. The 3-sack slurry should have a minimum 28-day strength of 300 psi. Samples of the slurry that is used for utility encasement should be fabricated and tested during construction to confirm that the minimum required compressive strength is achieved.

5.6 Pipelines

Redevelopment of the site will include a variety of new subsurface utilities. Geotechnical aspects of pipeline installation include lateral earth pressures for thrust blocks, modulus of soil reaction, and pipe bedding. Each of these parameters is discussed separately below.

5.6.1 Thrust Blocks

Lateral resistance for thrust blocks may be determined by a passive pressure value of 300 lbs/ft^2 per foot of embedment, assuming a triangular distribution. This value may be used for thrust blocks embedded into compacted fill soils as well as the formational materials.

5.6.2 Modulus of Soil Reaction

The modulus of soil reaction (E’) is used to characterize the stiffness of soil backfill placed along the sides of buried flexible pipelines. For the purpose of evaluating deflection due to the load associated with soil over the pipe, a value of 1,500 lbs/in^2 is recommended.

5.6.3 Pipe Bedding

Typical pipe bedding as specified in the *Standard Specifications for Public Works Construction* may be used. As a minimum, we recommend that pipes be supported on 4 to 6 inches of granular bedding material such as minus ¾-inch crushed rock or disintegrated granite. Where pipeline or trench excavations exceed a 15 percent gradient, we do not recommend that open graded rock be used for bedding or backfill because of the potential for piping and internal erosion. For sloping utilities, we recommend that coarse sand or sand-cement slurry be used for the bedding and pipe zone. The slurry should consist of a 2-sack mix having a slump no greater than 5 inches.

5.6.4 Filter Fabric Separator

It has been our experience that soil may migrate into void spaces within an open graded gravel over time. A ¾-inch Minus Crushed Rock may have 50 percent void space or more, creating the potential for migration of a large volume of soil into the gravel voids. This migration of soil may take several years to develop, and is generally recognized only when surface manifestations occur, such as settlement of the pavement around a manhole or over a utility trench. To help reduce the potential for distress to settlement sensitive improvements, we recommend that a filter fabric separator (such as Mirafi 140N or an approved similar product) be placed between the soil backfill and any open graded gravel used around sewer or storm drain pipes and manholes constructed within roadways, or beneath areas finished with concrete flatwork. It is our understanding that UCSD also requires the use of a filter fabric separator under these circumstances.

5.7 Supplemental Investigation

The recommendations provided within this report should be considered preliminary and subject to revision based on the findings of a supplemental subsurface investigation. Additional exploratory borings are recommended at the site during the design development phase in order to characterize the local geotechnical conditions which may impact pavement design, BMP design, retaining wall design and temporary slope stability.

In general, the supplemental borings should be located near the tops of the highest walls or cut-slopes described previously and should extend at least 10-feet below the bottom of the planned excavations. The approximate locations of three proposed borings for future investigation are shown in Figures 3A and 3B. The precise boring locations should be determined during the design development phase, once the project grading plans and precise retaining wall and slope locations are determined. Additional borings and field infiltration tests may be added at the precise BMP locations (once they are available).

6.0 LIMITATIONS

This report was prepared using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in similar localities. No warranty, express or implied, is made as to the conclusions and professional opinions included in this report.

The findings of this report are valid as of the present date. However, changes in the condition of a property can occur with the passage of time, whether due to natural processes or the work of man on this or adjacent properties. In addition, changes in applicable or appropriate standards of practice may occur from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

7.0 REFERENCES

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TABLES

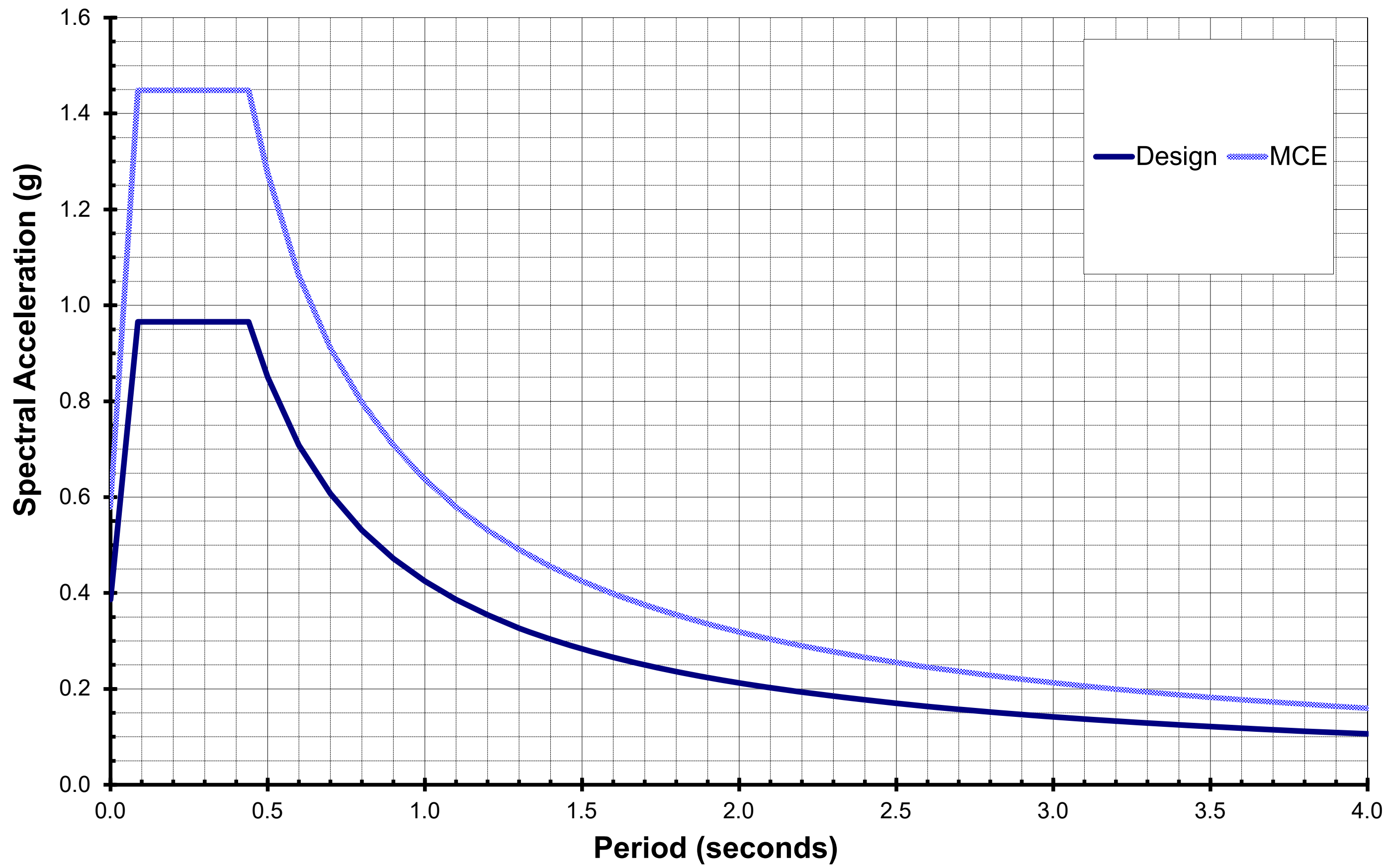
TABLE 1 - 2019 CBC ACCELERATION RESPONSE SPECTRA

INPUT	S_S=	1.207	g = short period (0.2 sec) mapped spectral response acceleration MCE Site Class B (**CBC 2019 Fig. 1613.5(3) or USGS Ground Motion Calculator**)
	S_1=	0.425	g = 1.0 sec period mapped spectral response acceleration MCE Site Class B (**CBC 2019 Fig. 1613.5(4) or USGS Ground Motion Calculator**)
	Site Class=	C	= Site Class definition based on **CBC 2019 Table 1613.5.2**
	F_a=	1.200	= Site Coefficient applied to S_s to account for soil type (**CBC 2019 Table 1613.5.3(1)**)
	F_v=	1.500	= Site Coefficient applied to S_1 to account for soil type (**CBC 2019 Table 1613.5.3(2)**)
	T_L=	8.00	sec = Long Period Transition Period (**ASCE 7-16 Figure 22-16**)
OUTPUT	S_{MS}=	1.448	= site class modified short period (0.2 sec) MCE spectral response acceleration = F_a x S_s (**CBC 2019 Eqn. 16-36**)
	S_{M1}=	0.638	= site class modified 1.0 sec period MCE spectral response acceleration = F_v x S_1 (**CBC 2019 Eqn. 16-37**)
	S_{DS}=	0.966	= site class modified short period (0.2 sec) Design spectral response acceleration = 2/3 x S_{MS} (**CBC 2019 Eqn. 16-38**)
	S_{D1}=	0.425	= site class modified 1.0 sec period Design spectral response acceleration = 2/3 x S_{M1} (**CBC 2019 Eqn. 16-39**)
	T_0=	0.088	sec = 0.2 S_{D1}/S_{DS} = Control Period (left end of peak) for ARS Curve (Section 11.4.5 ASCE 7-16)
	T_S=	0.440	sec = S_{D1}/S_{DS} = Control Period (right end of peak) for ARS Curve (Section 11.4.5 ASCE 7-16)

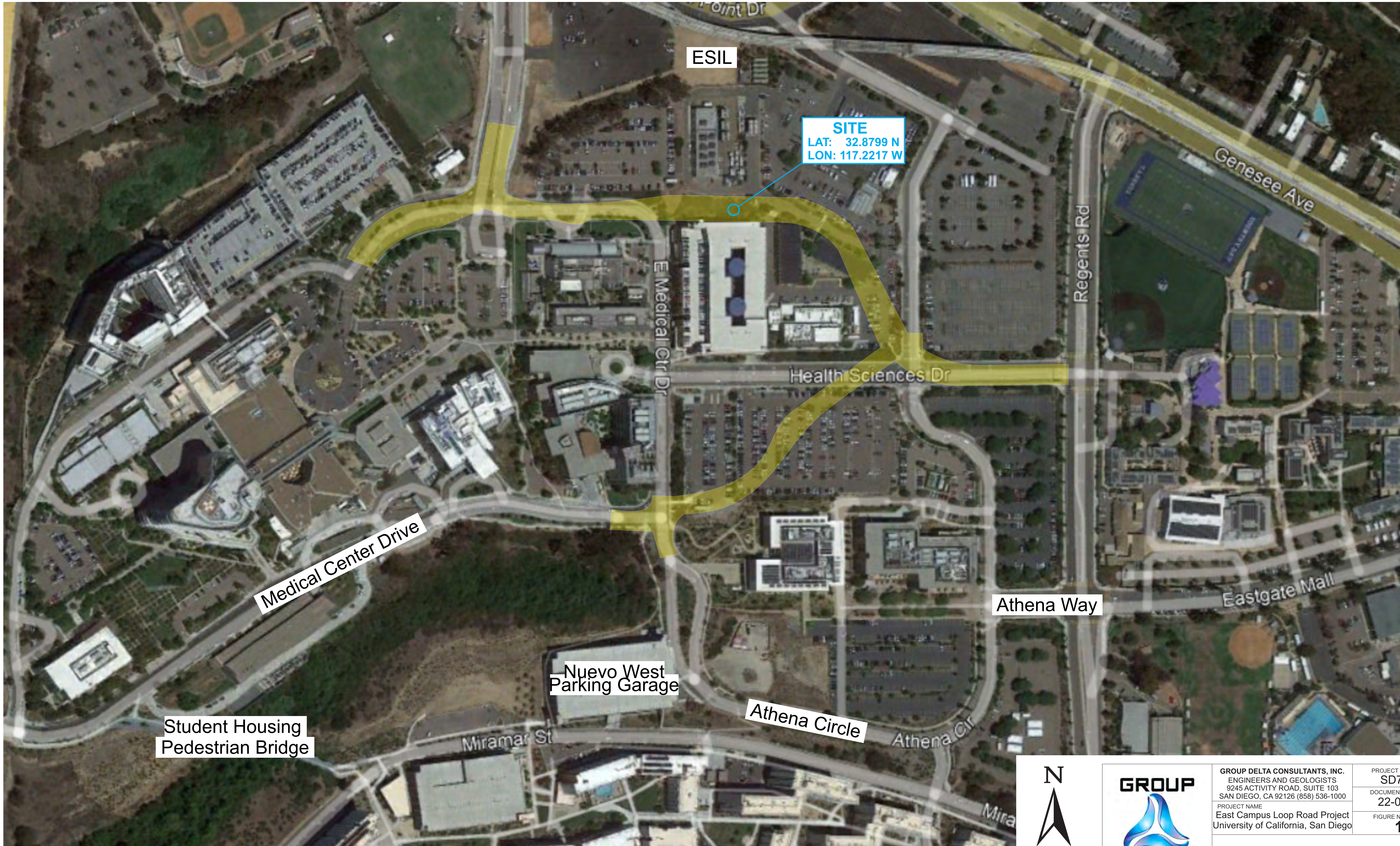
Site Latitude:	32.8799
Site Longitude:	-117.2217
Seismic Design Category:	D
Site Modified Peak Ground Accelerations (PGA_M):	0.653

SPECTRUM CALCULATION

T (seconds)	Design Sa (g)	MCE Sa (g)
0.000	0.386	0.579
0.088	0.966	1.448
0.440	0.966	1.448
0.500	0.850	1.275
0.600	0.708	1.063
0.700	0.607	0.911
0.800	0.531	0.797
0.900	0.472	0.708
1.000	0.425	0.638
1.100	0.386	0.580
1.200	0.354	0.531
1.300	0.327	0.490
1.400	0.304	0.455
1.500	0.283	0.425
1.600	0.266	0.398
1.700	0.250	0.375
1.800	0.236	0.354
1.900	0.224	0.336
2.000	0.213	0.319
2.100	0.202	0.304
2.200	0.193	0.290
2.300	0.185	0.277
2.400	0.177	0.266
2.500	0.170	0.255
2.600	0.163	0.245
2.700	0.157	0.236
2.800	0.152	0.228
2.900	0.147	0.220
3.000	0.142	0.213
3.100	0.137	0.206
3.200	0.133	0.199
3.300	0.129	0.193
3.400	0.125	0.188
3.500	0.121	0.182
3.600	0.118	0.177
3.700	0.115	0.172
3.800	0.112	0.168
3.900	0.109	0.163
4.000	0.106	0.159



FIGURES



N

NO SCALE

GROUP DELTA

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9245 ACTIVITY ROAD, SUITE 103
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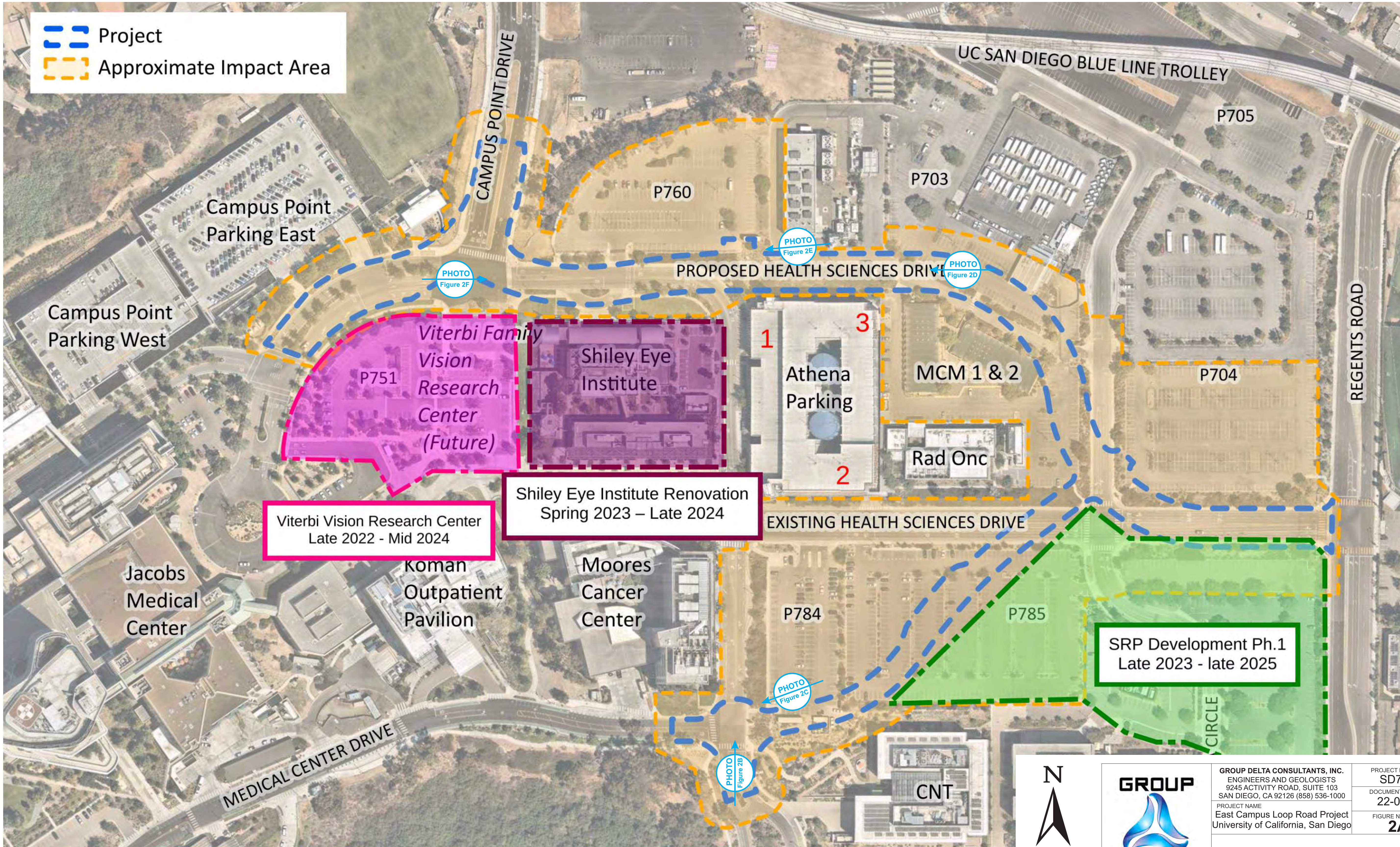
PROJECT NAME
East Campus Loop Road Project
University of California, San Diego

PROJECT NUMBER
SD736

DOCUMENT NUMBER
22-0061

FIGURE NUMBER
1

SITE LOCATION MAP



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University of California, San Diego

PROJECT NUMBER
SD736

DOCUMENT NUMBER
22-0061

FIGURE NUMBER
2A

PROPOSED DEVELOPMENT

Reference: University of California, San Diego (2022). *East Campus Loop Road Improvements, Project Site, Figure B,* January 14.

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PROJECT NUMBER
SD736

DOCUMENT NUMBER
22-0061

FIGURE NUMBER
2B

SITE PHOTOGRAPHS

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DOCUMENT NUMBER	22-0061
FIGURE NUMBER	2C

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East Campus Loop Road Project
University of California, San Diego

SITE PHOTOGRAPHS

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PROJECT NUMBER
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DOCUMENT NUMBER
22-0061

FIGURE NUMBER
2D

SITE PHOTOGRAPHS

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PROJECT NAME
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PROJECT NUMBER
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DOCUMENT NUMBER
22-0061

FIGURE NUMBER
2E

SITE PHOTOGRAPHS

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PROJECT NUMBER
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DOCUMENT NUMBER
22-0061

FIGURE NUMBER
2F

SITE PHOTOGRAPHS

EXPLANATION:

A-20-02 Approximate locations of the exploratory borings we have recently completed in the site vicinity (GDC, 2016ab, 2017bc, 2020b, 2022).

B-3 Approximate locations of proposed supplemental exploratory borings to aid in design of the East Campus Loop Road walls (GDC, 2022).

N

NO SCALE

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DOCUMENT NUMBER
22-0061

PROJECT NAME
East Campus Loop Road Project
University of California, San Diego

FIGURE NUMBER
3A

PREVIOUS EXPLORATIONS

EXPLANATION:

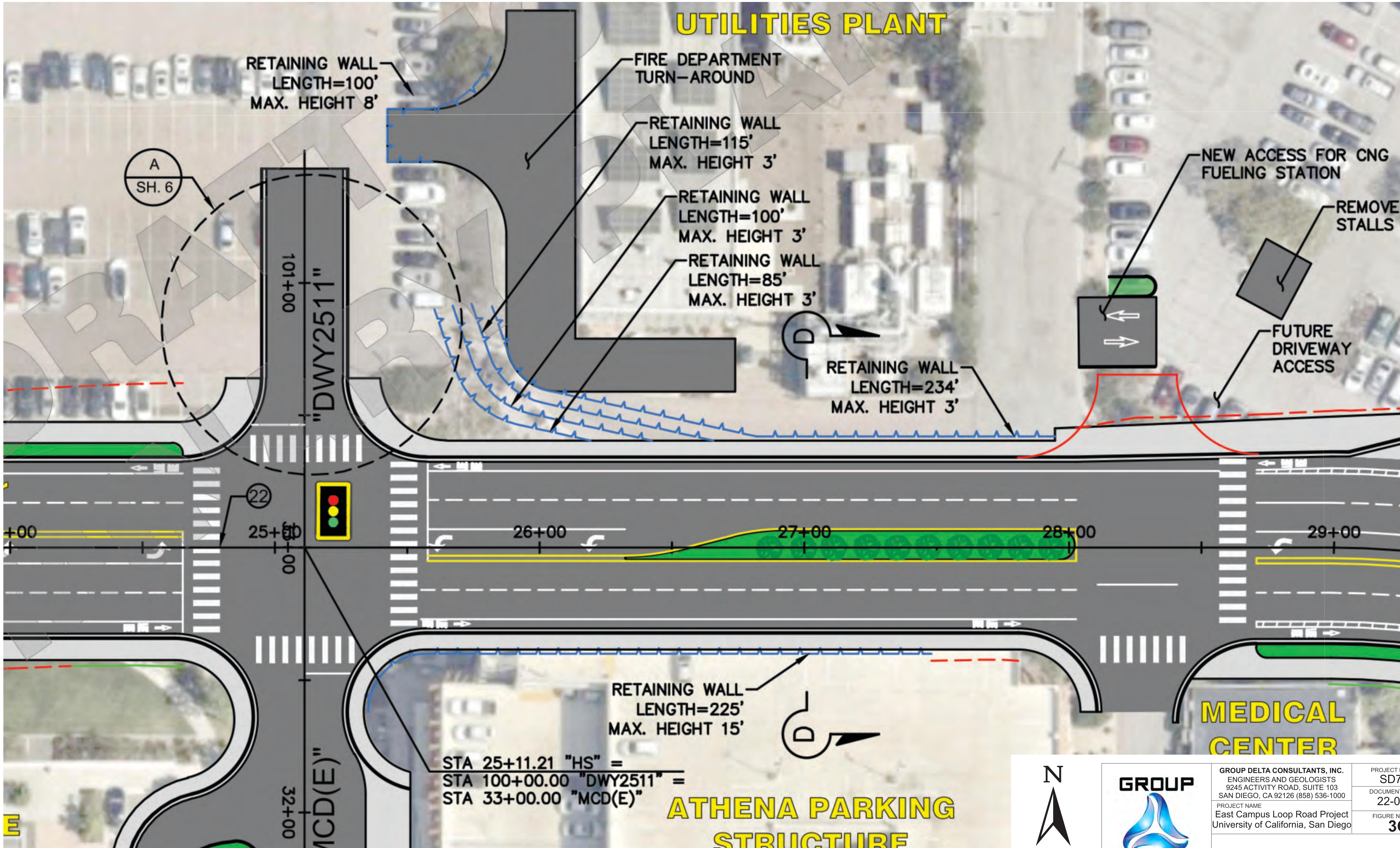
B-2 Approximate locations of proposed supplemental exploratory borings to aid in design of the East Campus Loop Road walls (GDC, 2022).

N

NO SCALE

Reference: University of California, San Diego (2016). *Project #4477, East Campus Parking Structure II, Record Drawings, Overall Civil Grading Plan,* Sheet C2.01, August 19.

GROUP DELTA	**GROUP DELTA CONSULTANTS, INC.** ENGINEERS AND GEOLOGISTS 9245 ACTIVITY ROAD, SUITE 103 SAN DIEGO, CA 92126 (858) 536-1000	PROJECT NUMBER SD736 DOCUMENT NUMBER 22-0061
	PROJECT NAME East Campus Loop Road Project University of California, San Diego	FIGURE NUMBER **3B**
	ATHENA PARKING GARAGE	



Reference: Dokken Engineering (2022). *Preliminary Plan and Profile, East Campus Loop Road*, Plan Sheet 2 of 7, July 1.

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PROJECT NAME
East Campus Loop Road Project
University of California, San Diego

PROJECT NUMBER
SD736

DOCUMENT NUMBER
22-0061

FIGURE NUMBER
3C

PRELIMINARY ROAD PLAN

EXPLANATION:

$Qvop_{10}$ **Very old paralic deposits, Unit 10 (middle to early Pleistocene)** — Mostly poorly sorted, moderately permeable, reddish-brown, interfingered strandline, beach, estuarine and colluvial deposits composed of siltstone, sandstone and conglomerate.

Tsc **Scripps Formation (middle Eocene)** — The Scripps Formation (Tsc) is mostly pale yellowish and gray-brown, medium-grained sandstone containing occasional cobble-conglomerate interbeds. Ardath Shale (not shown) underlies the Scripps Formation in the canyon bottoms east and south of the Campus Loop Road project.

REFERENCE: Kennedy & Tan (2005). *Geologic Map of the San Diego 30' x 60' Quadrangle, California*, Scale 1:100,000.

N
NO SCALE

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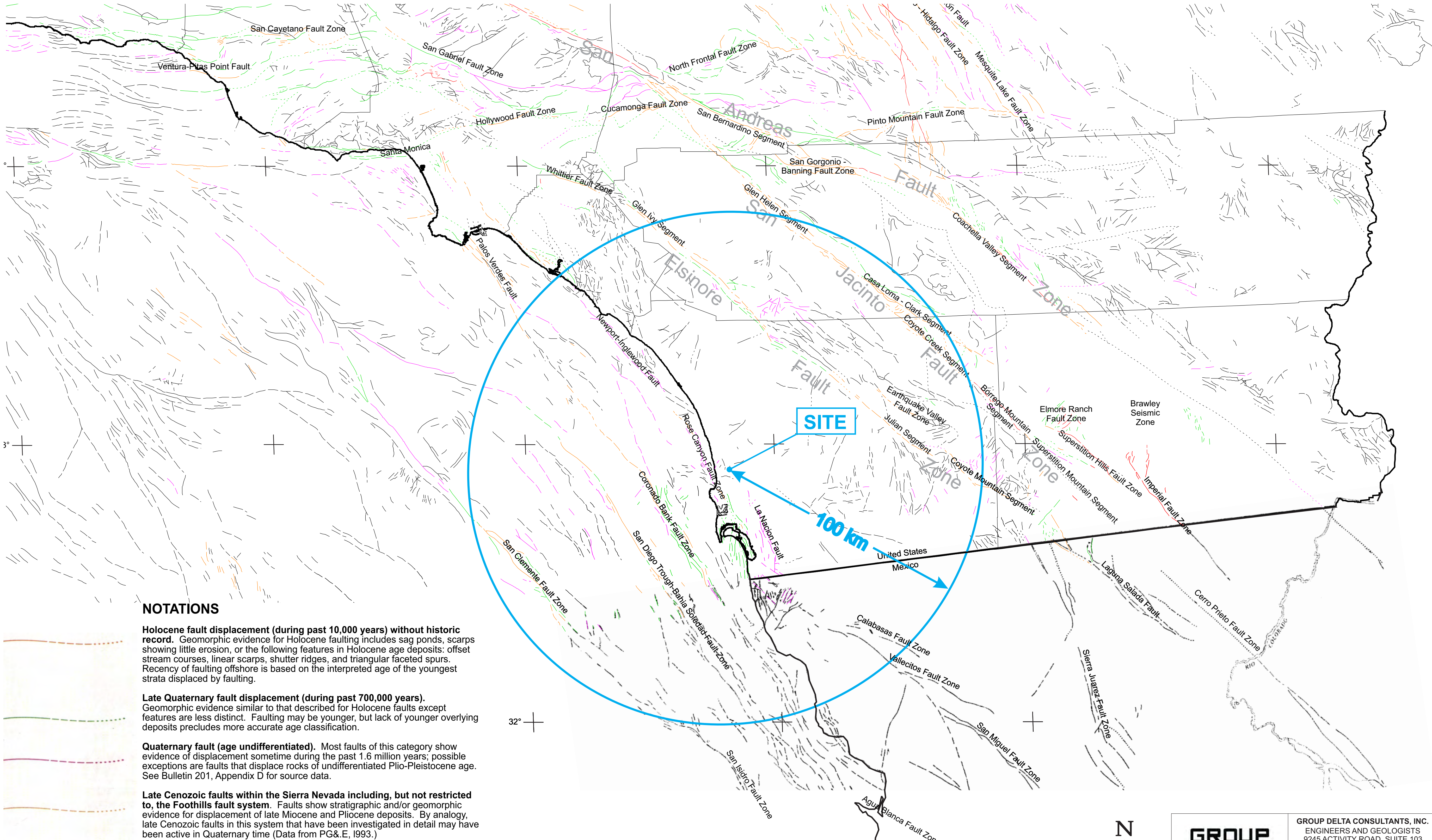
PROJECT NUMBER	SD736
DOCUMENT NUMBER	22-0061
PROJECT NAME	East Campus Loop Road Project, University of California, San Diego
FIGURE NUMBER	4

LOCAL GEOLOGIC MAP



NOTATIONS

Holocene fault displacement (during past 10,000 years) without historic record. Geomorphic evidence for Holocene faulting includes sag ponds, scarps showing little erosion, or the following features in Holocene age deposits: offset stream courses, linear scarps, shutter ridges, and triangular faceted spurs. Recency of faulting offshore is based on the interpreted age of the youngest strata displaced by faulting.

Late Quaternary fault displacement (during past 700,000 years). Geomorphic evidence similar to that described for Holocene faults except features are less distinct. Faulting may be younger, but lack of younger overlying deposits precludes more accurate age classification.

Quaternary fault (age undifferentiated). Most faults of this category show evidence of displacement sometime during the past 1.6 million years; possible exceptions are faults that displace rocks of undifferentiated Plio-Pleistocene age. See Bulletin 201, Appendix D for source data.

Late Cenozoic faults within the Sierra Nevada including, but not restricted to, the Foothills fault system. Faults show stratigraphic and/or geomorphic evidence for displacement of late Miocene and Pliocene deposits. By analogy, late Cenozoic faults in this system that have been investigated in detail may have been active in Quaternary time (Data from PG&E, l993.)

Pre-Quaternary fault (older than 1.6 million years) or fault without recognized Quaternary displacement. Some faults are shown in this category because the source of mapping used was of reconnaissance nature, or was not done with the object of dating fault displacements. Faults in this category are not necessarily inactive.

REFERENCE: Jennings, C.W. (1994). *Fault Activity Map of California and Adjacenet Areas*, CDMG Geologic Data Map Series, Map No. 6.

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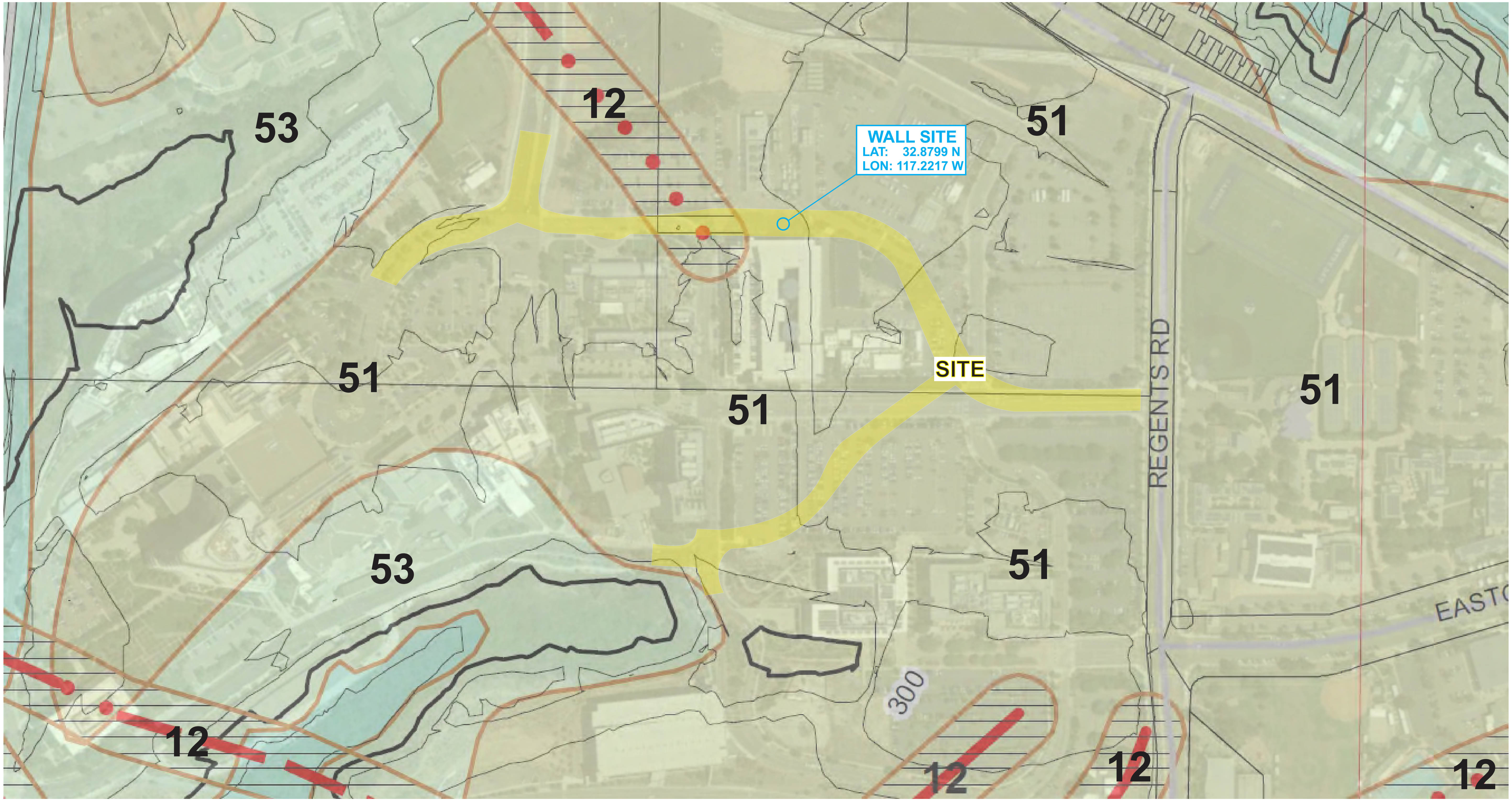
PROJECT NUMBER	SD736
DOCUMENT NUMBER	22-0061
PROJECT NAME	East Campus Loop Road Project University of California, San Diego
FIGURE NUMBER	5A

REGIONAL FAULT MAP



EXPLANATION:

FAULT ZONES

12 Potentially Active, Inactive, Presumed Inactive, or Activity Unknown

FAULTS

Fault

Inferred Fault

Concealed Fault

OTHER TERRAIN

51 Level mesas -- underlain by terrace deposits and bedrock nominal risk

53 Level or sloping terrain, unfavorable geologic structure, Low to moderate risk

REFERENCE: City of San Diego (2008). *Seismic Safety Study, Geologic Hazards and Faults*, Grids 34, dated April 3, 2008.

N

NO SCALE

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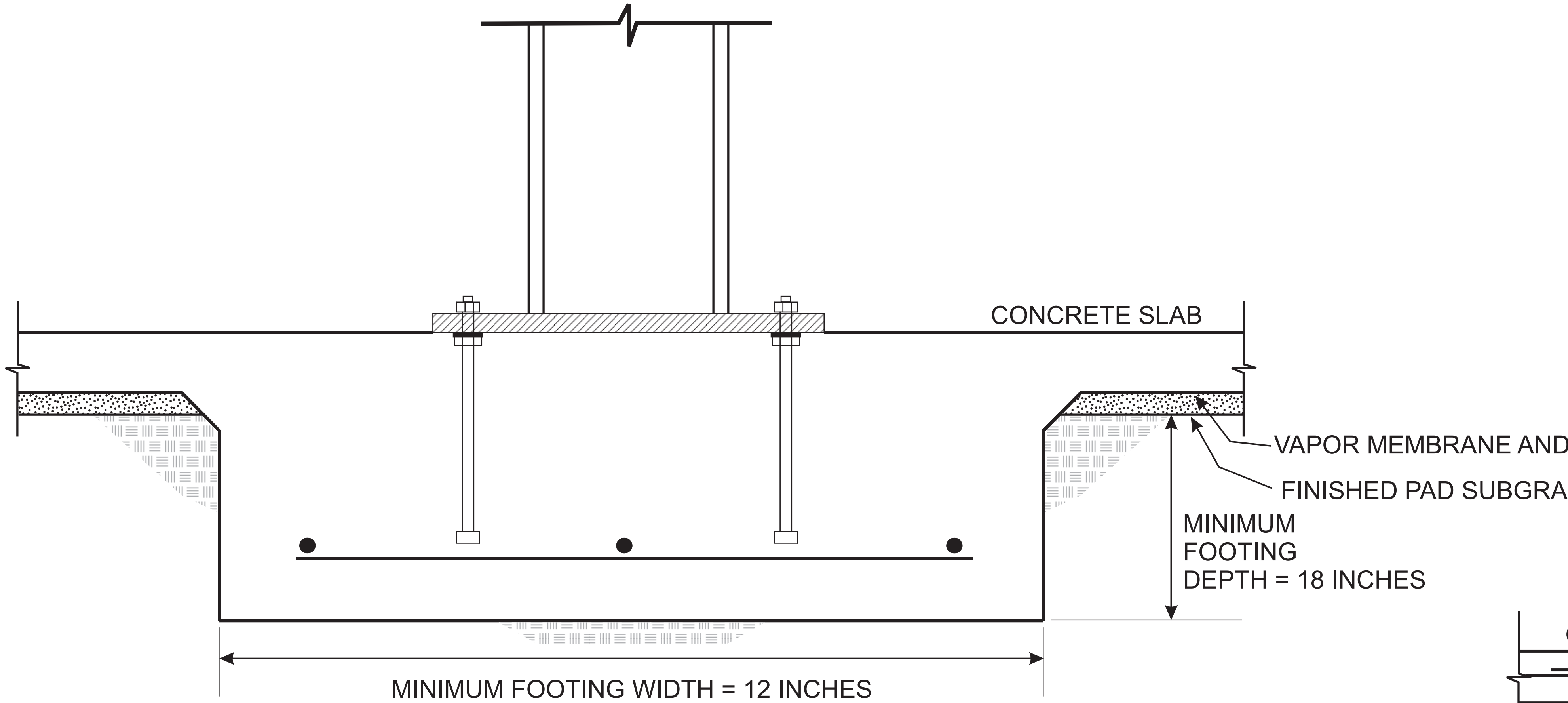
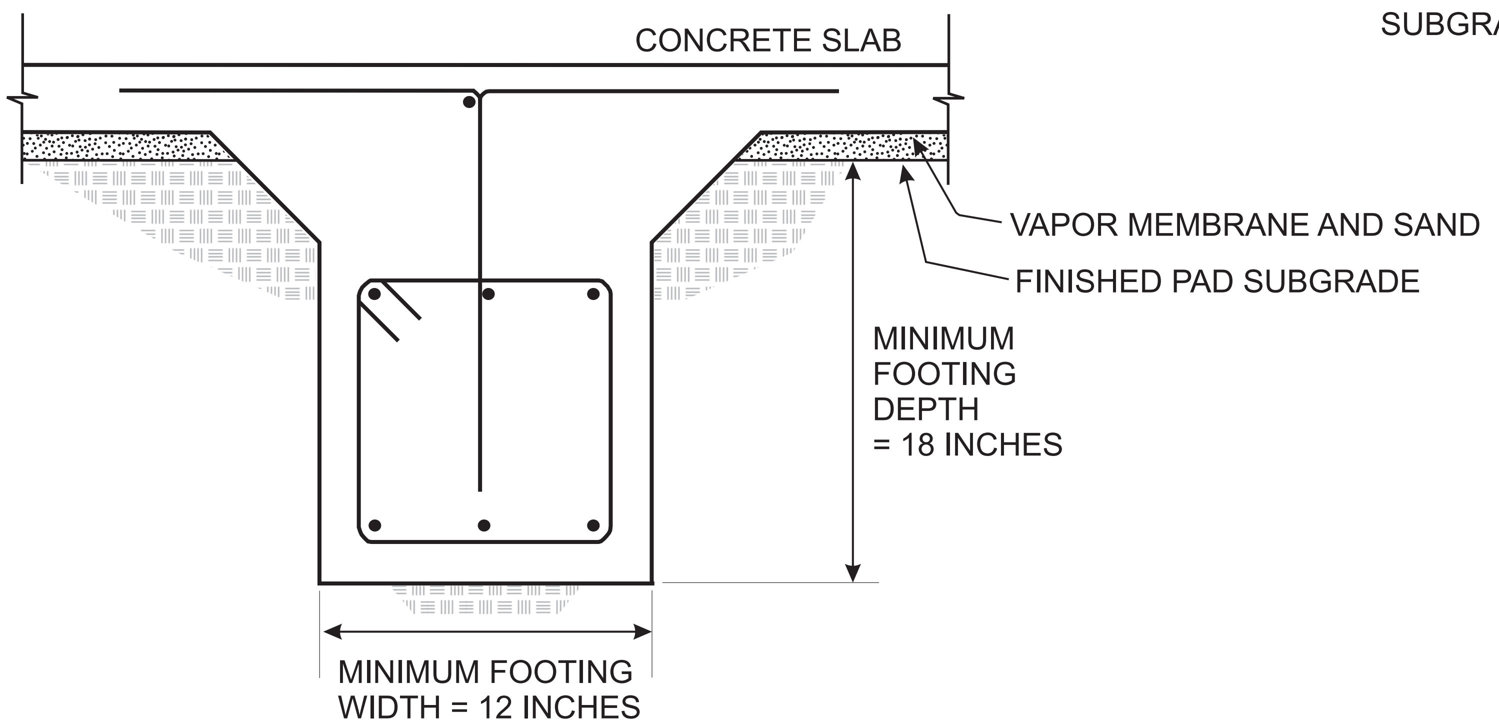
PROJECT NUMBER	SD736
DOCUMENT NUMBER	22-0061
PROJECT NAME	East Campus Loop Road Project University of California, San Diego
FIGURE NUMBER	5B

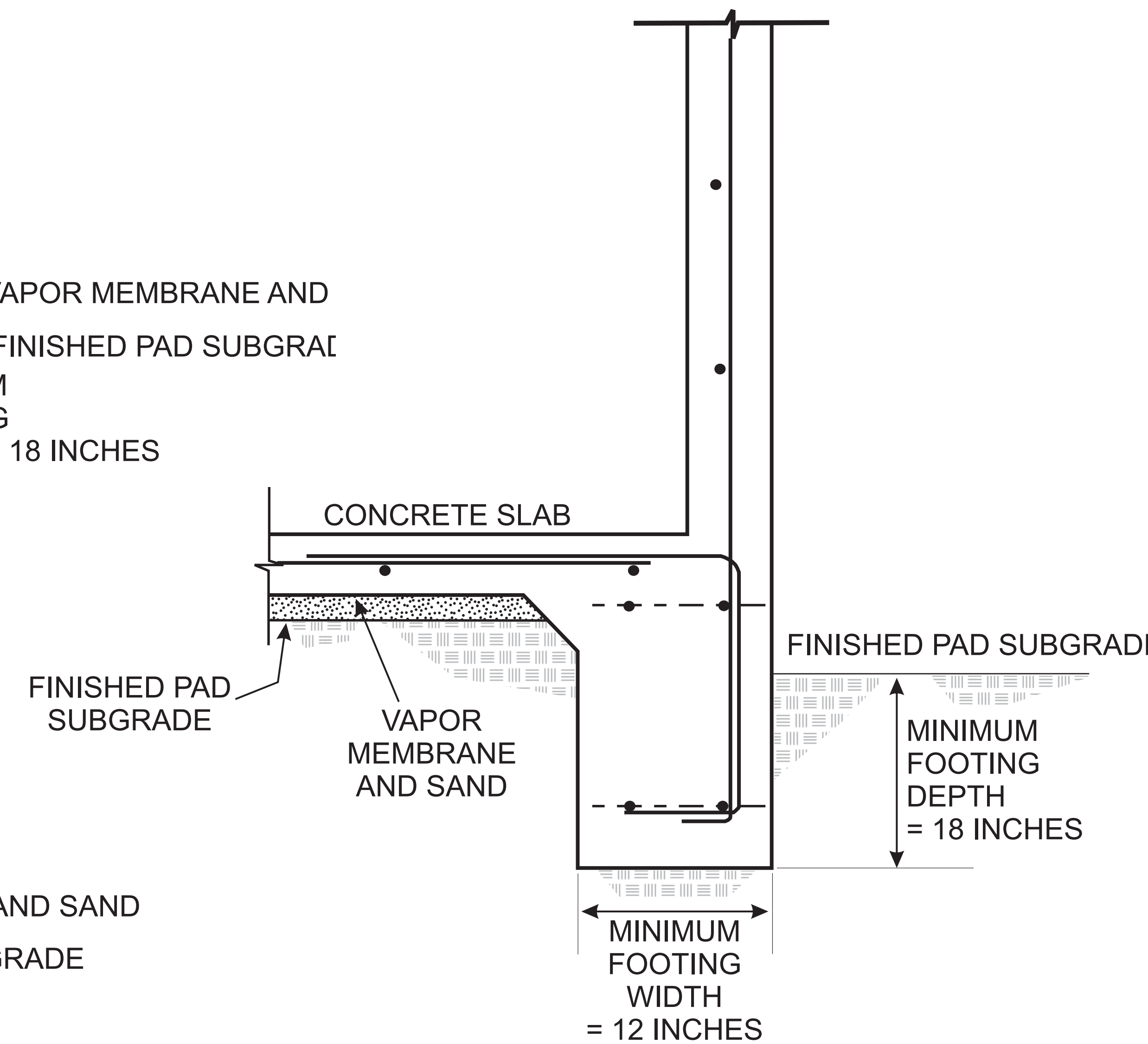
LOCAL FAULT MAP



SQUARE FOOTING

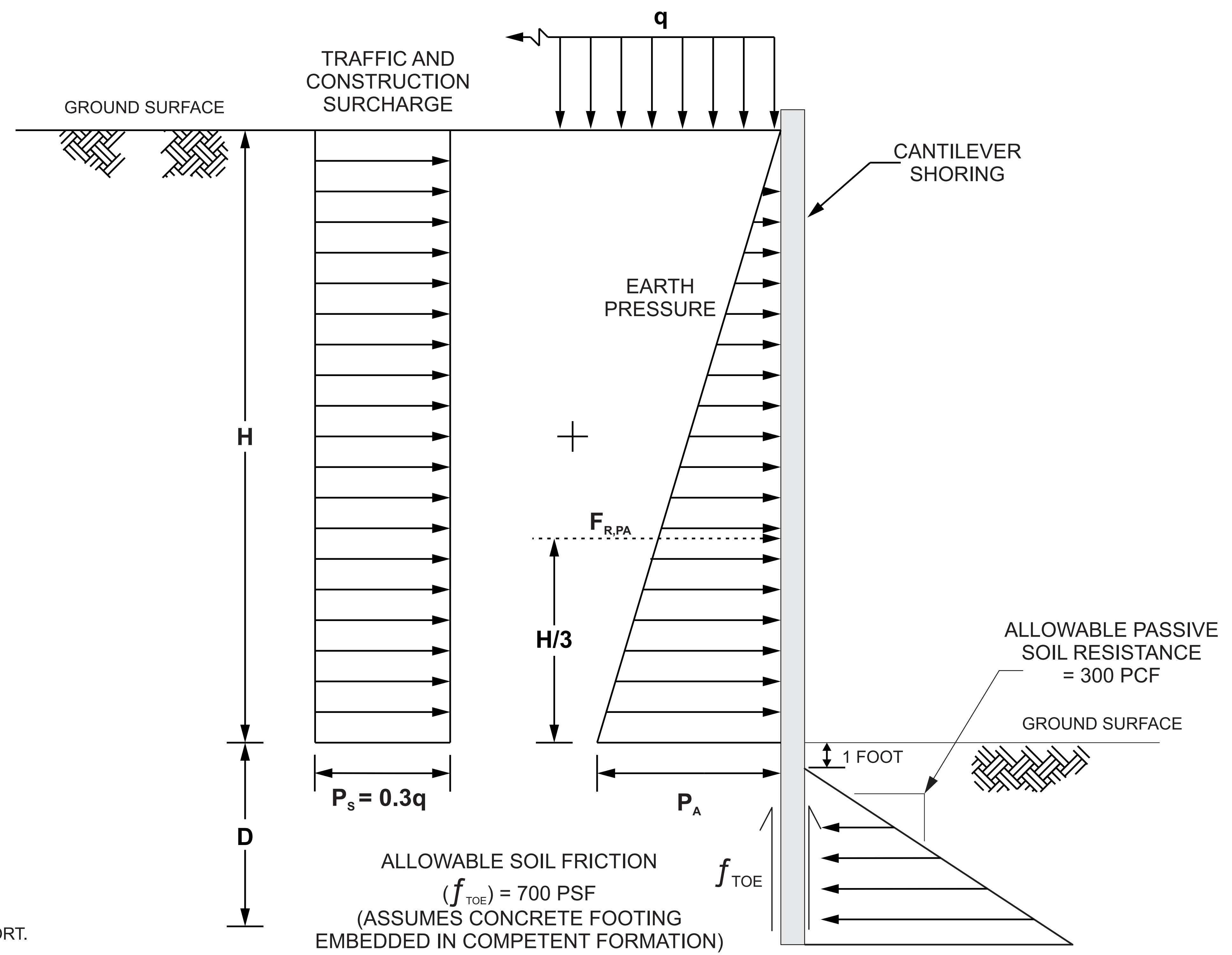


INTERIOR CONTINUOUS FOOTING



EXTERIOR CONTINUOUS FOOTING

GROUP DELTA	GROUP DELTA CONSULTANTS, INC. ENGINEERS AND GEOLOGISTS 9245 ACTIVITY ROAD, SUITE 103 SAN DIEGO, CA 92126 (858) 536-1000	PROJECT NUMBER SD736 DOCUMENT NUMBER 22-0061
	PROJECT NAME East Campus Loop Road Project University of California, San Diego	FIGURE NUMBER 6
	SHALLOW FOUNDATIONS	



TOTAL ALLOWABLE PASSIVE RESISTANCE PER SOLDIER PILE =
UNIT ALLOWABLE PASSIVE RESISTANCE
X
TWICE THE CONCRETED SOLDIER PILE WIDTH

NOTES:

1. ACTIVE LATERAL EARTH PRESSURE, PA
   -WITH LEVEL BACKFILL: P_A = 35 PCF
   -WITH 2:1 SLOPING BACKFILL: P_A = 55 PCF
2. ASSUMES NO HYDROSTATIC PRESSURE.
3. H IS MEASURED IN FEET.
4. FIGURE SHOULD BE USED WITH GEOTECHNICAL REPORT.
5. FOR PRELIMINARY DESIGN.
6. SURCHARGES FROM CONSTRUCTION EQUIPMENT, EXCAVATED SOIL, CONSTRUCTION MATERIALS, TRAFFIC LOADING OR OTHER UNIFORM LOADING (q) ABOVE THE WALL SHOULD BE CALCULATED USING THE SURCHARGE LATERAL EARTH PRESSURE, P_S. POINT LOADS OR OTHER SURCHARGES CAN BE EVALUATED UPON REQUEST.

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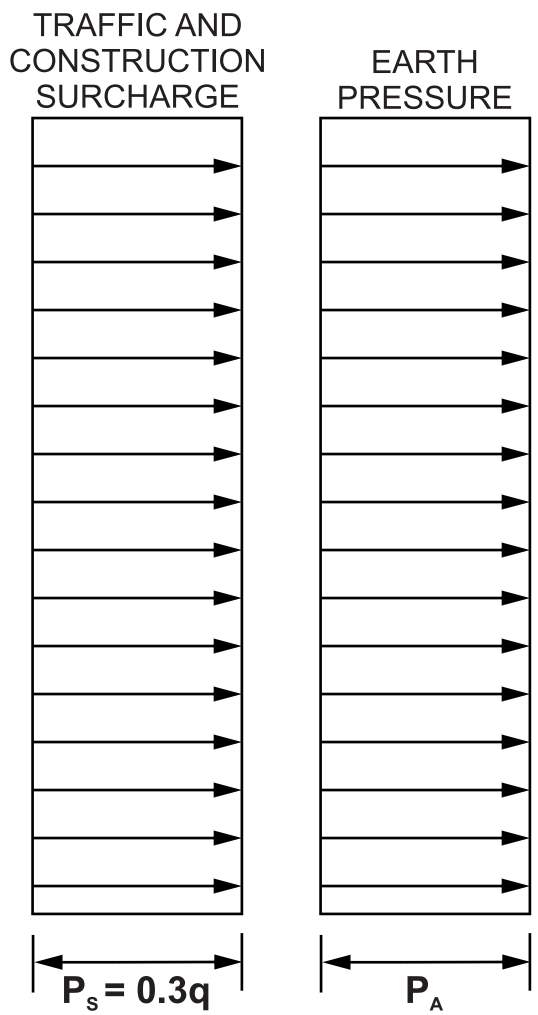
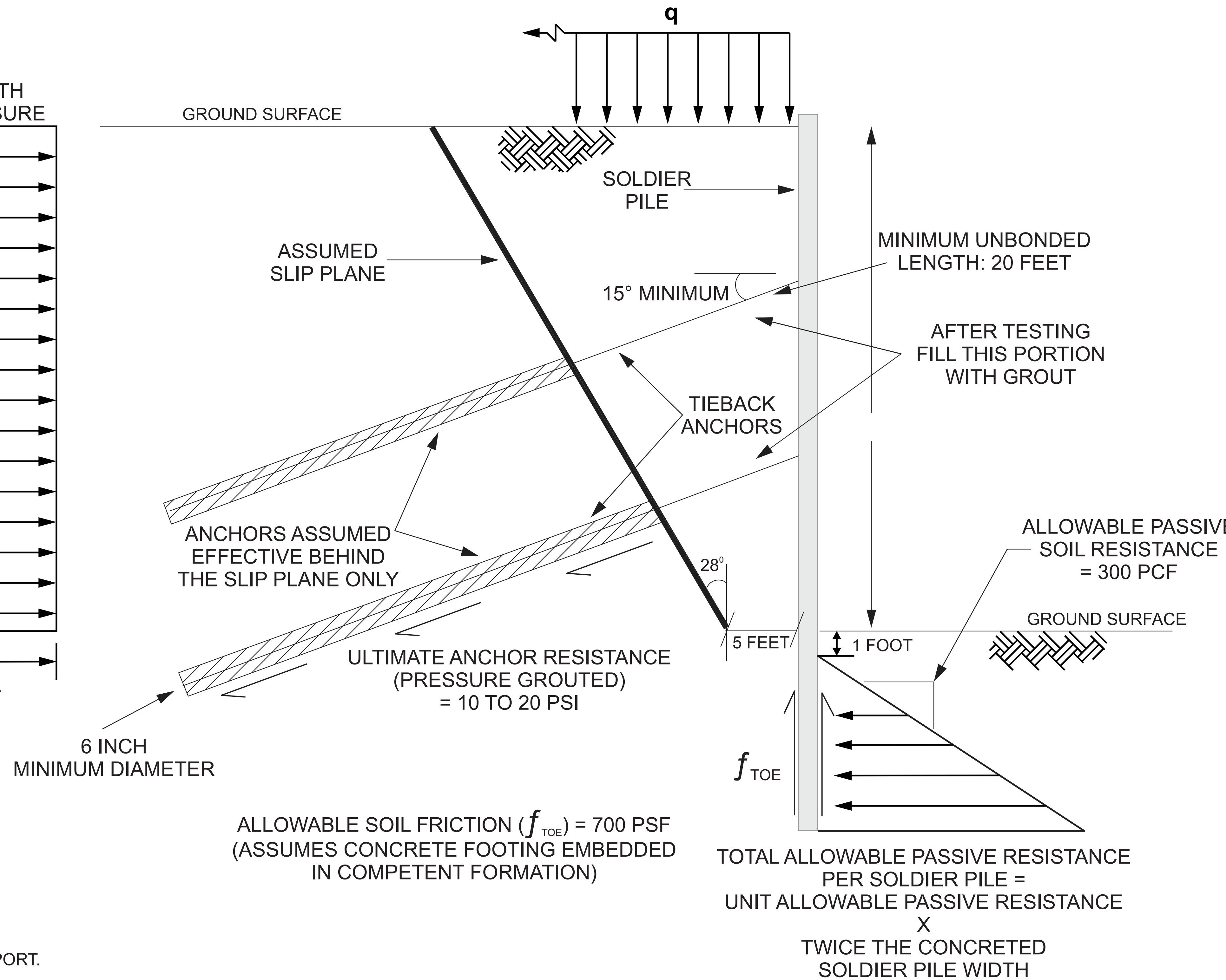
PROJECT NUMBER	SD736
DOCUMENT NUMBER	22-0061
PROJECT NAME	East Campus Loop Road Project University of California, San Diego
FIGURE NUMBER	7A

LATERAL EARTH PRESSURES
FOR CANTILEVER SHORING





NOTES:

1. ACTIVE LATERAL EARTH PRESSURE, PA
   -WITH LEVEL BACKFILL: $P_A = 22H$
   -WITH 2:1 SLOPING BACKFILL: $P_A = 36H$
2. ASSUMES NO HYDROSTATIC PRESSURE.
3. VALUES ASSUME SHORED MATERIAL IS FORMATIONAL AS DESCRIBED IN THE REPORT OF GEOTECHNICAL INVESTIGATION.
4. H IS MEASURED IN FEET.
5. FIGURE SHOULD BE USED WITH GEOTECHNICAL REPORT.
6. FOR PRELIMINARY DESIGN.
7. SURCHARGES FROM CONSTRUCTION EQUIPMENT, EXCAVATED SOIL, CONSTRUCTION MATERIALS, TRAFFIC LOADING OR OTHER UNIFORM LOADING (q) ABOVE THE WALL SHOULD BE CALCULATED USING THE SURCHARGE LATERAL EARTH PRESSURE, P_S. POINT LOADS OR OTHER SURCHARGES CAN BE EVALUATED UPON REQUEST.

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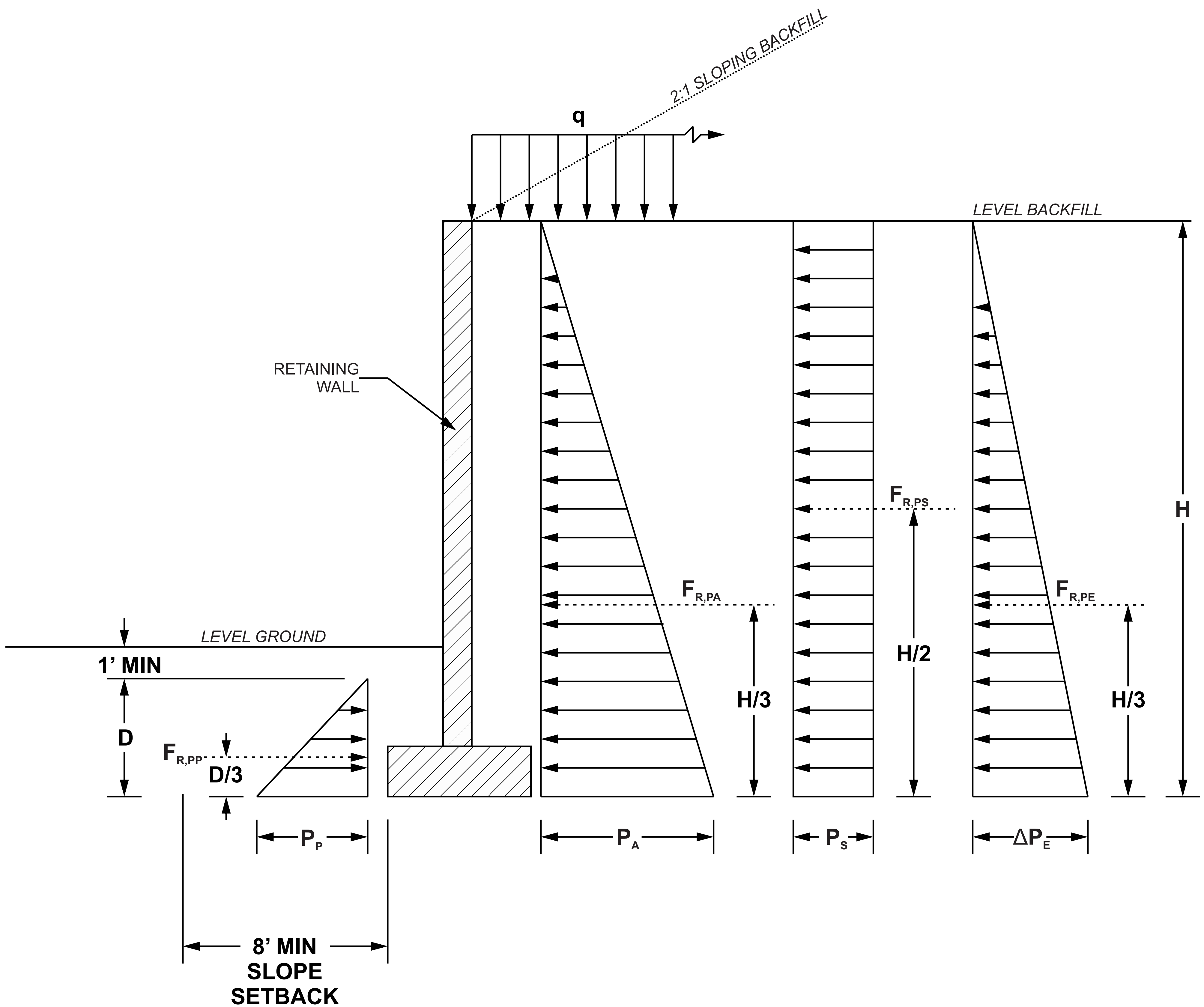
PROJECT NAME
East Campus Loop Road Project
University of California, San Diego

PROJECT NUMBER
SD736

DOCUMENT NUMBER
22-0061

FIGURE NUMBER
7B

LATERAL EARTH PRESSURES
FOR BRACED OR ANCHORED SHORING



NOTES:

1. PASSIVE PRESSURES MAY BE INCREASED BY ⅓ DURING SEISMIC LOADING. THE UPPER 12 INCHES OF MATERIAL NOT PROTECTED BY CONCRETE SLABS OR PAVEMENTS SHOULD NOT BE INCLUDED IN THE ESTIMATION OF PASSIVE RESISTANCE.

2. ASSUMES NO HYDROSTATIC PRESSURE. A WALL BACK DRAIN SHOULD BE INSTALLED AS RECOMMENDED IN THE *WALL DRAINAGE DETAIL* FIGURE.

3. SURCHARGES FROM CONSTRUCTION EQUIPMENT, EXCAVATED SOIL, TRAFFIC LOADING OR OTHER UNIFORM LOADING ABOVE THE WALL SHOULD BE CALCULATED USING THE SURCHARGE LATERAL EARTH PRESSURE, P_S. POINT LOADS OR OTHER SURCHARGES CAN BE EVALUATED UPON REQUEST.

4. SEISMIC INCREMENT LATERAL EARTH PRESSURE (ΔP_E) IS BASED ON A DESIGN-LEVEL PEAK GROUND ACCELERATION OF 0.435g. SEISMIC INCREMENT SHOULD BE APPLIED TO WALLS SIX FEET OR GREATER IN HEIGHT.

5. 'H' AND 'D' ARE MEASURED IN FEET.

6. PRESSURES ASSUME GRANULAR AND NON-EXPANSIVE SOIL MATERIALS COMPACTED AS RECOMMENDED IN THE GEOTECHNICAL REPORT.

LATERAL EARTH PRESSURES

LATERAL EARTH PRESSURE TYPE	EQUIVALENT FLUID PRESSURE (PCF)	
ACTIVE, P_A	LEVEL BACKFILL	2:1 SLOPING BACKFILL
COMPACTED FILL OR FORMATION	35	55
SEISMIC INCREMENT, ΔP_E*	26	
PASSIVE, P_P**	300	
SURCHARGE, P_S	0.3q	

*SEISMIC PRESSURE, $P_{AE} = P_A + \Delta P_E$
**PASSIVE RESISTANCE VERSUS DISPLACEMENT CURVES CAN BE PROVIDED UPON REQUEST.

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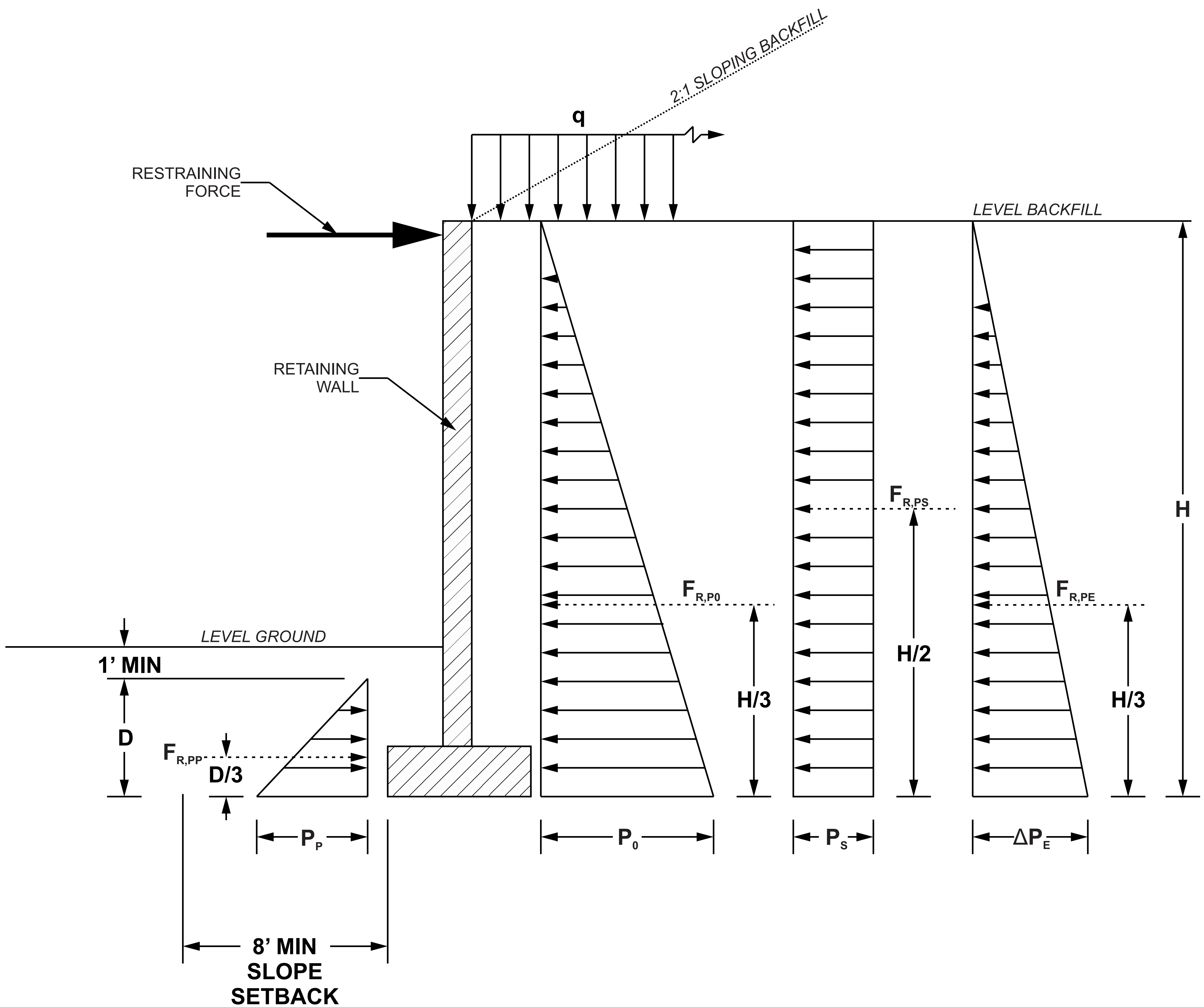
		DOCUMENT NUMBER 22-0061
	PROJECT NAME East Campus Loop Road Project University of California, San Diego	FIGURE NUMBER 7C
	LATERAL EARTH PRESSURES **FOR YIELDING RETAINING WALLS**	



NOTES:

1. PASSIVE PRESSURES MAY BE INCREASED BY ⅓ DURING SEISMIC LOADING. THE UPPER 12 INCHES OF MATERIAL NOT PROTECTED BY CONCRETE SLABS OR PAVEMENTS SHOULD NOT BE INCLUDED IN THE ESTIMATION OF PASSIVE RESISTANCE.

2. ASSUMES NO HYDROSTATIC PRESSURE. A WALL BACK DRAIN SHOULD BE INSTALLED AS RECOMMENDED IN THE *WALL DRAINAGE DETAIL* FIGURE.

3. SURCHARGES FROM CONSTRUCTION EQUIPMENT, EXCAVATED SOIL, TRAFFIC LOADING OR OTHER UNIFORM LOADING ABOVE THE WALL SHOULD BE CALCULATED USING THE SURCHARGE LATERAL EARTH PRESSURE, P_S. POINT LOADS OR OTHER SURCHARGES CAN BE EVALUATED UPON REQUEST.

4. SEISMIC INCREMENT LATERAL EARTH PRESSURE (ΔP_E) IS BASED ON A DESIGN-LEVEL PEAK GROUND ACCELERATION OF 0.435g. SEISMIC INCREMENT SHOULD BE APPLIED TO WALLS SIX FEET OR GREATER IN HEIGHT.

5. 'H' AND 'D' ARE MEASURED IN FEET.

6. PRESSURES ASSUME GRANULAR AND NON-EXPANSIVE SOIL MATERIALS COMPACTED AS RECOMMENDED IN THE GEOTECHNICAL REPORT.

LATERAL EARTH PRESSURES

LATERAL EARTH PRESSURE TYPE	EQUIVALENT FLUID PRESSURE (PCF)	
AT-REST, P_0	LEVEL BACKFILL	2:1 SLOPING BACKFILL
COMPACTED FILL OR FORMATION	60	80
SEISMIC INCREMENT, ΔP_E*	(SEE FIGURE 7C)	
PASSIVE, P_P**	300	
SURCHARGE, P_S	0.5q	

*SEISMIC PRESSURE, $P_{AE} = P_A + \Delta P_E$ (SEE FIGURE 7C)
**PASSIVE RESISTANCE VERSUS DISPLACEMENT CURVES CAN BE PROVIDED UPON REQUEST.

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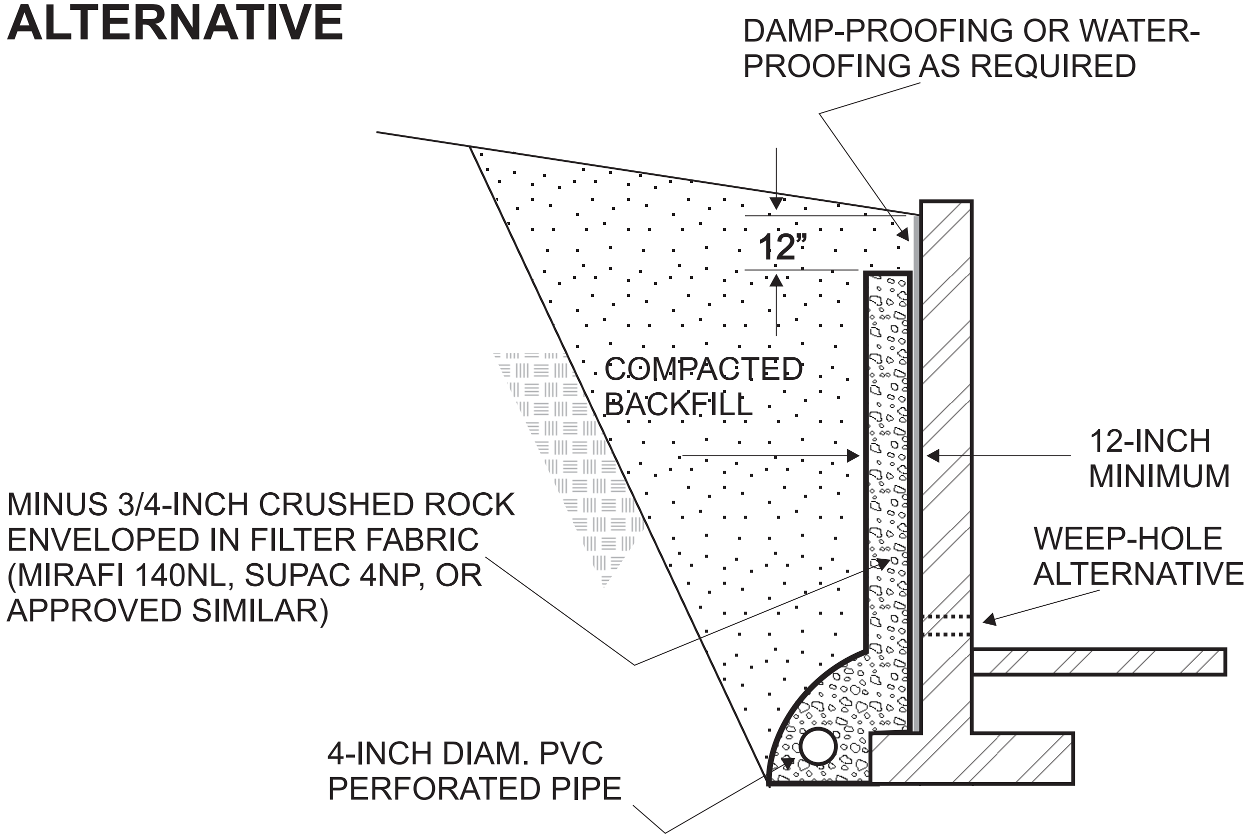
PROJECT NAME
East Campus Loop Road Project
University of California, San Diego

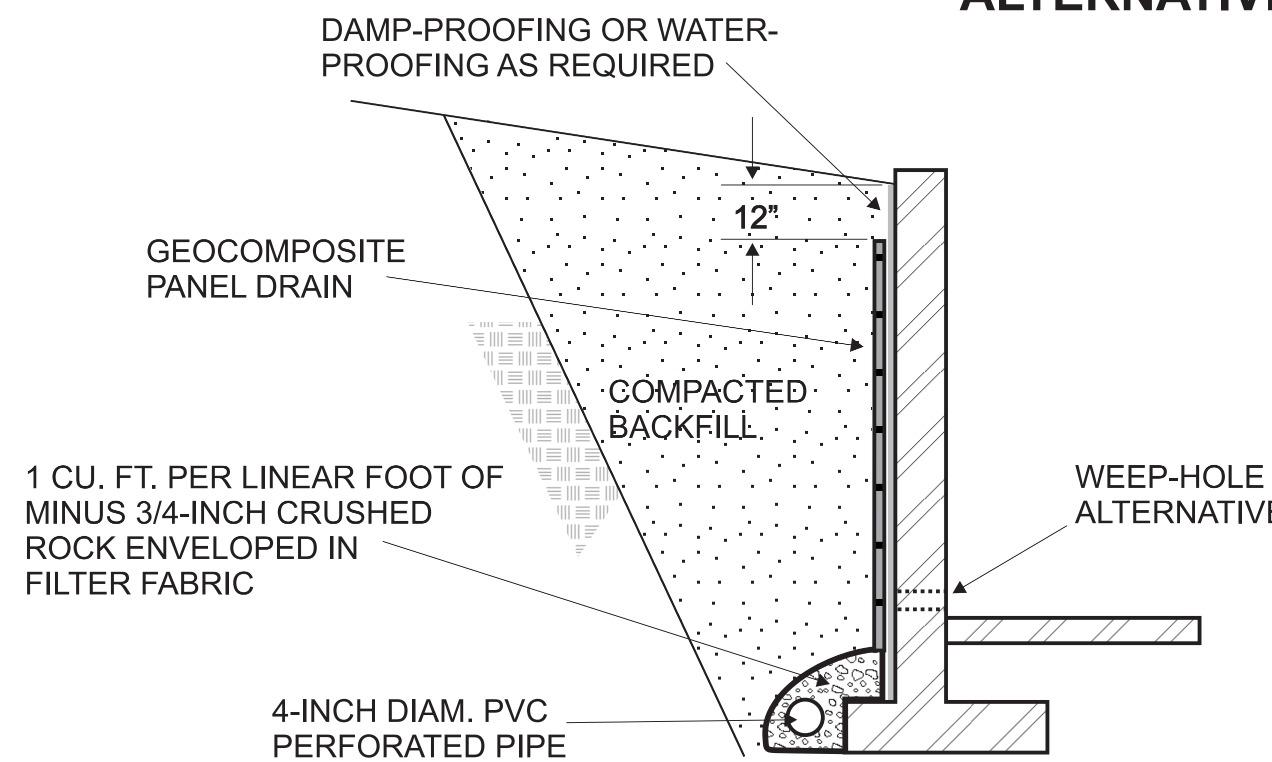
PROJECT NUMBER
SD736
DOCUMENT NUMBER
22-0061
FIGURE NUMBER
7D

LATERAL EARTH PRESSURES
FOR BRACED RETAINING WALLS

ROCK AND FABRIC ALTERNATIVE



PANEL DRAIN ALTERNATIVE



NOTES

1) Perforated pipe should outlet through a solid pipe to a free gravity outfall. Perforated pipe and outlet pipe should have a fall of at least 1%.

2) As an alternative to the perforated pipe and outlet, weep-holes may be constructed. Weep-holes should be at least 2 inches in diameter, spaced no greater than 8 feet, and be located just above grade at the bottom of wall.

3) Filter fabric should consist of Mirafi 140N, Supac 5NP, Amoco 4599, or similar approved fabric. Filter fabric should be overlapped at least 6-inches.

4) Geocomposite panel drain should consist of Miradrain 6000, J-DRain 400, Supac DS-15, or approved similar product.

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PROJECT NAME East Campus Loop Road Project University of California, San Diego	PROJECT NUMBER SD736
	DOCUMENT NUMBER 22-0061
	FIGURE NUMBER 7E

WALL DRAINAGE DETAILS

APPENDIX A
FIELD EXPLORATION

APPENDIX A

FIELD EXPLORATION

The subsurface explorations included in the following appendix were part of several previous geotechnical investigations including the Nuevo West Parking Garage, the Athena Way, Athena Circle and Medical Center Drive road realignment projects, the Mesa Housing Pedestrian Bridge, and the ESIL or Power Islanding project (GDC, 2016ab, 2017bc, 2020ab, 2022b). These borings were completed between April of 2016 and June of 2022. The maximum depth of exploration was about 100½ feet below grade. The approximate locations of the borings are shown in Figure 3A. The boring logs are reproduced in Figures A-1 to A-18, immediately after the Boring Record Legends.

The 18 borings included in this appendix were advanced by Pacific and Tri-County Drilling using various drill rigs. Disturbed soil samples were collected from the borings using a 2-inch outside diameter Standard Penetration Test (SPT) sampler. Less disturbed samples were collected using a 3-inch outside diameter ring lined sampler (a modified California sampler). Automatic hammers with a Energy Transfer Ratios (ETR) ranging from about 83 to 92 percent were used to collect some of the drive samples, while a standard Cat-Head was used for others (ETR~60%). The drive samples were sealed in plastic bags, labeled, and returned to the laboratory for testing. For each sample, the number of blows needed to drive the sampler 12 inches was recorded on the logs. The field blow counts (N) were normalized to approximate a standard 60 percent ETR, as shown on the logs (N_{60}). Bulk samples were also collected from the borings at selected intervals, as shown on the logs. A summary of the borings included in this appendix is provided in the table below.

Exploration ID	Date Drilled	Project Description	Ground Surface Elevation [FT]	Exploration Depth [FT]	Figure No.
A-16-01	04/20/16	Nuevo West Parking Garage	334	20½	A-1
A-16-02	04/20/16	Nuevo West Parking Garage	329	6½	A-2
A-16-03	04/20/16	Nuevo West Parking Garage	327	20½	A-3
A-16-04	04/20/16	Nuevo West Parking Garage	336	6	A-4
A-16-05	04/20/16	Nuevo West Parking Garage	332	6	A-5
A-16-06	04/20/16	Nuevo West Parking Garage	331	20½	A-6
A-16-07	04/20/16	Nuevo West Parking Garage	329	6½	A-7
A-16-08	06/07/16	Athena Way Development	336½	4½	A-8
A-16-09	06/07/16	Athena Way Development	338½	4½	A-9
A-16-10	06/07/16	Athena Way Development	337	4	A-10
A-16-11	06/07/16	Athena Way Development	340½	5	A-11
A-16-12	12/08/16	Mesa Housing Pedestrian Bridge	305	100½	A-12
A-17-01	03/17/17	Athena Circle Development	334½	21½	A-13
A-17-02	03/17/17	Athena Circle Development	335	16	A-14
A-20-01	06/16/20	ESIL Development	362	6	A-15
A-20-02	06/16/20	ESIL Development	359	3	A-16
A-22-01	06/07/22	Power Islanding Development	359	21	A-17
A-22-02	06/07/22	Power Islanding Development	360	16½	A-18

SOIL IDENTIFICATION AND DESCRIPTION SEQUENCE

Sequence	Identification Components	Refer to Section: Field	Refer to Section: Lab	Required	Optional
1	Group Name	2.5.2	3.2.2	●	
2	Group Symbol	2.5.2	3.2.2	●	
	Description Components				
3	Consistency of Cohesive Soil	2.5.3	3.2.3	●	
4	Apparent Density of Cohesionless Soil	2.5.4		●	
5	Color	2.5.5		●	
6	Moisture	2.5.6		●	
7	Percent or Proportion of Soil	2.5.7	3.2.4	●	◉
	Particle Size	2.5.8	2.5.8	●	◉
	Particle Angularity	2.5.9			○
	Particle Shape	2.5.10			○
8	Plasticity (for fine-grained soil)	2.5.11	3.2.5		○
9	Dry Strength (for fine-grained soil)	2.5.12			○
10	Dilatency (for fine-grained soil)	2.5.13			○
11	Toughness (for fine-grained soil)	2.5.14			○
12	Structure	2.5.15			○
13	Cementation	2.5.16		●	
14	Percent of Cobbles and Boulders	2.5.17		●	
	Description of Cobbles and Boulders	2.5.18		●	
15	Consistency Field Test Result	2.5.3		●	
16	Additional Comments	2.5.19			○

Describe the soil using descriptive terms in the order shown

Minimum Required Sequence:

USCS Group Name (Group Symbol); Consistency or Density; Color; Moisture; Percent or Proportion of Soil; Particle Size; Plasticity (optional).

◉ = optional for non-Caltrans projects

Where applicable:

Cementation; % cobbles & boulders; Description of cobbles & boulders; Consistency field test result

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010).

HOLE IDENTIFICATION

Holes are identified using the following convention:

H – YY – NNN

Where:

H: Hole Type Code

YY: 2-digit year

NNN: 3-digit number (001-999)

Hole Type Code and Description

Hole Type Code	Description
A	Auger boring (hollow or solid stem, bucket)
R	Rotary drilled boring (conventional)
RC	Rotary core (self-cased wire-line, continuously-sampled)
RW	Rotary core (self-cased wire-line, not continuously sampled)
P	Rotary percussion boring (Air)
HD	Hand driven (1-inch soil tube)
HA	Hand auger
D	Driven (dynamic cone penetrometer)
CPT	Cone Penetration Test
O	Other (note on LOTB)

Description Sequence Examples:

SANDY lean CLAY (CL); very stiff; yellowish brown; moist; mostly fines; some SAND, from fine to medium; few gravels; medium plasticity; PP=2.75.

Well-graded SAND with SILT and GRAVEL and COBBLES (SW-SM); dense; brown; moist; mostly SAND, from fine to coarse; some fine GRAVEL; few fines; weak cementation; 10% GRANITE COBBLES; 3 to 6 inches; hard; subrounded.

Clayey SAND (SC); medium dense, light brown; wet; mostly fine sand,; little fines; low plasticity.

GROUP DELTA

Project No. SD736

East Campus Loop Road Project
University of California, San Diego

BORING RECORD LEGEND #1

GROUP SYMBOLS AND NAMES

Graphic / Symbol	Group Names
GW	Well-graded GRAVEL Well-graded GRAVEL with SAND
GP	Poorly graded GRAVEL Poorly graded GRAVEL with SAND
GW-GM	Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND
GW-GC	Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GP-GM	Poorly graded GRAVEL with SILT Poorly graded GRAVEL with SILT and SAND
GP-GC	Poorly graded GRAVEL with CLAY (or SILTY CLAY) Poorly graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GM	SILTY GRAVEL SILTY GRAVEL with SAND
GC	CLAYEY GRAVEL CLAYEY GRAVEL with SAND
GC-GM	SILTY, CLAYEY GRAVEL SILTY, CLAYEY GRAVEL with SAND
SW	Well-graded SAND Well-graded SAND with GRAVEL
SP	Poorly graded SAND Poorly graded SAND with GRAVEL
SW-SM	Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL
SW-SC	Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SP-SM	Poorly graded SAND with SILT Poorly graded SAND with SILT and GRAVEL
SP-SC	Poorly graded SAND with CLAY (or SILTY CLAY) Poorly graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SM	SILTY SAND SILTY SAND with GRAVEL
SC	CLAYEY SAND CLAYEY SAND with GRAVEL
SC-SM	SILTY, CLAYEY SAND SILTY, CLAYEY SAND with GRAVEL
PT	PEAT
	COBBLES COBBLES and BOULDERS BOULDERS

Graphic / Symbol	Group Names
CL	Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
CL-ML	SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
ML	SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
OL	ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
OL	ORGANIC SILT ORGANIC SILT with SAND ORGANIC SILT with GRAVEL SANDY ORGANIC SILT SANDY ORGANIC SILT with GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT with SAND
CH	Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY SANDY fat CLAY with GRAVEL GRAVELLY fat CLAY GRAVELLY fat CLAY with SAND
MH	Elastic SILT Elastic SILT with SAND Elastic SILT with GRAVEL SANDY elastic SILT SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT GRAVELLY elastic SILT with SAND
OH	ORGANIC fat CLAY ORGANIC fat CLAY with SAND ORGANIC fat CLAY with GRAVEL SANDY ORGANIC fat CLAY SANDY ORGANIC fat CLAY with GRAVEL GRAVELLY ORGANIC fat CLAY GRAVELLY ORGANIC fat CLAY with SAND
OH	ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY elastic ELASTIC SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
OL/OH	ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND

FIELD AND LABORATORY TESTING

C	Consolidation (ASTM D 2435)
CL	Collapse Potential (ASTM D 5333)
CP	Compaction Curve (CTM 216)
CR	Corrosion, Sulfates, Chlorides (CTM 643; CTM 417; CTM 422)
CU	Consolidated Undrained Triaxial (ASTM D 4767)
DS	Direct Shear (ASTM D 3080)
EI	Expansion Index (ASTM D 4829)
M	Moisture Content (ASTM D 2216)
OC	Organic Content (ASTM D 2974)
P	Permeability (CTM 220)
PA	Particle Size Analysis (ASTM D 422)
PI	Liquid Limit, Plastic Limit, Plasticity Index (AASHTO T 89, AASHTO T 90)
PL	Point Load Index (ASTM D 5731)
PM	Pressure Meter
R	R-Value (CTM 301)
SE	Sand Equivalent (CTM 217)
SG	Specific Gravity (AASHTO T 100)
SL	Shrinkage Limit (ASTM D 427)
SW	Swell Potential (ASTM D 4546)
UC	Unconfined Compression - Soil (ASTM D 2166) Unconfined Compression - Rock (ASTM D 2938)
UU	Unconsolidated Undrained Triaxial (ASTM D 2850)
UW	Unit Weight (ASTM D 4767)

SAMPLER GRAPHIC SYMBOLS

- Standard Penetration Test (SPT)
- Standard California Sampler
- Modified California Sampler (2.4" ID, 3" OD)
- Shelby Tube
- Piston Sampler
- NX Rock Core
- HQ Rock Core
- Bulk Sample
- Other (see remarks)

DRILLING METHOD SYMBOLS

- Auger Drilling
- Rotary Drilling
- Dynamic Cone or Hand Driven
- Diamond Core

WATER LEVEL SYMBOLS

- ▽ First Water Level Reading (during drilling)
- ▼ Static Water Level Reading (after drilling, date)

Definitions for Change in Material

Term	Definition	Symbol
Material Change	Change in material is observed in the sample or core and the location of change can be accurately located.	
Estimated Material Change	Change in material cannot be accurately located either because the change is gradational or because of limitations of the drilling and sampling methods.	
Soil / Rock Boundary	Material changes from soil characteristics to rock characteristics.	

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010).

GROUP DELTA

Project No. SD736

East Campus Loop Road Project
University of California, San Diego

BORING RECORD LEGEND #2

CONSISTENCY OF COHESIVE SOILS				
Description	Shear Strength (tsf)	Pocket Penetrometer, PP, Measurement (tsf)	Torvane, TV, Measurement (tsf)	Vane Shear, VS, Measurement (tsf)
Very Soft	Less than 0.12	Less than 0.25	Less than 0.12	Less than 0.12
Soft	0.12 - 0.25	0.25 - 0.5	0.12 - 0.25	0.12 - 0.25
Medium Stiff	0.25 - 0.5	0.5 - 1	0.25 - 0.5	0.25 - 0.5
Stiff	0.5 - 1	1 - 2	0.5 - 1	0.5 - 1
Very Stiff	1 - 2	2 - 4	1 - 2	1 - 2
Hard	Greater than 2	Greater than 4	Greater than 2	Greater than 2

APPARENT DENSITY OF COHESIONLESS SOILS	
Description	SPT N_{60} (blows / 12 inches)
Very Loose	0 - 5
Loose	5 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Greater than 50

MOISTURE	
Description	Criteria
Dry	No discernable moisture
Moist	Moisture present, but no free water
Wet	Visible free water

PERCENT OR PROPORTION OF SOILS	
Description	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5 - 10%
Little	15 - 25%
Some	30 - 45%
Mostly	50 - 100%

PARTICLE SIZE		
Description		Size (in)
Boulder		Greater than 12
Cobble		3 - 12
Gravel	Coarse	3/4 - 3
	Fine	1/5 - 3/4
Sand	Coarse	1/16 - 1/5
	Medium	1/64 - 1/16
	Fine	1/300 - 1/64
Silt and Clay		Less than 1/300

CEMENTATION	
Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010), with the exception of consistency of cohesive soils vs. N_{60}.

Plasticity

Description	Criteria
Nonplastic	A 1/8-in. thread cannot be rolled at any water content.
Low	The thread can barely be rolled and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

CONSISTENCY OF COHESIVE SOILS	
Description	SPT N_{60} (blows/12 inches)
Very Soft	0 - 2
Soft	2 - 4
Medium Stiff	4 - 8
Stiff	8 - 15
Very Stiff	15 - 30
Hard	Greater than 30

Ref: Peck, Hansen, and Thornburn, 1974, "Foundation Engineering," Second Edition.

Note: Only to be used (with caution) when pocket penetrometer or other data on undrained shear strength are unavailable. Not allowed by Caltrans Soil and Rock Logging and Classification Manual, 2010.

GROUP DELTA

Project No. SD736

East Campus Loop Road Project
University of California, San Diego

BORING RECORD LEGEND #3

BORING RECORD

PROJECT NAME	PROJECT NUMBER	BORING
East Campus Loop Road Realignment	SD736	A-16-01

SITE LOCATION	START	FINISH	SHEET NO.
Nuevo West Parking Garage on Athena Circle	4/20/2016	4/20/2016	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Pacific Drilling	Flight Auger	TSL	MAF

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Limited Access (Mini-Mole)	6	20.5	334	▼ N/A / *na*

SAMPLING METHOD	NOTES
Hammer: 140 lbs., Drop: 30 in. (Cat-Head)	ETR ~ 60%, N_{60} ~ 60/60 * N ~ 1.00 * N

DEPTH (feet)	ELEVATION (feet)	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DESCRIPTION AND CLASSIFICATION
0	334								**PAVEMENT:** 3-inches asphalt concrete over 5-inches aggregate base.
		B-1						PA CR EI	**FILL:** CLAYEY SAND (SC); medium dense; mottled orange brown, light gray and olive gray; moist; mostly fine to medium SAND; some fines; trace to few GRAVEL; low plasticity.
		R-2	9 17 23	40	27	10.1	112	EPA	
	330								(3% Gravel; 65% Sand; 32% Fines)
5		S-3	33 50 (6")	100	100	---	---	EPA	Contains layer of gravel and cobble.
	325								
10		R-4	4 8 12	20	13	13.7	112	EPA	Contains crushed asphalt concrete.
	320								**SCRIPPS FORMATION:** SILTY SANDSTONE (SM); very dense; yellowish and grayish brown; moist; mostly fine SAND; little fines; few GRAVEL; nonplastic.
15		S-5	30 50 (4")	150	150	---	---		
	315								SANDY SILTSTONE (ML); very dense; light brown; moist; mostly fines; some fine SAND; low plasticity.
20		R-6	50 (4")	150	100	18.5	105		
									Total Depth: 20½ feet No groundwater encountered
	310								

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FIGURE A-1

BORING RECORD

PROJECT NAME East Campus Loop Road Realignment	**PROJECT NUMBER** SD736	**BORING** A-16-02	
SITE LOCATION Nuevo West Parking Garage on Athena Circle	**START** 4/20/2016	**FINISH** 4/20/2016	**SHEET NO.** 1 of 1
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Flight Auger	**LOGGED BY** TSL	**CHECKED BY** MAF
DRILLING EQUIPMENT Limited Access (Mini-Mole)	**BORING DIA. (in)** 6	**TOTAL DEPTH (ft)** 6.5	**GROUND ELEV (ft)** 329
DEPTH/*ELEV.* GROUND WATER (ft) N/A / *na*			
SAMPLING METHOD Hammer: 140 lbs., Drop: 30 in. (Cat-Head)	**NOTES** ETR ~ 60%, N_{60} ~ 60/60 * N ~ 1.00 * N		

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
0	329											**PAVEMENT:** 3-inches asphalt concrete over 5-inches aggregate base.
												FILL: CLAYEY SAND (SC); loose to medium dense; reddish brown; moist; mostly fine to medium SAND; little fines; few GRAVEL; low plasticity.
			R-1	3 5 6	11	7	---	---	EPA			
	325											
5			S-2	7 7 8	15	15	---	---	EPA	5		
												Total Depth: 6½ feet No groundwater encountered
	320											
10										10		
	315											
15										15		
	310											
20										20		
	305											

BORING RECORD

PROJECT NAME	East Campus Loop Road Realignment
PROJECT NUMBER	SD736
BORING	A-16-03
SITE LOCATION	Nuevo West Parking Garage on Athena Circle
START	4/20/2016
FINISH	4/20/2016
SHEET NO.	1 of 1
DRILLING COMPANY	Pacific Drilling
DRILLING METHOD	Flight Auger
LOGGED BY	TSL
CHECKED BY	MAF
DRILLING EQUIPMENT	Limited Access (Mini-Mole)
BORING DIA. (in)	6
TOTAL DEPTH (ft)	20.5
GROUND ELEV (ft)	327
DEPTH/*ELEV.* GROUND WATER (ft)	⊻ N/A / *na*
SAMPLING METHOD	Hammer: 140 lbs., Drop: 30 in. (Cat-Head)
NOTES	ETR ~ 60%, N_{60} ~ 60/60 * N ~ 1.00 * N

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			B-1						R~31			**<u>FILL:</u>** SILTY SAND (SM); medium dense; light gray brown; moist; mostly fine SAND; some fines; nonplastic.
	325		S-2	6 10 13	23	23	---	---	EPA			
5			R-3	50 (4")	150	100	---	---	EPA	5		CLAYEY SAND WITH GRAVEL (SC); medium dense; dark gray; moist; mostly fine to medium SAND; some fines; few to little subangular GRAVEL; low plasticity.
	320											CLAYEY SAND (SC); medium dense; light brown; moist; mostly fine to medium SAND; some fines; low plasticity.
10			S-4	7 9 11	20	13	---	---	EPA	10		
	315											
15			R-5	50 (6")	100	67	---	---	EPA	15		Sampler bouncing on cobble, no soil recovered.
	310											**<u>SCRIPPS FORMATION</u>:** SILTY SANDSTONE (SM); very dense; light gray; moist; mostly fine to medium SAND; litte fines; nonplastic.
20			S-6	50 (6")	100	100	---	---		20		
	305											Total Depth: 20½ feet No groundwater encountered

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FIGURE

A-3

BORING RECORD

PROJECT NAME East Campus Loop Road Realignment		**PROJECT NUMBER** SD736		**BORING** A-16-04
SITE LOCATION Nuevo West Parking Garage on Athena Circle		**START** 4/20/2016	**FINISH** 4/20/2016	**SHEET NO.** 1 of 1
DRILLING COMPANY Pacific Drilling	**DRILLING METHOD** Flight Auger		**LOGGED BY** TSL	**CHECKED BY** MAF
DRILLING EQUIPMENT Limited Access (Mini-Mole)	**BORING DIA. (in)** 6	**TOTAL DEPTH (ft)** 6	**GROUND ELEV (ft)** 336	**DEPTH/*ELEV.* GROUND WATER (ft)** ⊻ N/A / *na*
SAMPLING METHOD Hammer: 140 lbs., Drop: 30 in. (Cat-Head)	**NOTES** ETR ~ 60%, N_{60} ~ 60/60 * N ~ 1.00 * N			

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
0	335											**PAVEMENT:** 3-inches asphalt concrete over 5-inches aggregate base.
												SCRIPPS FORMATION: SILTY SANDSTONE (SM); very dense; light orangish brown; moist; mostly fine to medium SAND; little fines; nonplastic.
			R-1	50 (6")	100	67	---	---	EPA			
5	330									5		SANDY SILTSTONE (ML); very dense; light gray; moist; mostly fines; some fine SAND; few GRAVEL; low plasticity.
			S-2	20 50 (6")	100	100	---	---	EPA			
												Total Depth: 6 feet No groundwater encountered
10	325									10		
15	320									15		
20	315									20		

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BORING RECORD

PROJECT NAME	East Campus Loop Road Realignment
PROJECT NUMBER	SD736
BORING	A-16-05
SITE LOCATION	Nuevo West Parking Garage on Athena Circle
START	4/20/2016
FINISH	4/20/2016
SHEET NO.	1 of 1
DRILLING COMPANY	Pacific Drilling
DRILLING METHOD	Flight Auger
LOGGED BY	TSL
CHECKED BY	MAF
DRILLING EQUIPMENT	Limited Access (Mini-Mole)
BORING DIA. (in)	6
TOTAL DEPTH (ft)	6
GROUND ELEV (ft)	332
DEPTH/*ELEV.* GROUND WATER (ft)	⯆ N/A / *na*
SAMPLING METHOD	Hammer: 140 lbs., Drop: 30 in. (Cat-Head)
NOTES	ETR ~ 60%, N_{60} ~ 60/60 * N ~ 1.00 * N

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
												PAVEMENT: 3-inches asphalt concrete over 5-inches aggregate base.
	330		B-1									**SCRIPPS FORMATION:** SILTY SANDSTONE (SM); very dense; light gray and orangish brown; moist; mostly fine to medium SAND; little fines; nonplastic.
			S-2	50 (6")	100	100	---	---	EPA			
5			R-3	50 (1")	600	400	---	---	EPA	5		Cobble stuck in sampler.
	325											Total Depth: 6 feet No groundwater encountered
10										10		
	320											
15										15		
	315											
20										20		
	310											

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FIGURE A-5

GDC_LOG_BORING_MMX_SOIL_SD SD476 LOGS.GPJ GDCLOG.GDT 5/31/22

BORING RECORD

PROJECT NAME	PROJECT NUMBER	BORING
East Campus Loop Road Realignment	SD736	**A-16-06**

SITE LOCATION	START	FINISH	SHEET NO.
Nuevo West Parking Garage on Athena Circle	4/20/2016	4/20/2016	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Pacific Drilling	Flight Auger	TSL	MAF

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Limited Access (Mini-Mole)	6	20.5	331	▼ N/A / *na*

SAMPLING METHOD	NOTES
Hammer: 140 lbs., Drop: 30 in. (Cat-Head)	ETR ~ 60%, N_{60} ~ 60/60 * N ~ 1.00 * N

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
	330											**PAVEMENT:** 3-inches asphalt concrete over 5-inches aggregate base.
			R-1	50 (6")	100	67	7.1	97	EPA			**SCRIPPS FORMATION:** SILTY SANDSTONE (SM); very dense; light yellow to reddish brown; moist; mostly fine to medium SAND; little fines; nonplastic.
5	325		S-2	33 50	100	100	---	---	EPA	5		
10	320		R-3	50 (6")	100	67	8.6	100		10		
15	315		S-4	50 (5")	120	120	---	---		15		SILTSTONE (ML); very dense; light gray; moist; mostly fines; few fine SAND; low plasticity; moderately to strongly indurated.
20	310		R-5	50 (4")	150	100	15.4	105		20		
												Total Depth: 20½ feet No groundwater encountered

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FIGURE A-6

GDC_LOG_BORING_MMX_SOIL_SD SD476 LOGS.GPJ GDCLOG.GDT 5/31/22

BORING RECORD

PROJECT NAME	East Campus Loop Road Realignment
PROJECT NUMBER	SD736
BORING	**A-16-07**
SITE LOCATION	Nuevo West Parking Garage on Athena Circle
START	4/20/2016
FINISH	4/20/2016
SHEET NO.	1 of 1
DRILLING COMPANY	Pacific Drilling
DRILLING METHOD	Flight Auger
LOGGED BY	TSL
CHECKED BY	MAF
DRILLING EQUIPMENT	Limited Access (Mini-Mole)
BORING DIA. (in)	6
TOTAL DEPTH (ft)	6.5
GROUND ELEV (ft)	329
DEPTH/*ELEV.* GROUND WATER (ft)	▼ N/A / *na*
SAMPLING METHOD	Hammer: 140 lbs., Drop: 30 in. (Cat-Head)
NOTES	ETR ~ 60%, N_{60} ~ 60/60 * N ~ 1.00 * N

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
												FILL: CLAYEY SAND (SC); medium dense; light orange brown; moist; mostly fine SAND; some fines; low plasticity.
			R-1	50 (5")	120	80	---	---	EPA			**SCRIPPS FORMATION:** SILTSTONE (ML); very dense; gray; moist; mostly fines; trace fine sand; low plasticity; moderately to strongly indurated.
	325											
5			S-2	21 23 60	83	83	---	---	EPA	5		SILTY SANDSTONE (SM); very dense; light gray and orange brown; moist; mostly fine sand; some fines; low plasticity.
												Total Depth: 6½ feet No groundwater encountered
	320											
10										10		
	315											
15										15		
	310											
20										20		
	305											

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE A-7

GDC_LOG_BORING_MMX_SOIL_SD SD476 LOGS.GPJ GDCLOG.GDT 5/31/22

BORING RECORD

PROJECT NAME	PROJECT NUMBER	BORING
East Campus Loop Road Realignment	SD736	**A-16-08**

SITE LOCATION	START	FINISH	SHEET NO.
Athena Way Development	6/7/2016	6/7/2016	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Tri-County	Test Pit	TSL	MAF

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Backhoe	18	4.5	336.5	⊻ N/A / *na*

SAMPLING METHOD	NOTES
Shovel	Moisture and density determined using nuclear gauge.

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
												FILL: Cemented gravel and sand mixture.
							10.5	116				SILTY SAND (SM); dense; moderately brown; moist; mostly fine to medium SAND; little fines; nonplastic.
	335		B-1						PA CR EI			CLAYEY SAND (SC); medium dense to dense; reddish brown; moist; mostly fine to medium SAND; little to some fines; low plasticity.
5										5		Total Depth: 4.5 feet No groundwater encountered
	330											

GDC_LOG_BORING_MMX_SOIL_SD SD487 LOGS.GPJ GDCLOG.GDT 5/31/22

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FIGURE A-8

BORING RECORD

PROJECT NAME East Campus Loop Road Realignment	**PROJECT NUMBER** SD736	**BORING** A-16-09	
SITE LOCATION Athena Way Development	**START** 6/7/2016	**FINISH** 6/7/2016	**SHEET NO.** 1 of 1
DRILLING COMPANY Tri-County	**DRILLING METHOD** Test Pit	**LOGGED BY** TSL	**CHECKED BY** MAF
DRILLING EQUIPMENT Backhoe	**BORING DIA. (in)** 18	**TOTAL DEPTH (ft)** 4.5	**GROUND ELEV (ft)** 338.5
DEPTH/*ELEV.* GROUND WATER (ft) ⯍ N/A / *na*			
SAMPLING METHOD Shovel	**NOTES** Moisture and density determined using nuclear gauge.		

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
												FILL: Cemented gravel and sand mixture.
							12.2	122				SILTY SAND (SM); dense; moderately brown; moist; mostly fine to medium SAND; little fines; nonplastic.
							11.8	104				SILTY SAND (SM); medium dense to dense; reddish brown; moist; mostly fine to medium SAND; little to some fines; low plasticity.
	335		B-1						PA R CP			
5										5		Total Depth: 4.5 feet No groundwater encountered
	330											

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE

A-9

BORING RECORD

PROJECT NAME: East Campus Loop Road Realignment	PROJECT NUMBER: SD736	BORING: **A-16-10**	
SITE LOCATION: Athena Way Development	START: 6/7/2016	FINISH: 6/7/2016	SHEET NO.: 1 of 1
DRILLING COMPANY: Tri-County	DRILLING METHOD: Test Pit	LOGGED BY: TSL	CHECKED BY: MAF
DRILLING EQUIPMENT: Backhoe	BORING DIA. (in): 18	TOTAL DEPTH (ft): 4	GROUND ELEV (ft): 337
DEPTH/*ELEV.* GROUND WATER (ft): N/A / *na*			
SAMPLING METHOD: Shovel	NOTES: Moisture and density determined using nuclear gauge.		

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
												FILL: Cemented gravel and sand mixture.
							12.5	115				SILTY SAND (SM); dense; moderately brown; moist; mostly fine to medium SAND; little fines; nonplastic.
	335		B-1						PA R			SILTY SAND (SM); medium dense to dense; reddish brown; moist; mostly fine to medium SAND; little to some fines; low plasticity.
5										5		Total Depth: 4 feet No groundwater encountered
	330											

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE
A-10

BORING RECORD

PROJECT NAME	PROJECT NUMBER	BORING
East Campus Loop Road Realignment	SD736	**A-16-11**

SITE LOCATION	START	FINISH	SHEET NO.
Athena Way Development	6/7/2016	6/7/2016	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Tri-County	Test Pit	TSL	MAF

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Backhoe	18	5	340.5	⊻ N/A / *na*

SAMPLING METHOD	NOTES
Shovel	Moisture and density determined using nuclear gauge.

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
	340						11.8	118				**FILL:** SILTY SAND (SM); dense; moderately brown; moist; mostly fine to medium SAND; little fines; nonplastic.
			B-1						PA CR EI			CLAYEY SAND (SC); medium dense to dense; reddish brown; moist; mostly fine to medium SAND; little to some fines; low plasticity.
5										5		
	335											Total Depth: 5 feet No groundwater encountered

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE

A-11

BORING RECORD

PROJECT NAME	PROJECT NUMBER	BORING
East Campus Loop Road Realignment	SD736	A-16-12

SITE LOCATION	START	FINISH	SHEET NO.
Student Housing Pedestrian Bridge (North Abutment)	12/7/2016	12/8/2016	1 of 4

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Pacific	Hollow Stem Auger	TSL	MAF

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Fraste Track Rig	6	100.5	305	▼ 49.0 / *256.0*

SAMPLING METHOD	NOTES
Automatic Hammer	ETR ~ 83%, N_{60} ~ 83/60 * N ~ 1.38 * N

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			B-1						PA PI CR CP DS EI			**FILL:** SILTY SAND (SM); medium dense; light brown; moist; mostly fine to medium grained sand; some fines, little fine to coarse gravel; nonplastic.
			R-2	12 29 47	76	70	19.5	97				**SCRIPPS FORMATION:** LEAN CLAYSTONE WITH SAND (CL); hard; light gray; moist; mostly fines; little sand; low plasticity; moderately to strongly cemented (LL~46, PI~26), (18% Sand; 82% Fines).
5	300		S-3	8 50 (5")	68	94				5		SILTY SANDSTONE (SM); very dense; orange brown; moist; mostly fine sand; little fines; nonplastic. Thin bed of SANDY CLAYSTONE (CL); hard; green.
												POORLY GRADED SANDSTONE WITH SILT (SP-SM); very dense; dark brown; moist; mostly fine sand; few fines; nonplastic; weakly cemented.
10	295		R-4	20 50 (6")	70	64	---	---		10		SANDY SILTSTONE (ML); very dense; light greenish gray; moist; mostly fines; little fine sand; low plasticity; moderately to strongly cemented.
15	290		S-5	25 50 (6")	75	104				15		POORLY GRADED SANDSTONE (SP); very dense; light gray; moist; mostly fine sand; trace fines; nonplastic; weakly cemented.
20	285		R-6	50 (6")	100	92	6.7	91		20		
25	280		S-7	50 (6")	100	138				25		SILTY SANDSTONE (SM); very dense; gray with orange stains; moist; mostly fine sand; some fines; nonplastic; moderately to strongly cemented.

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FIGURE
A-12 a

BORING RECORD

PROJECT NAME	East Campus Loop Road Realignment
PROJECT NUMBER	SD736
BORING	A-16-12
SITE LOCATION	Student Housing Pedestrian Bridge (North Abutment)
START	12/7/2016
FINISH	12/8/2016
SHEET NO.	2 of 4
DRILLING COMPANY	Pacific
DRILLING METHOD	Hollow Stem Auger
LOGGED BY	TSL
CHECKED BY	MAF
DRILLING EQUIPMENT	Fraste Track Rig
BORING DIA. (in)	6
TOTAL DEPTH (ft)	100.5
GROUND ELEV (ft)	305
DEPTH/*ELEV.* GROUND WATER (ft)	▼ 49.0 / *256.0*
SAMPLING METHOD	Automatic Hammer
NOTES	ETR ~ 83%, N_{60} ~ 83/60 * N ~ 1.38 * N

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			R-8	10 50 (6")	60	55	19.0	93				**SCRIPPS FORMATION:** SANDY SILTSTONE (ML); very dense; greenish brown; moist; mostly fines; little fine sand; low plasticity; strongly cemented.
												SILTY SANDSTONE (SM); very dense; light gray; moist; mostly fine sand; little fines; nonplastic.
35	270		S-9	29 50 (6")	79	109			PA	35		SILTSTONE WITH SAND (ML); very dense; orangish brown; moist; mostly fines; some fine sand; low plasticity; moderately cemented. (29% Sand; 71% Fines)
40	265		R-10	50 (4")	150	138	9.5	90		40		SILTY SANDSTONE (SM); very dense; light yellowish gray; moist; mostly fine sand; little fines; nonplastic; weakly to moderately cemented.
45	260		S-11	25 50 (4")	100	138				45		
50	255		R-12	50 (6")	100	92	---	---		50		SILTSTONE WITH SAND (ML); very dense; gray brown with orange stains; wet; mostly fines; little fine sand; low plasticity; moderately to strongly cemented.
55	250		S-13	50 (6")	100	138				55		SILTY SANDSTONE (SM); very dense; brownish gray; wet; mostly fine to medium sand; little fines; trace fine subrounded gravel; nonplastic; weakly cemented.

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BORING RECORD

PROJECT NAME: East Campus Loop Road Realignment	PROJECT NUMBER: SD736	BORING: **A-16-12**	
SITE LOCATION: Student Housing Pedestrian Bridge (North Abutment)	START: 12/7/2016	FINISH: 12/8/2016	SHEET NO.: 3 of 4
DRILLING COMPANY: Pacific	DRILLING METHOD: Hollow Stem Auger	LOGGED BY: TSL	CHECKED BY: MAF
DRILLING EQUIPMENT: Fraste Track Rig	BORING DIA. (in): 6	TOTAL DEPTH (ft): 100.5	GROUND ELEV (ft): 305
DEPTH/*ELEV.* GROUND WATER (ft): ▼ 49.0 / *256.0*			
SAMPLING METHOD: Automatic Hammer	NOTES: ETR ~ 83%, N_{60} ~ 83/60 * N ~ 1.38 * N		

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			R-14	50 (6")	100	92	23.0	102				**SCRIPPS FORMATION:** SILTY SANDSTONE (SM); very dense; light brown; wet; mostly fine to medium sand; little fines; nonplastic; weakly cemented.
65	240		S-15	50 (6")	100	138				65		
70	235		R-16	50 (5")	120	110	16.4	105		70		
75	230		S-17	25 50 (6")	75	104				75		CLAYSTONE (CL); very hard; light greenish gray; wet; mostly fines; few fine sand; medium plasticity; moderately cemented.
80	225		R-18	50 (6")	100	92	17.2	106		80		POORLY GRADED SANDSTONE WITH SILT (SP-SM); very dense; light gray brown; wet; mostly fine to medium sand; few fines; nonplastic; weakly cemented.
85	220		S-19	50 (4")	150	207				85		SILTSTONE (ML); very dense; light gray; wet; mostly fines; few fine sand; low plasticity; moderately cemented. Thinly interbedded with POORLY GRADED SANDSTONE (SP); very dense; orange; wet; mostly fine to medium sand; few fines; nonplastic; weakly cemented.

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BORING RECORD

PROJECT NAME	East Campus Loop Road Realignment
PROJECT NUMBER	SD736
BORING	A-16-12
SITE LOCATION	Student Housing Pedestrian Bridge (North Abutment)
START	12/7/2016
FINISH	12/8/2016
SHEET NO.	4 of 4
DRILLING COMPANY	Pacific
DRILLING METHOD	Hollow Stem Auger
LOGGED BY	TSL
CHECKED BY	MAF
DRILLING EQUIPMENT	Fraste Track Rig
BORING DIA. (in)	6
TOTAL DEPTH (ft)	100.5
GROUND ELEV (ft)	305
DEPTH/*ELEV.* GROUND WATER (ft)	▼ 49.0 / *256.0*
SAMPLING METHOD	Automatic Hammer
NOTES	ETR ~ 83%, N_{60} ~ 83/60 * N ~ 1.38 * N

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			R-20	50 (2")	300	276	---	---				**<u>SCRIPPS FORMATION</u>:** SILTY SANDSTONE (SM); very dense; light gray brown; wet; mostly fine to medium sand; little fines; nonplastic; strongly cemented. Very hard drilling from 90' to 93'.
95	210		S-21	50 (4")	150	207				95		
100	205		R-22	50 (5")	120	110	17.9	109		100		
												Total Depth = 100½ feet Groundwater at 49 Feet
105	200									105		
110	195									110		
115	190									115		

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FIGURE

A-12 d

BORING RECORD

PROJECT NAME	PROJECT NUMBER	BORING
East Campus Loop Road Realignment	SD736	A-17-01

SITE LOCATION	START	FINISH	SHEET NO.
Athena Circle Development	3/17/2017	3/17/2017	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Pacific Drilling	Hollow Stem Auger	SRN	MAF

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Tracked Rig (Fraste)	6	21.5	334.5	▼ N/A / *na*

SAMPLING METHOD	NOTES
Hammer: 140 lbs., Drop: 30 in. (Cat-Head)	ETR ~ 83%, N_{60} ~ 83/60 * N ~ 1.38 * N

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
												PAVEMENT: 4-inch asphalt concrete, 1-inch base.
			B-1						PA PI R			**FILL:** CLAYEY SAND (SC); medium dense; dark yellowish brown, moist; mostly fine to medium SAND; some fines; trace GRAVEL; low plasticity. (4% Gravel; 65% Sand; 31% Fines) (LL~24; PL~15; PI~9)
5	330		R-2	12 15 15	30	28	11.9	121		5		
10	325		S-3	5 12 16	28	39				10		**SCRIPPS FORMATION:** POORLY GRADED SANDSTONE (SP); very dense; yellowish and grayish brown; moist; mostly fine SAND; few fines; nonplastic.
15	320		R-4	24 50	74	68	8.6	103		15		
20	315		S-5	17 29 34	63	87				20		
	310											Total Depth: 21½ feet No groundwater encountered

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE A-13

BORING RECORD

PROJECT NAME	PROJECT NUMBER	BORING
East Campus Loop Road Realignment	SD736	**A-17-02**

SITE LOCATION	START	FINISH	SHEET NO.
Athena Circle Development	3/17/2017	3/17/2017	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Pacific Drilling	Hollow Stem Auger	SRN	MAF

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Tracked Rig (Fraste)	6	16	335	▼ N/A / *na*

SAMPLING METHOD	NOTES
Hammer: 140 lbs., Drop: 30 in. (Cat-Head)	ETR ~ 83%, N_{60} ~ 83/60 * N ~ 1.38 * N

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
0	335									0		**PAVEMENT:** 4-inch asphalt concrete, 1-inch base.
0.6–4.5		Bulk	B-1						PA R			**FILL:** CLAYEY SAND (SC); medium dense to dense; dark yellowish brown; moist; mostly fine SAND; some fines; trace GRAVEL; low plasticity. (3% Gravel; 61% Sand; 36% Fines)
5	330	Ring	R-2	16 21 45	66	61	4.3	115	DS	5		Contains some plastic fragments.
10	325	SPT	S-3	25 36 43	79	109				10		**SCRIPPS FORMATION:** SILTY SANDSTONE (SM); very dense; orange and grayish brown; moist; mostly fine SAND; little fines; nonplastic; weakly cemented.
13.5												SILTSTONE WITH SAND (ML); very dense; light gray and orange; moist; mostly fines; little fine SAND; low plasticity; moderately cemented.
15	320	Ring	R-4	19 60	79	73	11.6	103		15		
16												Total Depth: 16 feet No groundwater encountered
20	315									20		

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FIGURE
A-14

BORING RECORD

PROJECT NAME	PROJECT NUMBER	BORING
East Campus Loop Road Realignment	SD736	**A-20-01**

SITE LOCATION	START	FINISH	SHEET NO.
Energy Storage and Innovations Laboratory	6/16/2020	6/17/2020	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Group Delta Consultants	Hand Auger	SRN	MAF

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Hand Auger and Rod	6	6	362	▼ / *na*

SAMPLING METHOD	NOTES
Auger and Shovel	

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
												FILL: SILTY SAND (SM); loose to medium dense, yellowish brown (10 YR 5/4); moist; mostly fine to medium SAND; some fines; trace fine GRAVEL; nonplastic. (3% Gravel; 74% Sand; 23% Fines)
	360		B-1						PA CR EI~4 R~9			3" clay lense observed at 2½' depth. Difficult drilling at 3 feet, few GRAVEL and COBBLE.
5			B-2							5		**VERY OLD PARALIC DEPOSITS:** SILTY SANDSTONE (SM); dense; reddish brown (7.5YR 5/3); moist; mostly fine to medium SAND; some fines; few fine to coarse subrounded GRAVEL; nonplastic; weakly cemented.
	355											Total Depth: 6 feet No Groundwater Observed

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE
A-15

GDC_LOG_BORING_MMX_SOIL_SD SD663 LOGS.GPJ GDCLOG.GDT 5/31/22

BORING RECORD

PROJECT NAME	PROJECT NUMBER	BORING
East Campus Loop Road Realignment	SD736	A-20-02

SITE LOCATION	START	FINISH	SHEET NO.
Energy Storage and Innovations Laboratory	6/16/2020	6/17/2020	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Group Delta Consultants	Hand Auger	SRN	MAF

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Hand Auger and Rod	6	3	359	▼ / *na*

SAMPLING METHOD	NOTES
Auger and Shovel	

DEPTH (feet)	ELEVATION (feet)	SAMPLE TYPE	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS	DEPTH (feet)	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION
			B-1									**FILL:** SILTY SAND WITH GRAVEL (SM); medium dense; yellowish brown (10YR 5/4); moist; mostly SAND; little fines; little angular GRAVEL; nonplastic.
			B-2						PA EI~20			**VERY OLD PARALIC DEPOSITS:** CLAYEY SANDSTONE (SC); dense; reddish gray (5YR 5/2) and brown (7YR 5/4); moist; mostly fine to medium SAND; some fines; trace GRAVEL; low plasticity; weakly cemented. (1% Gravel; 69% Sand; 30% Fines)
	355											Total Depth: 3 feet No Groundwater Observed
5										5		

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FIGURE
A-16

BORING RECORD

PROJECT NAME	PROJECT NUMBER	BORING
East Campus Loop Road Realignment	SD736	**A-22-01**

SITE LOCATION	START	FINISH	SHEET NO.
Power Islanding Development	6/7/2022	6/7/2022	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Pacific Drilling	Hollow Stem Auger	MAF	JCS

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Marl M10 Truck Mounted Rig (Yeti)	6	21	359	▼ N/A / *na*

SAMPLING METHOD	NOTES
Hammer: 140 lbs., Drop: 30 in. (Automatic)	ETR ~ 92%, N_{60} ~ 92/60 * N ~ 1.53 * N

SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS
B-1						
S-2	3 3 6	9	14			PA CR EI
R-3	4 15 18	33	34	11.8	117	
S-4	8 21 35	56	86			
S-5	7 25 35	60	92			
R-6	20 60	80	82	---	---	
S-7	42 60	100+	100+			

Depth (feet): 5, 10, 15, 20. Elevation (feet): 355, 350, 345, 340, 335.

DESCRIPTION AND CLASSIFICATION

FILL: CLAYEY SAND (SC); loose to medium dense; yellow brown; very moist; mostly fine to medium SAND; little fines; little subrounded GRAVEL; low plasticity. @ 1½': Subrounded 3" cobble (Poway Clast).

(13% Gravel; 61% Sand; 26% Fines)

Decreasing moisture content with depth.

CLAYEY SAND (SC); dense; mottled yellow and reddish brown; moist; mostly fine to medium SAND; some fines; low plasticity. @ 6': Wood fragments in sampler.

VERY OLD PARALIC DEPOSITS: SILTY SANDSTONE (SM); very dense; light reddish brown; moist; mostly fine to medium SAND; little fines; nonplastic; weakly cemented.

SCRIPPS FORMATION: CLAYEY SANDSTONE (SC); very dense; mottled light yellow and gray brown; moist; mostly fine to medium SAND; some fines; low plasticity; weakly cemented.

Total Depth: 21 feet
No Groundwater Encountered

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FIGURE A-17

BORING RECORD

PROJECT NAME	PROJECT NUMBER	BORING
East Campus Loop Road Realignment	SD736	**A-22-02**

SITE LOCATION	START	FINISH	SHEET NO.
Power Islanding Development	6/7/2022	6/7/2022	1 of 1

DRILLING COMPANY	DRILLING METHOD	LOGGED BY	CHECKED BY
Pacific Drilling	Hollow Stem Auger	MAF	JCS

DRILLING EQUIPMENT	BORING DIA. (in)	TOTAL DEPTH (ft)	GROUND ELEV (ft)	DEPTH/*ELEV.* GROUND WATER (ft)
Marl M10 Truck Mounted Rig (Yeti)	6	16.5	360	▼ N/A / *na*

SAMPLING METHOD	NOTES
Hammer: 140 lbs., Drop: 30 in. (Automatic)	ETR ~ 92%, N_{60} ~ 92/60 * N ~ 1.53 * N

DEPTH (feet)	ELEVATION (feet)	SAMPLE NO.	PENETRATION RESISTANCE (BLOWS / 6 IN)	BLOW/FT "N"	N_{60}	MOISTURE (%)	DRY DENSITY (pcf)	OTHER TESTS
0–2		B-1						
2–3.5		R-2	14 16 19	35	36	11.9	122	PA R
5–6.5	355	S-3	17 27 75	100+	100+			
10–11.5	350	R-4	19 29 47	76	78	9.5	117	DS
15–16.5	345	S-5	13 26 35	61	93			

DEPTH (feet)	DESCRIPTION AND CLASSIFICATION
0–2	**FILL:** SILTY SAND (SM); medium dense; light yellow brown; dry to moist; mostly fine to medium SAND; little fines; few fine rounded GRAVEL; low plasticity.
2–4	CLAYEY SAND (SC); dense; yellow brown and gray; moist; mostly fine SAND; some fines; few GRAVEL; low plasticity. (7% Gravel; 64% Sand; 29% Fines)
4–14	**VERY OLD PARALIC DEPOSITS:** SILTY SANDSTONE (SM); very dense; light reddish brown; dry to moist; mostly fine SAND; little fines; nonplastic; weakly cemented.
14–16.5	**SCRIPPS FORMATION:** CLAYEY SANDSTONE (SC); very dense; mottled light yellow and gray brown; moist; mostly fine to medium SAND; some fines; low plasticity; weakly cemented.
	Total Depth: 16½ feet No Groundwater Encountered

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APPENDIX B
LABORATORY TESTING

APPENDIX B

LABORATORY TESTING

Laboratory testing was conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the same locality. No warranty, express or implied, is made as to the correctness or serviceability of the test results, or the conclusions derived from these tests. Where a specific laboratory test method has been referenced, the reference only applies to the specified laboratory test method, which has been used only as a guidance document for the general performance of the test and not as a "Test Standard". A brief description of the various tests performed for this project follows.

Classification: Soils were visually classified according to the Unified Soil Classification System as established by the American Society of Civil Engineers per ASTM D2487. The soil classifications are shown on the boring logs in Appendix A.

Particle Size Analysis: Particle size analyses were performed in accordance with ASTM D422, and were used to supplement visual classifications. The results are shown in Figures B-1.1 to B-1.12.

Expansion Index: The expansion potential of selected soil samples was estimated in general accordance with ASTM D4829. The test results are summarized in Figure B-2, along with common criteria for evaluating the expansion potential based on the expansion index.

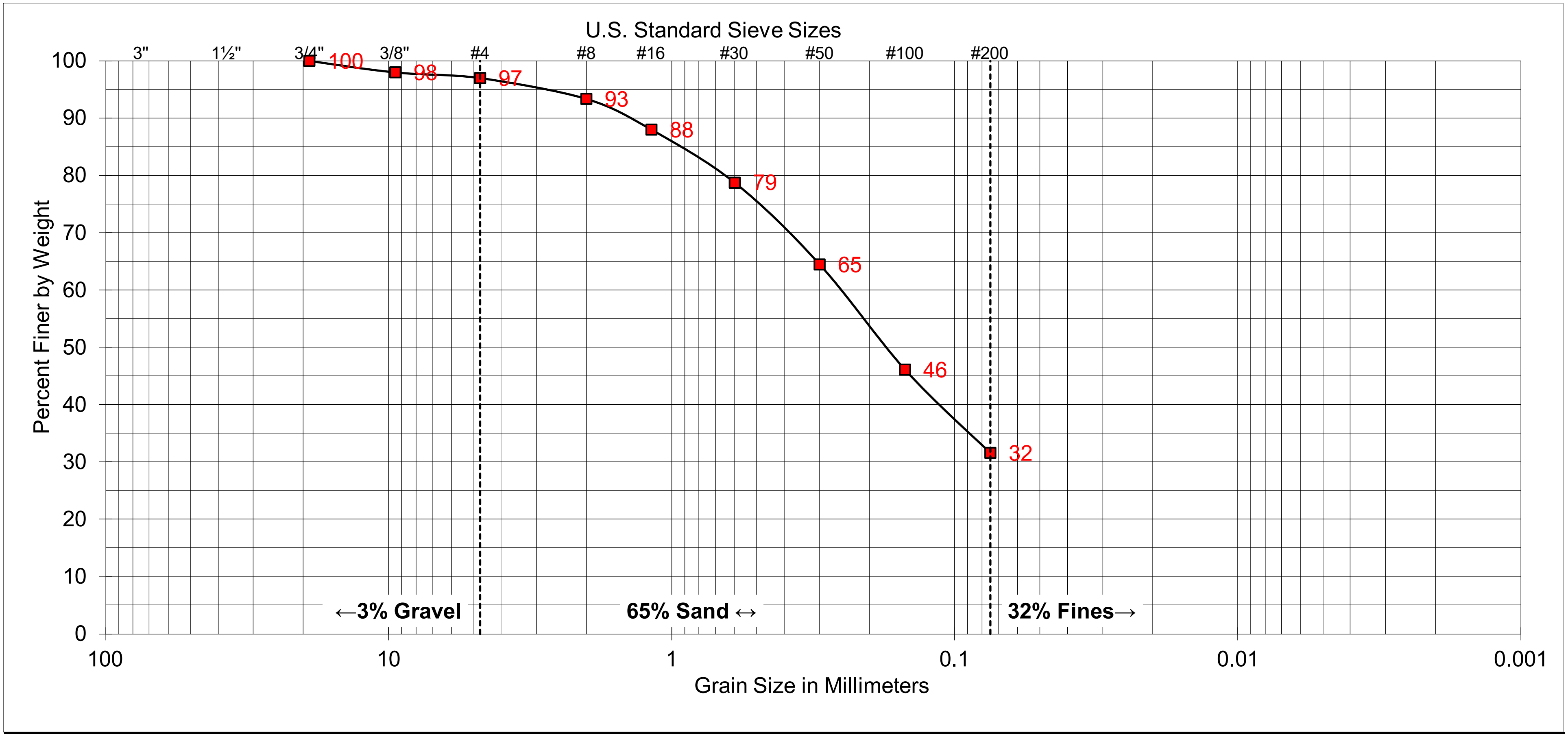
pH and Resistivity: To assess the potential for reactivity with buried metals, selected soil samples were tested for pH and minimum resistivity using Caltrans test method 643. The corrosivity test results are summarized in Figure B-3.

Sulfate Content: To assess the potential for reactivity with concrete, selected soil samples were tested for water soluble sulfate. The sulfate was extracted from the soil under vacuum using a 10:1 (water to dry soil) dilution ratio, and then tested for water soluble sulfate using ASTM D516. The test results are presented in Figure B-3, along with criteria for evaluating soluble sulfate content.

Chloride Content: The extracted solution described above was also tested for water soluble chloride using a calibrated ion specific electronic probe. The results are also shown in Figure B-3.

Maximum Density/Optimum Moisture: The maximum density and optimum moisture of selected soil samples were determined using ASTM D1557. The test results are summarized in B-4.

R-Value: R-Value tests were performed on selected samples of the subgrade soils collected from the previous borings in the site vicinity. The R-Value tests were conducted in general accordance with CTM 301. The test results are provided in Figures B-5.1a through B-5.7b.



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
BORING NO:	A-16-01
SAMPLE DEPTH:	1' - 5'

UNIFIED SOIL CLASSIFICATION: SC

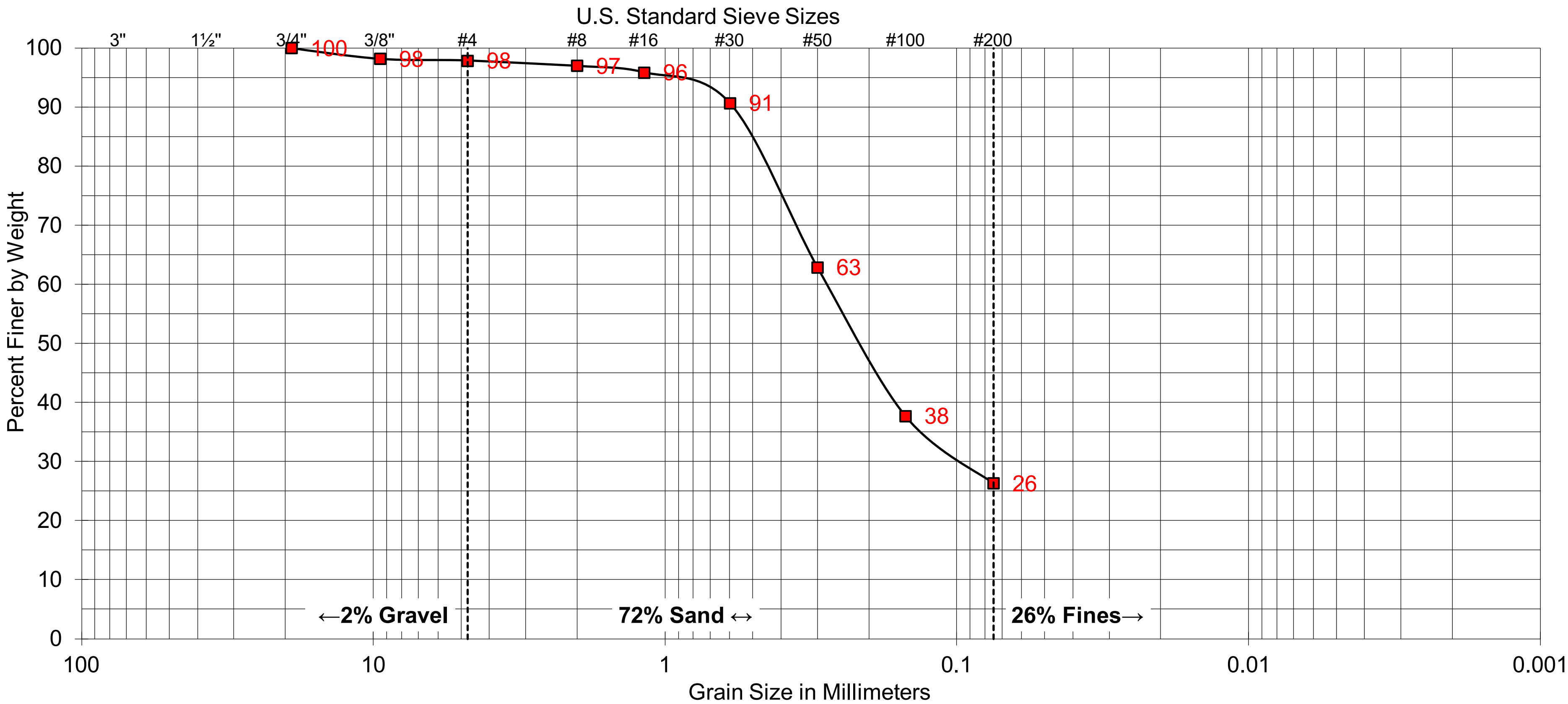
DESCRIPTION: CLAYEY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 22-0061
Project No. SD736
FIGURE B-1.1



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
BORING NO:	A-16-08
SAMPLE DEPTH:	1' - 3'

UNIFIED SOIL CLASSIFICATION: SM

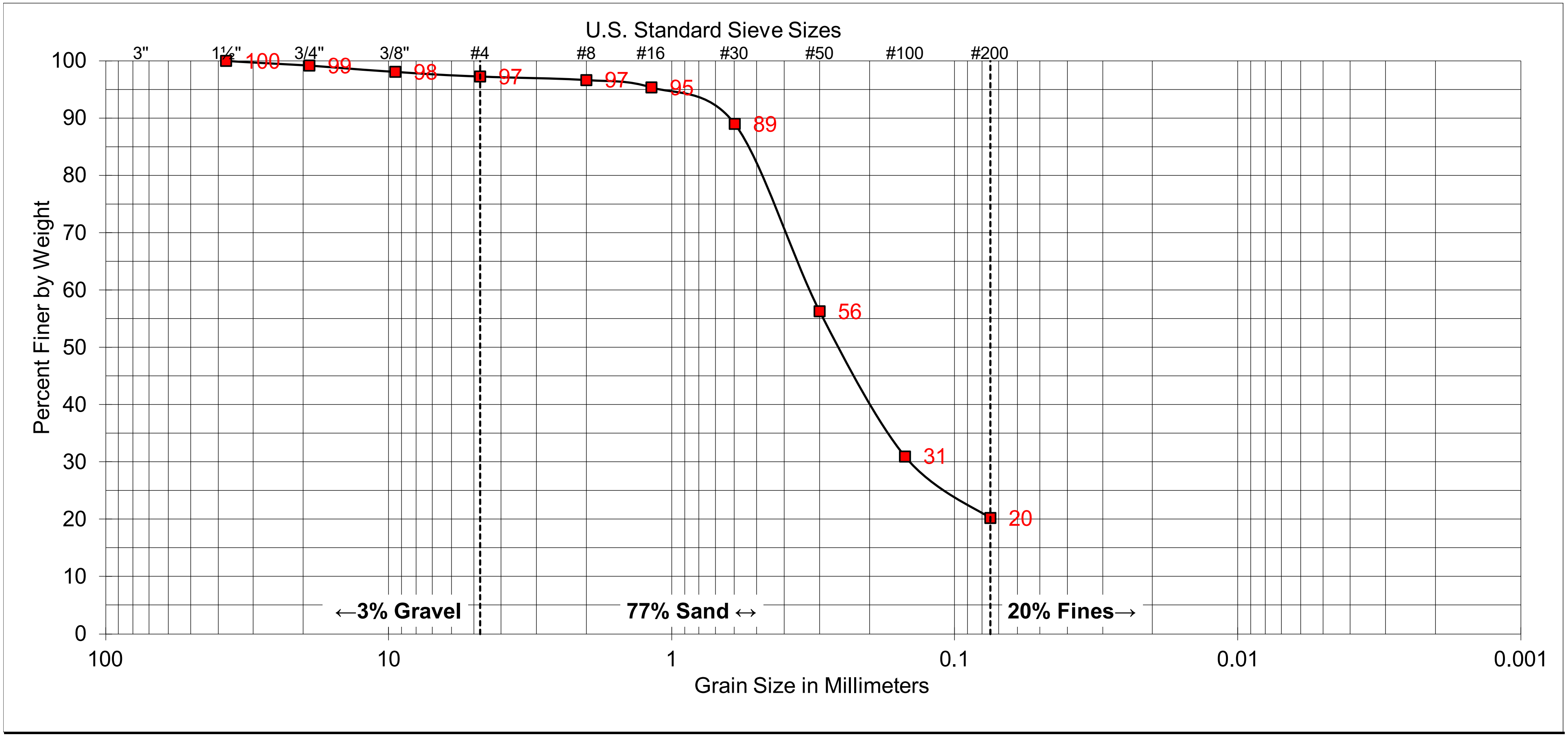
DESCRIPTION: SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 22-0061
Project No. SD736
FIGURE B-1.2



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
BORING NO:	A-16-09
SAMPLE DEPTH:	2' - 4'

UNIFIED SOIL CLASSIFICATION: SM

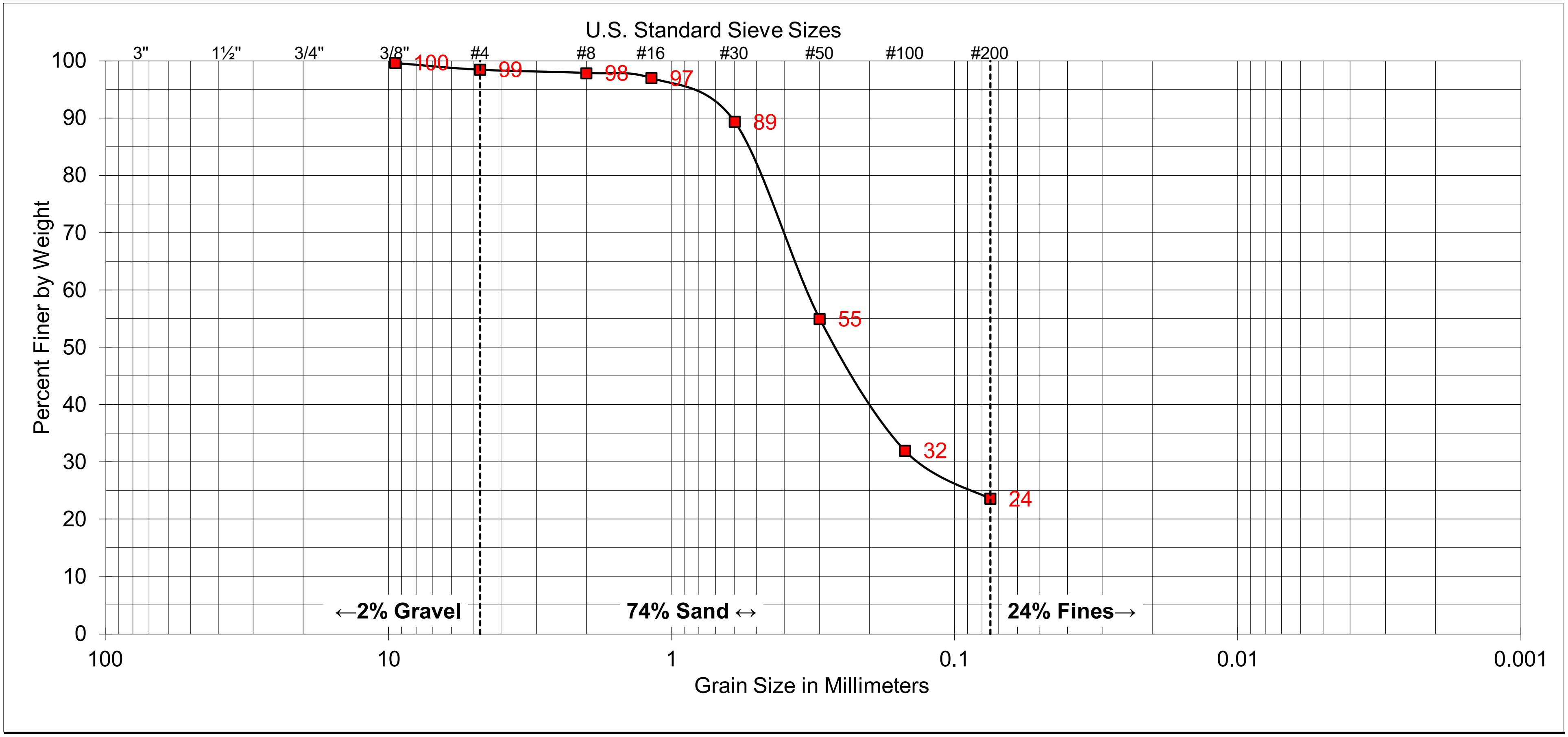
DESCRIPTION: SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 22-0061
Project No. SD736
FIGURE B-1.3



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
BORING NO:	A-16-10
SAMPLE DEPTH:	2' - 4'

UNIFIED SOIL CLASSIFICATION: SM

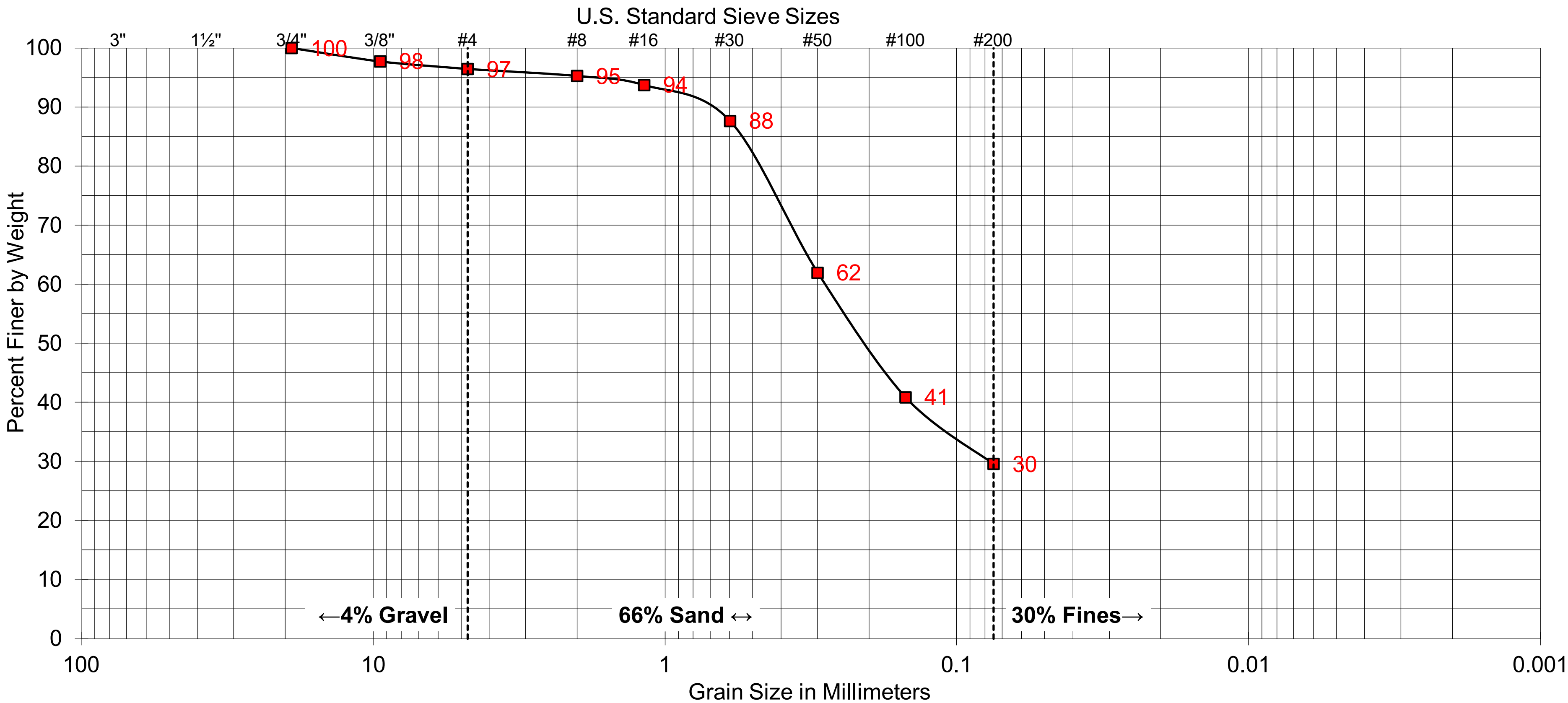
DESCRIPTION: SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 22-0061
Project No. SD736
FIGURE B-1.4



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
BORING NO:	A-16-11
SAMPLE DEPTH:	1' - 3'

UNIFIED SOIL CLASSIFICATION: SM

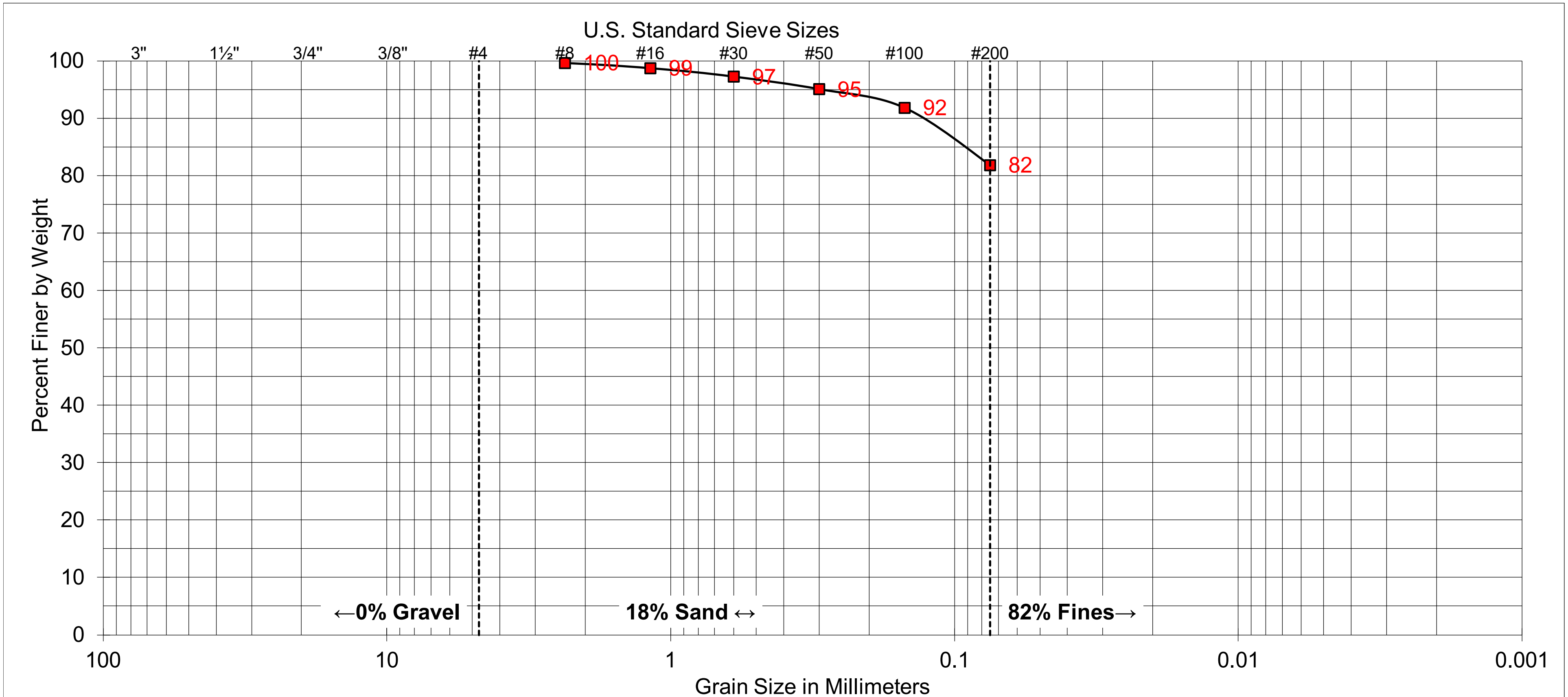
DESCRIPTION: SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 22-0061
Project No. SD736
FIGURE B-1.5



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
BORING NO:	A-16-12
SAMPLE DEPTH:	0' - 5' (EL. 305')

UNIFIED SOIL CLASSIFICATION: CL

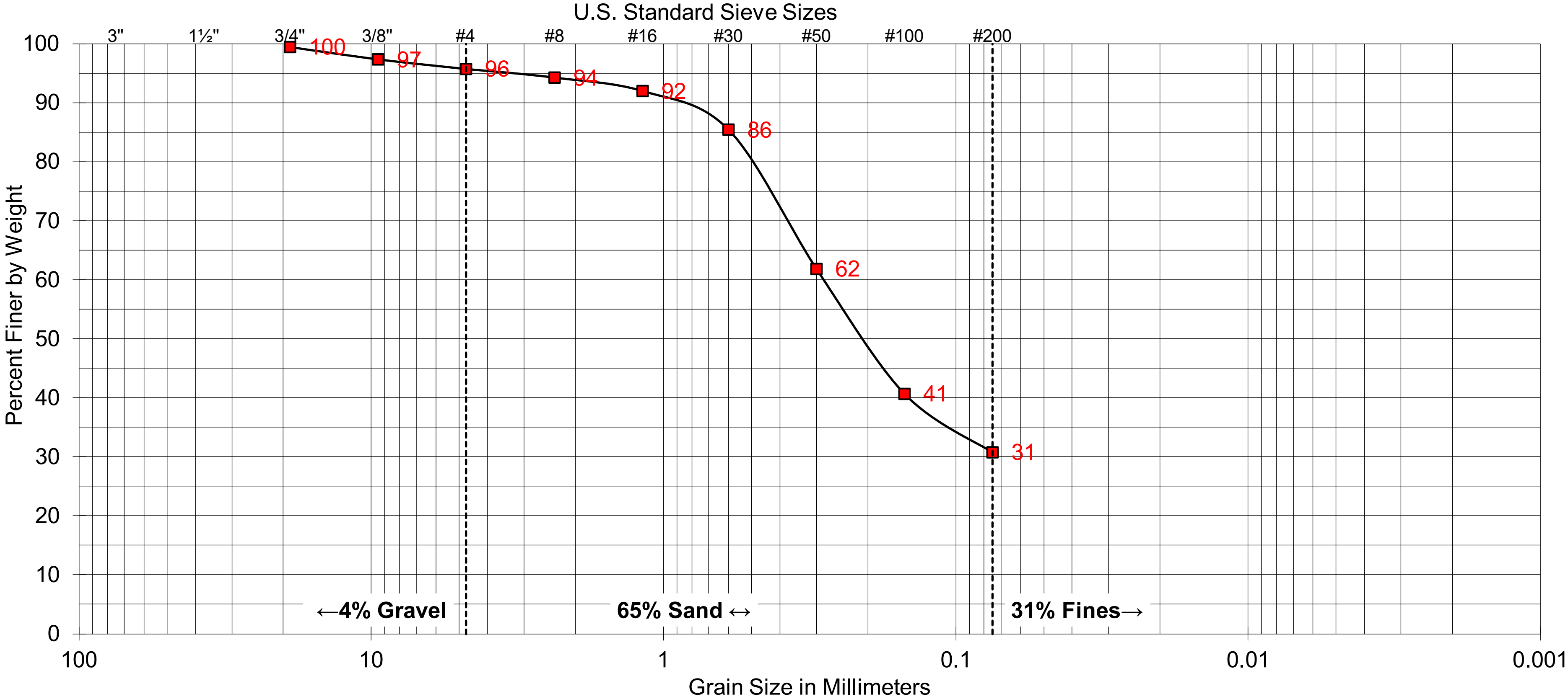
DESCRIPTION: LEAN CLAY WITH SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	46
PLASTIC LIMIT:	20
PLASTICITY INDEX:	26

GROUP DELTA

SOIL CLASSIFICATION

Document No. 22-0061
Project No. SD736
FIGURE B-1.6



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE

BORING NO: A-17-01

SAMPLE DEPTH: ½' - 5'

UNIFIED SOIL CLASSIFICATION: SC

DESCRIPTION: CLAYEY SAND

ATTERBERG LIMITS

LIQUID LIMIT: 24

PLASTIC LIMIT: 15

PLASTICITY INDEX: 9

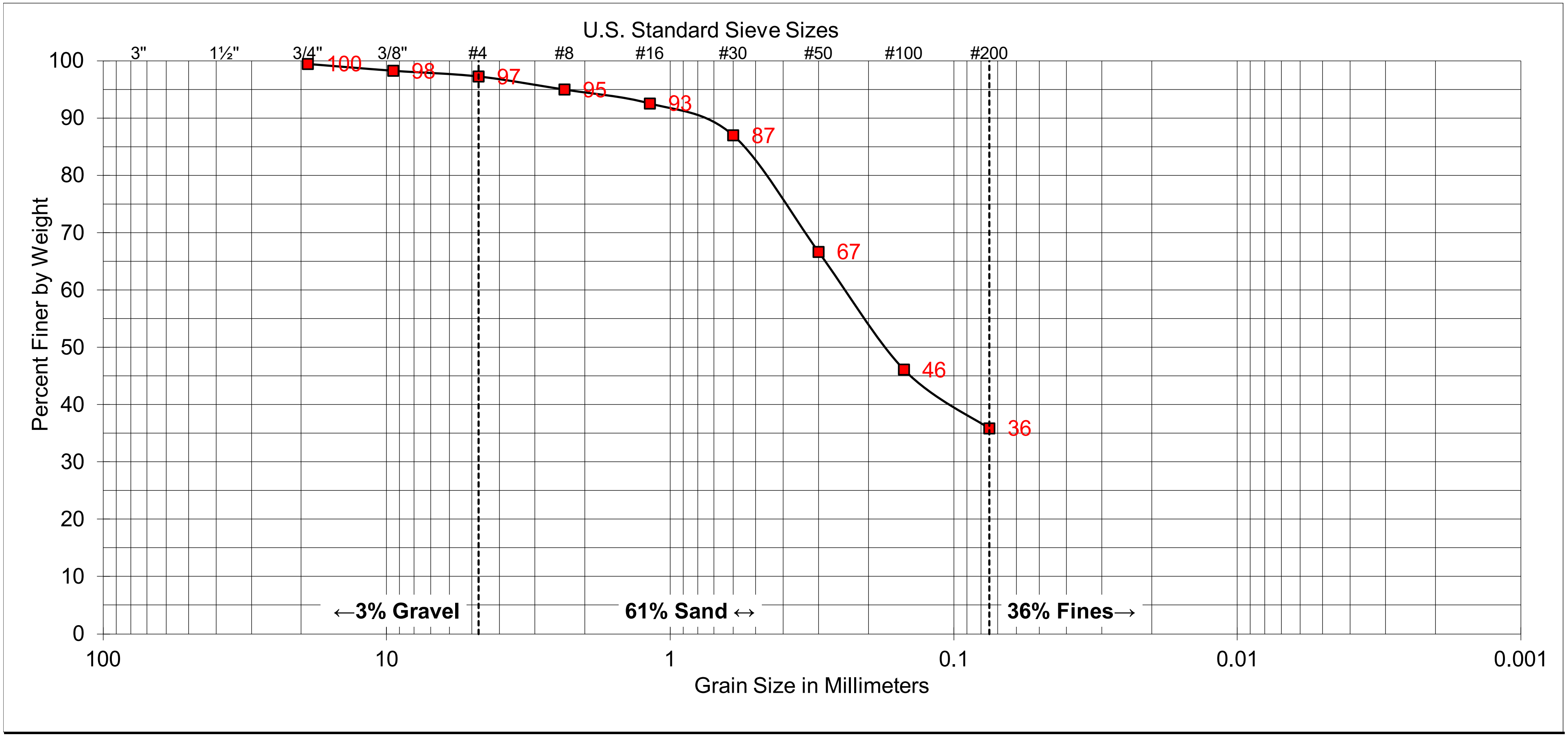
GROUP DELTA

SOIL CLASSIFICATION

Document No. 22-0061

Project No. SD736

FIGURE B-1.7



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
BORING NO:	A-17-02
SAMPLE DEPTH:	½' - 5'

UNIFIED SOIL CLASSIFICATION: SC

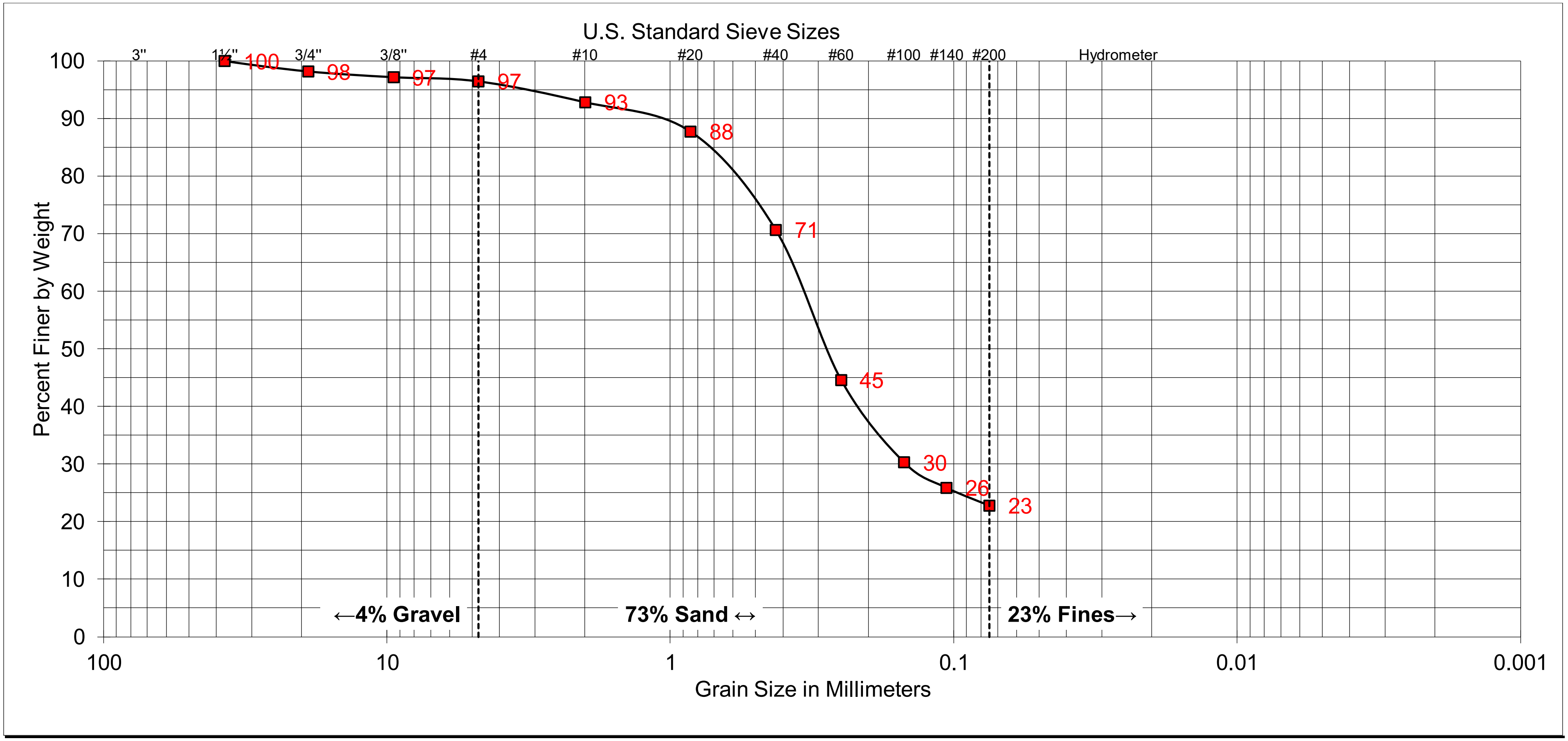
DESCRIPTION: CLAYEY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 22-0061
Project No. SD736
FIGURE B-1.8



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
BORING NO:	A-20-01
SAMPLE DEPTH:	0' - 4'

UNIFIED SOIL CLASSIFICATION: SM

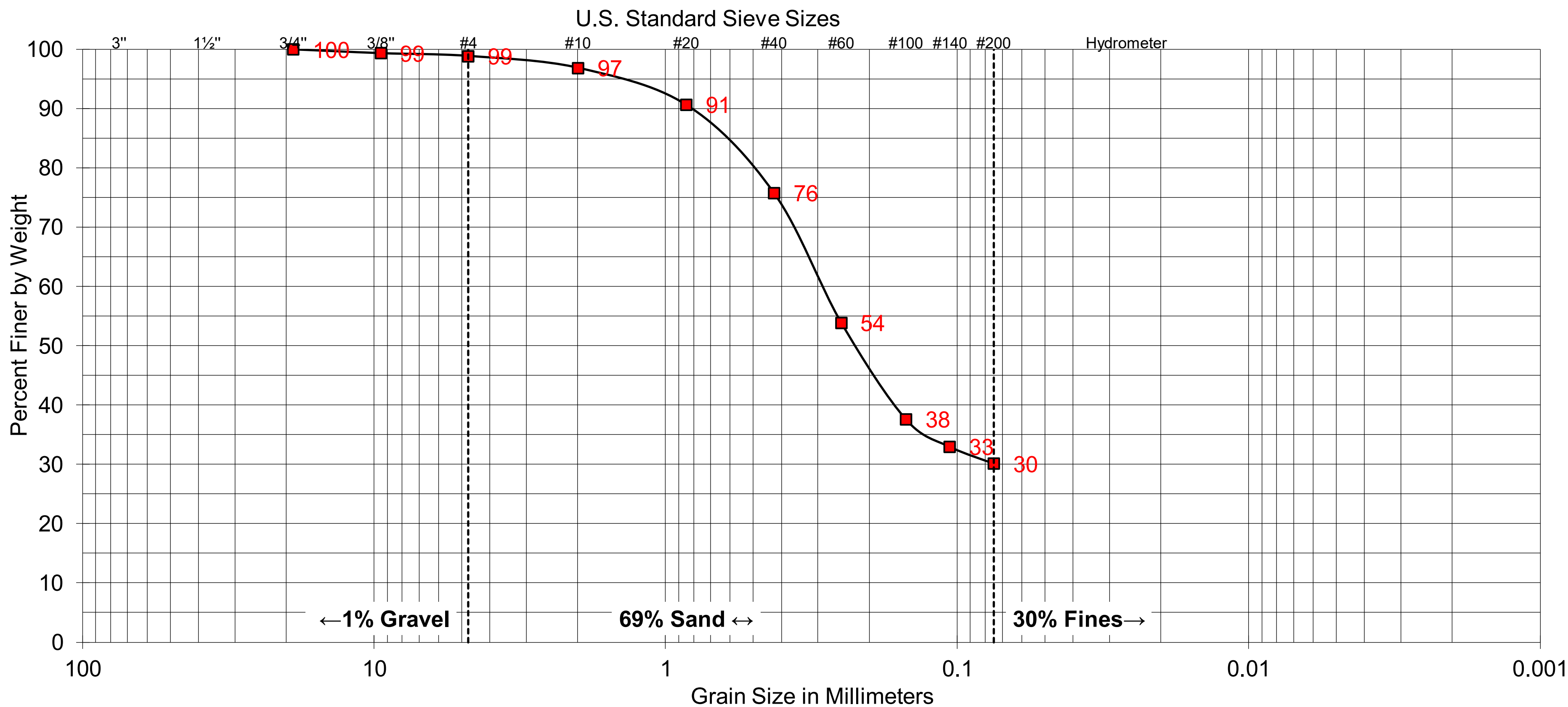
DESCRIPTION: SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 22-0061
Project No. SD736
FIGURE B-1.9



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
BORING NO:	A-20-02
SAMPLE DEPTH:	1' - 3'

UNIFIED SOIL CLASSIFICATION: SC

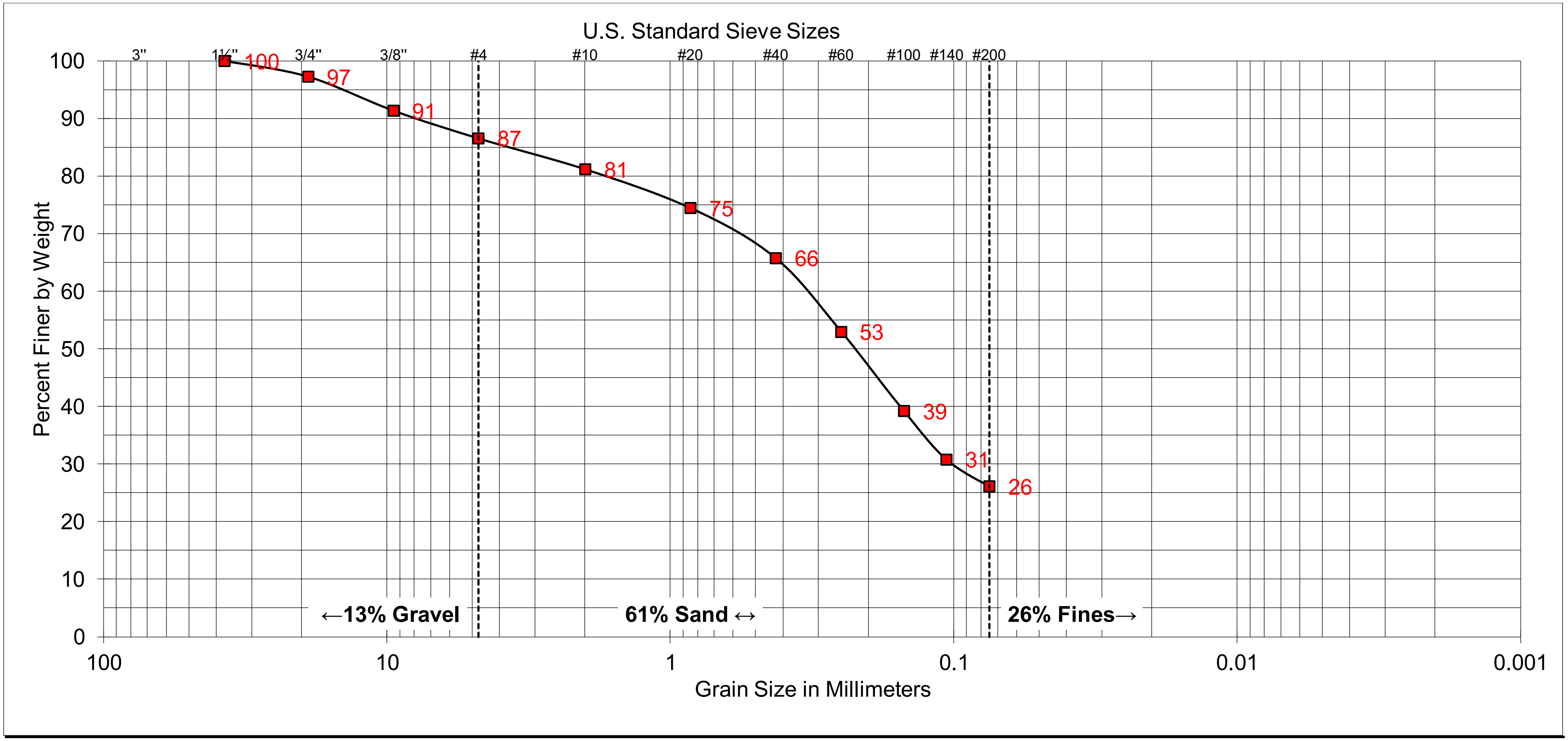
DESCRIPTION: CLAYEY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 22-0061
Project No. SD736
FIGURE B-1.10



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
BORING NUMBER:	A-22-01
SAMPLE DEPTH:	½' - 5'

UNIFIED SOIL CLASSIFICATION: SC

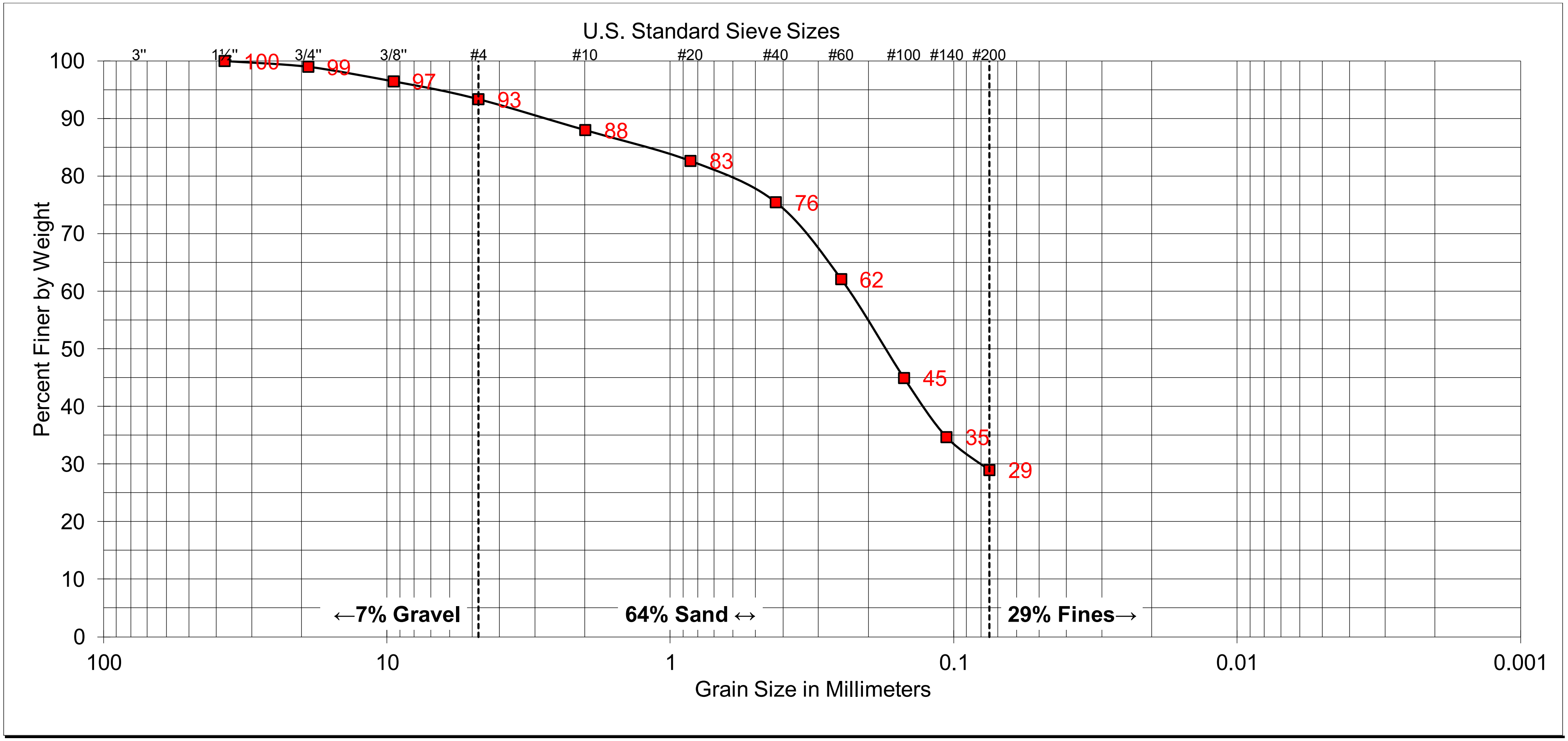
DESCRIPTION: CLAYEY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 22-0061
Project No. SD736
FIGURE B-1.11



COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND
GRAVEL		SAND			CLAY

SAMPLE	
BORING NUMBER:	A-22-02
SAMPLE DEPTH:	0' - 4'

UNIFIED SOIL CLASSIFICATION: SC

DESCRIPTION: CLAYEY SAND

ATTERBERG LIMITS	
LIQUID LIMIT:	---
PLASTIC LIMIT:	---
PLASTICITY INDEX:	---

GROUP DELTA

SOIL CLASSIFICATION

Document No. 22-0061
Project No. SD736
FIGURE B-1.12

EXPANSION TEST RESULTS
(ASTM D4829)

SAMPLE NO.	DESCRIPTION	EXPANSION INDEX
A-16-01 @ 1' – 5'	**Fill**: Yellow brown clayey sand (SC)	16
A-16-08 @ 1' – 3'	**Fill**: Yellow brown silty sand (SM)	9
A-16-11 @ 1' – 3'	**Fill**: Yellow brown silty sand (SM)	9
A-16-12 @ 0' – 5'	**Fill**: Yellow brown sandy lean clay (CL)	85
A-20-01 @ 0' – 4'	**Fill**: Yellow brown silty sand (SM)	4
A-20-02 @ 1' – 3'	**Very Old Paralic Deposits**: Reddish brown clayey sand (SC)	20
A-22-01 @ ½' – 5'	**Fill**: Yellow brown clayey sand (SC)	1

EXPANSION INDEX	POTENTIAL EXPANSION
0 to 20	Very low
21 to 50	Low
51 to 90	Medium
91 to 130	High
Above 130	Very High

CORROSIVITY TEST RESULTS
(ASTM D516, CTM 643)

SAMPLE NO.	pH	RESISTIVITY [OHM-CM]	SULFATE CONTENT [%]	CHLORIDE CONTENT [%]
A-16-01 @ 1' – 5'	7.3	670	0.03	0.01
A-16-08 @ 1' – 3'	8.0	630	0.02	0.03
A-16-11 @ 1' – 3'	7.9	570	0.04	0.03
A-16-12 @ 0' – 5'	7.4	240	0.05	0.11
A-20-01 @ 0' – 4'	6.2	1,090	0.02	0.02
A-22-01 @ ½' – 5'	7.9	810	0.07	0.04

SULFATE CONTENT [%]	SULFATE EXPOSURE	CEMENT TYPE
0.00 to 0.10	Negligible	-
0.10 to 0.20	Moderate	II, IP(MS), IS(MS)
0.20 to 2.00	Severe	V
Above 2.00	Very Severe	V plus pozzolan

SOIL RESISTIVITY	GENERAL DEGREE OF CORROSIVITY TO FERROUS
0 to 1,000	Very Corrosive
1,000 to 2,000	Corrosive
2,000 to 5,000	Moderately Corrosive
5,000 to 10,000	Mildly Corrosive
Above 10,000	Slightly Corrosive

CHLORIDE (Cl) CONTENT	GENERAL DEGREE OF
0.00 to 0.03	Negligible
0.03 to 0.15	Corrosive
Above 0.15	Severely Corrosive

MAXIMUM DENSITY & OPTIMUM MOISTURE
(ASTM D1557)

SAMPLE NO.	DESCRIPTION	MAXIMUM DENSITY [lb/ft^3]	OPTIMUM MOISTURE [%]
A-16-09 @ 2' – 4'	**Fill**: Yellow brown silty sand (SM).	128	10
A-16-12 @ 0' – 5'	**Fill**: Yellow brown sandy lean clay (CL)	116½	15

BORING NO.: A-16-03 **SAMPLE DATE:** 4/20/16

BORING DEPTH: 0' - 5' **TEST DATE:** 4/27/16

SAMPLE DESCRIPTION: Dark yellow brown clayey sand (SC)

LABORATORY TEST DATA

	TEST SPECIMEN	1	2	3	4	5	
A	COMPACTOR PRESSURE	290	230	170			[PSI]
B	INITIAL MOISTURE	7.1	7.1	7.1			[%]
C	BATCH SOIL WEIGHT	1200	1200	1200			[G]
D	WATER ADDED	60	70	85			[ML]
E	WATER ADDED (D*(100+B)/C)	5.4	6.2	7.6			[%]
F	COMPACTION MOISTURE (B+E)	12.5	13.3	14.7			[%]
G	MOLD WEIGHT	2111.4	2112.2	2108.6			[G]
H	TOTAL BRIQUETTE WEIGHT	3137.0	3135.7	3127.3			[G]
I	NET BRIQUETTE WEIGHT (H-G)	1025.6	1023.5	1018.7			[G]
J	BRIQUETTE HEIGHT	2.50	2.50	2.48			[IN]
K	DRY DENSITY (30.3*I/((100+F)*J))	110.5	109.4	108.5			[PCF]
L	EXUDATION LOAD	5461	4108	2886			[LB]
M	EXUDATION PRESSURE (L/12.54)	435	328	230			[PSI]
N	STABILOMETER AT 1000 LBS	28	31	46			[PSI]
O	STABILOMETER AT 2000 LBS	65	71	104			[PSI]
P	DISPLACEMENT FOR 100 PSI	3.97	4.10	4.59			[Turns]
Q	R VALUE BY STABILOMETER	48	43	23			
R	CORRECTED R-VALUE (See Fig. 14)	48	43	23			
S	EXPANSION DIAL READING	0.0052	0.0034	0.0013			[IN]
T	EXPANSION PRESSURE (S*43,300)	225	147	56			[PSF]
U	COVER BY STABILOMETER	0.52	0.57	0.77			[FT]
V	COVER BY EXPANSION	1.73	1.13	0.43			[FT]

TRAFFIC INDEX:	5.0
GRAVEL FACTOR:	1.60
UNIT WEIGHT OF COVER [PCF]:	130
R-VALUE BY EXUDATION:	39
R-VALUE BY EXPANSION:	31
R-VALUE AT EQUILIBRIUM:	31

*Note: Gravel factor estimated from pavement section using CTM 301, Section C, Part b.

REV. 2, DATED 1/31/15

GROUP DELTA

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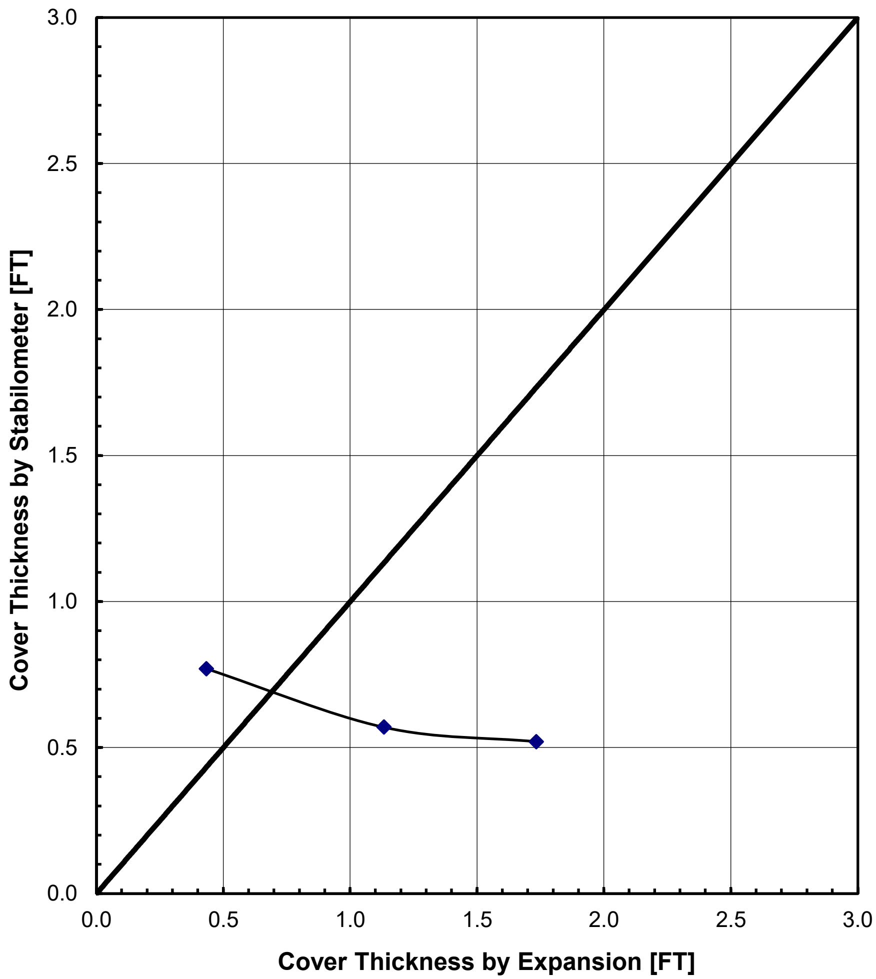
SAN DIEGO, CALIFORNIA 92126

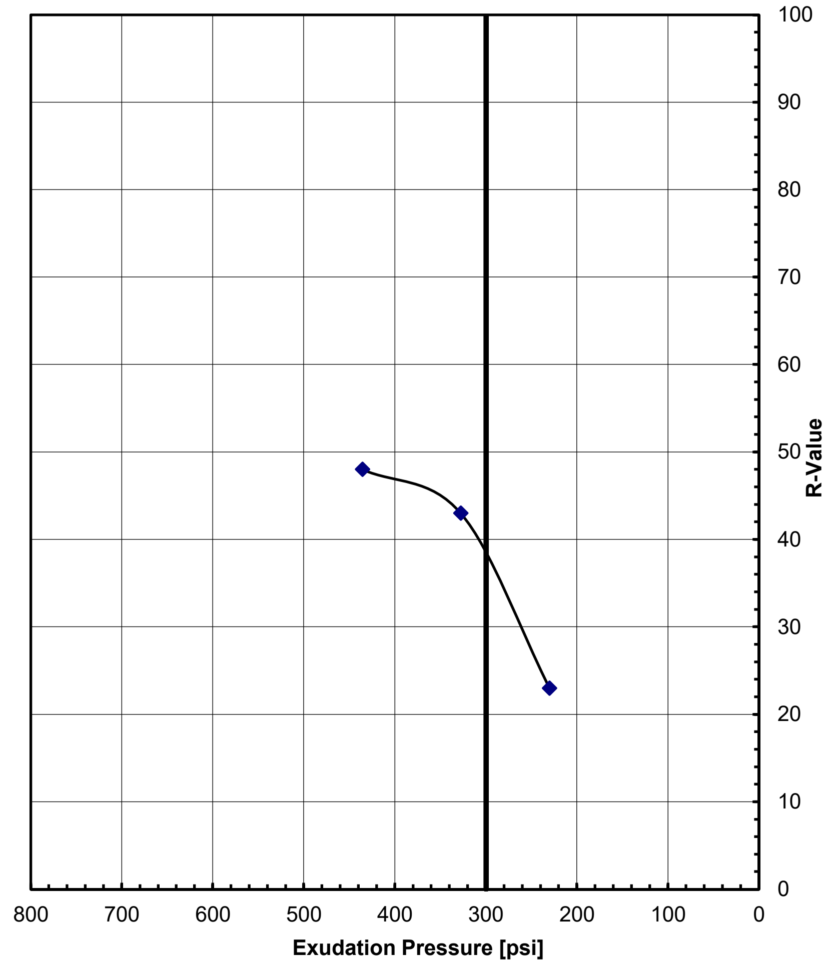
R-VALUE TEST RESULTS

Document No. 22-0061
Project No. SD736
FIGURE B-5.1a

Sample: A-16-03, 0' - 5'

R-Value at Equilibrium: 31





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COVER AND EXUDATION CHARTS

Document No. 22-0061
Project No. SD736
FIGURE B-5.1b

BORING NO.: A-16-09 **SAMPLE DATE:** 6/7/16
BORING DEPTH: 2' - 4' **TEST DATE:** 6/10/16
SAMPLE DESCRIPTION: Dark yellow brown silty sand (SM)

LABORATORY TEST DATA

	TEST SPECIMEN	1	2	3	4	5	
A	COMPACTOR PRESSURE	350	280	350			[PSI]
B	INITIAL MOISTURE	2.1	2.1	2.1			[%]
C	BATCH SOIL WEIGHT	1200	1200	1200			[G]
D	WATER ADDED	80	90	74			[ML]
E	WATER ADDED (D*(100+B)/C)	6.8	7.7	6.3			[%]
F	COMPACTION MOISTURE (B+E)	8.9	9.8	8.4			[%]
G	MOLD WEIGHT	2108.7	2112.2	2114.3			[G]
H	TOTAL BRIQUETTE WEIGHT	3215.2	3231.4	3216.8			[G]
I	NET BRIQUETTE WEIGHT (H-G)	1106.5	1119.2	1102.5			[G]
J	BRIQUETTE HEIGHT	2.44	2.45	2.45			[IN]
K	DRY DENSITY (30.3*I/((100+F)*J))	126.2	126.1	125.8			[PCF]
L	EXUDATION LOAD	5283	3113	8218			[LB]
M	EXUDATION PRESSURE (L/12.54)	421	248	655			[PSI]
N	STABILOMETER AT 1000 LBS	22	30	14			[PSI]
O	STABILOMETER AT 2000 LBS	45	68	27			[PSI]
P	DISPLACEMENT FOR 100 PSI	3.56	4.19	3.69			[Turns]
Q	R VALUE BY STABILOMETER	64	45	77			
R	CORRECTED R-VALUE (See Fig. 14)	63	45	77			
S	EXPANSION DIAL READING	0.0012	0.0000	0.0024			[IN]
T	EXPANSION PRESSURE (S*43,300)	52	0	104			[PSF]
U	COVER BY STABILOMETER	0.34	0.51	0.21			[FT]
V	COVER BY EXPANSION	0.40	0.00	0.80			[FT]

TRAFFIC INDEX:	5.0
GRAVEL FACTOR:	1.72
UNIT WEIGHT OF COVER [PCF]:	130
R-VALUE BY EXUDATION:	51
R-VALUE BY EXPANSION:	60
R-VALUE AT EQUILIBRIUM:	51

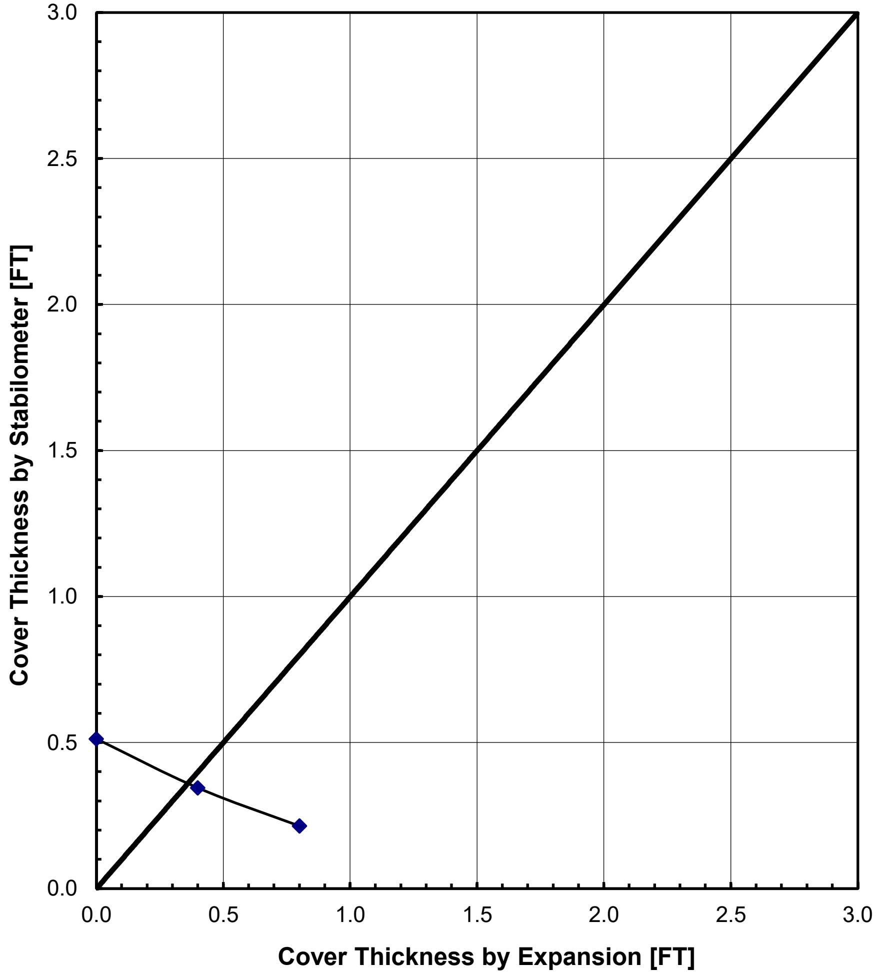
*Note: Gravel factor estimated from pavement section using CTM 301, Section C, Part b.

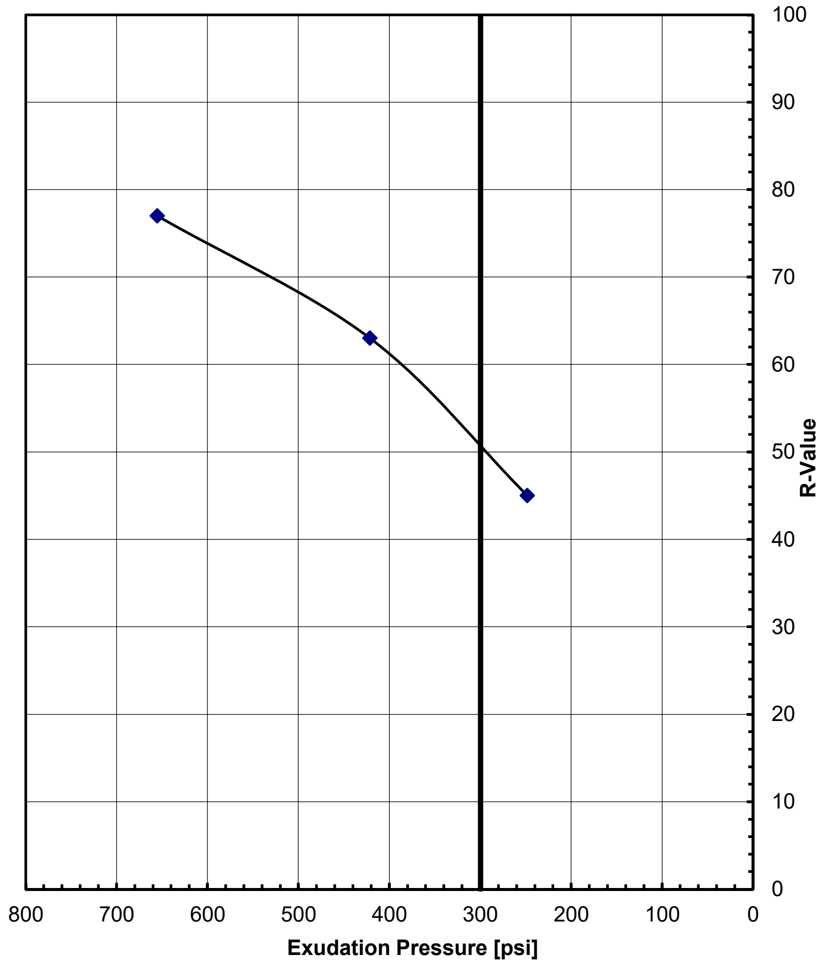
REV. 2, DATED 1/31/15

GROUP DELTA **R-VALUE TEST RESULTS** Document No. 22-0061
Project No. SD736
FIGURE B-5.2a

Sample: A-16-09, 2' - 4'

R-Value at Equilibrium: 51





GROUP DELTA

COVER AND EXUDATION CHARTS

Document No. 22-0061
Project No. SD736
FIGURE B-5.2b

BORING NO.: A-16-10 **SAMPLE DATE:** 6/7/16

BORING DEPTH: 2' - 4' **TEST DATE:** 6/10/16

SAMPLE DESCRIPTION: Dark yellow brown silty sand (SM)

LABORATORY TEST DATA

	TEST SPECIMEN	1	2	3	4	5	
A	COMPACTOR PRESSURE	270	200	350			[PSI]
B	INITIAL MOISTURE	4.2	4.2	4.2			[%]
C	BATCH SOIL WEIGHT	1200	1200	1200			[G]
D	WATER ADDED	81	90	70			[ML]
E	WATER ADDED (D*(100+B)/C)	7.0	7.8	6.1			[%]
F	COMPACTION MOISTURE (B+E)	11.3	12.0	10.3			[%]
G	MOLD WEIGHT	2098.7	2108.2	2113.2			[G]
H	TOTAL BRIQUETTE WEIGHT	3221.4	3260.8	3207.8			[G]
I	NET BRIQUETTE WEIGHT (H-G)	1122.7	1152.6	1094.6			[G]
J	BRIQUETTE HEIGHT	2.44	2.50	2.40			[IN]
K	DRY DENSITY (30.3*I/((100+F)*J))	125.3	124.7	125.3			[PCF]
L	EXUDATION LOAD	4180	3143	6731			[LB]
M	EXUDATION PRESSURE (L/12.54)	333	251	537			[PSI]
N	STABILOMETER AT 1000 LBS	38	46	19			[PSI]
O	STABILOMETER AT 2000 LBS	90	106	40			[PSI]
P	DISPLACEMENT FOR 100 PSI	4.15	4.58	3.51			[Turns]
Q	R VALUE BY STABILOMETER	32	22	68			
R	CORRECTED R-VALUE (See Fig. 14)	32	22	66			
S	EXPANSION DIAL READING	0.0000	0.0000	0.0019			[IN]
T	EXPANSION PRESSURE (S*43,300)	0	0	82			[PSF]
U	COVER BY STABILOMETER	0.69	0.79	0.34			[FT]
V	COVER BY EXPANSION	0.00	0.00	0.63			[FT]

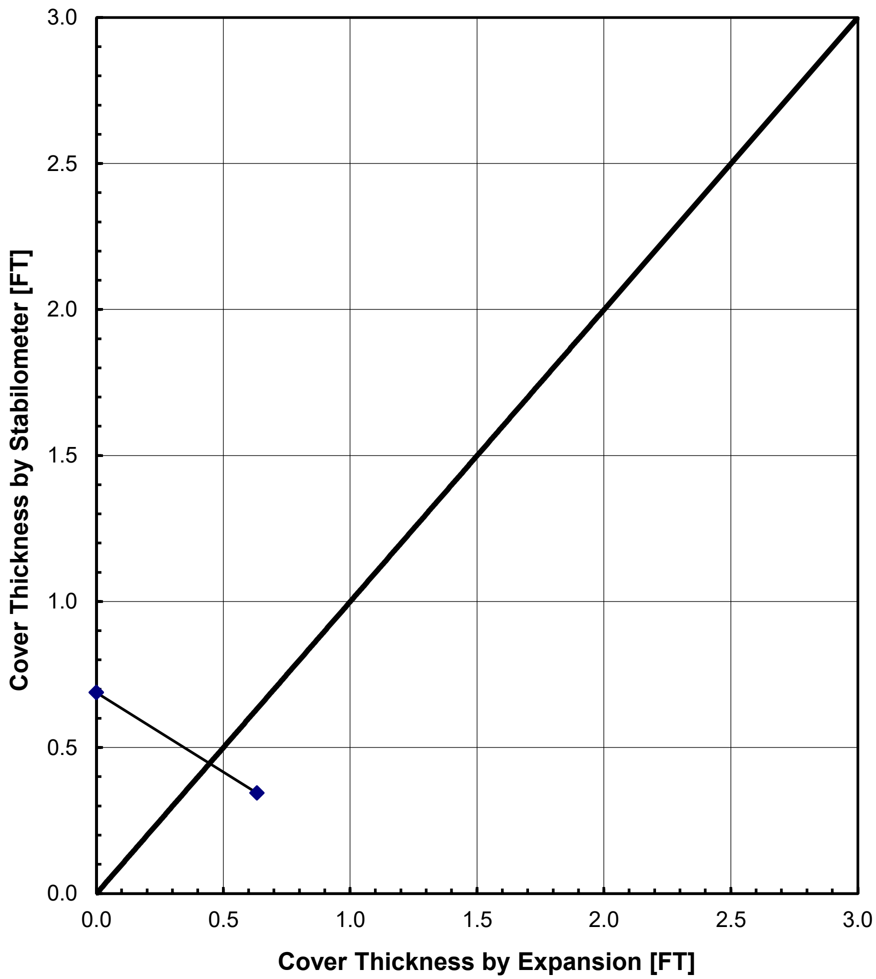
TRAFFIC INDEX:	5.0
GRAVEL FACTOR:	1.58
UNIT WEIGHT OF COVER [PCF]:	130
R-VALUE BY EXUDATION:	26
R-VALUE BY EXPANSION:	55
R-VALUE AT EQUILIBRIUM:	26

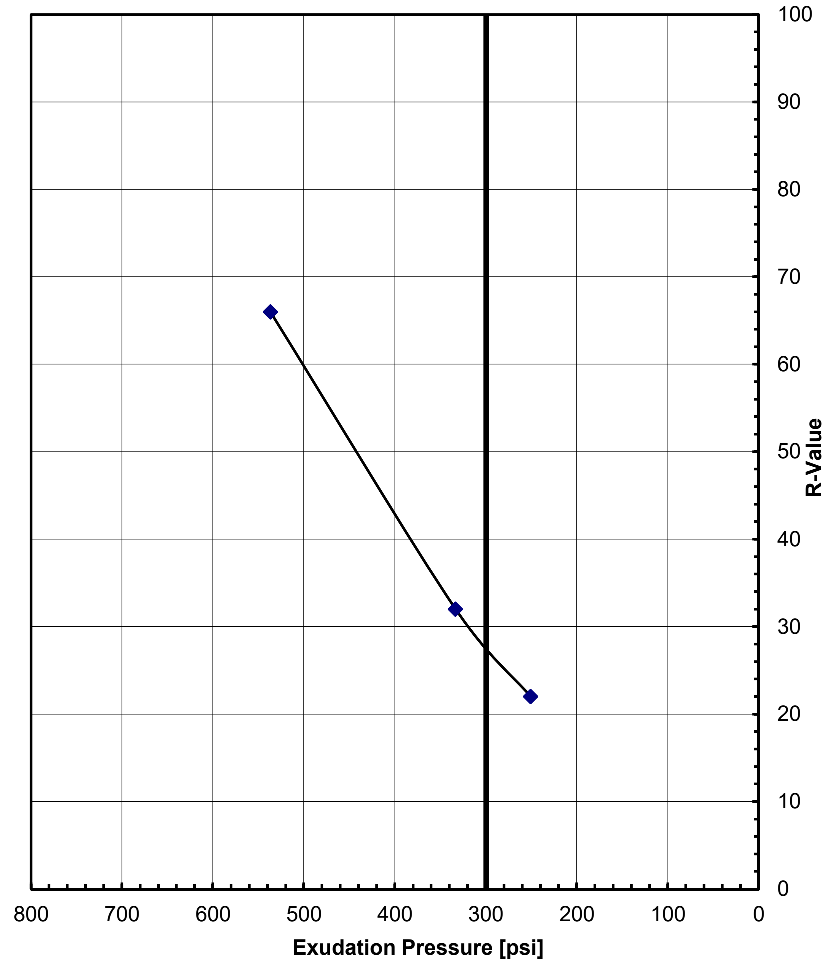
*Note: Gravel factor estimated from pavement section using CTM 301, Section C, Part b.

REV. 2, DATED 1/31/15

Sample: A-16-10, 2' - 4'

R-Value at Equilibrium: 26





GROUP DELTA

COVER AND EXUDATION CHARTS

Document No. 22-0061
Project No. SD736
FIGURE B-5.3b

BORING NO.: A-17-01 **SAMPLE DATE:** 3/17/17

BORING DEPTH: ½' - 5' **TEST DATE:** 3/31/17

SAMPLE DESCRIPTION: Dark yellowish brown clayey sand (SC)

LABORATORY TEST DATA

	TEST SPECIMEN	**1**	**2**	**3**	**4**	**5**	
A	COMPACTOR PRESSURE	100	150	350			[PSI]
B	INITIAL MOISTURE	1.4	1.4	1.4			[%]
C	BATCH SOIL WEIGHT	1200	1200	1200			[G]
D	WATER ADDED	120	105	95			[ML]
E	WATER ADDED (D*(100+B)/C)	10.1	8.9	8.0			[%]
F	COMPACTION MOISTURE (B+E)	11.5	10.3	9.4			[%]
G	MOLD WEIGHT	2113.1	2098.6	2100.2			[G]
H	TOTAL BRIQUETTE WEIGHT	3293.3	3248.0	3182.7			[G]
I	NET BRIQUETTE WEIGHT (H-G)	1180.2	1149.4	1082.5			[G]
J	BRIQUETTE HEIGHT	2.64	2.43	2.40			[IN]
K	DRY DENSITY (30.3*I/((100+F)*J))	121.4	130.0	124.9			[PCF]
L	EXUDATION LOAD	2055	2878	7440			[LB]
M	EXUDATION PRESSURE (L/12.54)	164	230	593			[PSI]
N	STABILOMETER AT 1000 LBS	56	49	29			[PSI]
O	STABILOMETER AT 2000 LBS	129	114	64			[PSI]
P	DISPLACEMENT FOR 100 PSI	5.67	4.73	3.84			[Turns]
Q	R VALUE BY STABILOMETER	10	18	49			
R	CORRECTED R-VALUE (See Fig. 14)	11	18	47			
S	EXPANSION DIAL READING	0.0000	0.0001	0.0031			[IN]
T	EXPANSION PRESSURE (S*43,300)	0	4	134			[PSF]
U	COVER BY STABILOMETER	0.87	0.80	0.52			[FT]
V	COVER BY EXPANSION	0.00	0.03	1.03			[FT]

TRAFFIC INDEX:	5.0
GRAVEL FACTOR:	1.64
UNIT WEIGHT OF COVER [PCF]:	130
R-VALUE BY EXUDATION:	24
R-VALUE BY EXPANSION:	32
R-VALUE AT EQUILIBRIUM:	24

*Note: Gravel factor estimated from pavement section using CTM 301, Section C, Part b.

REV. 2, DATED 1/31/15

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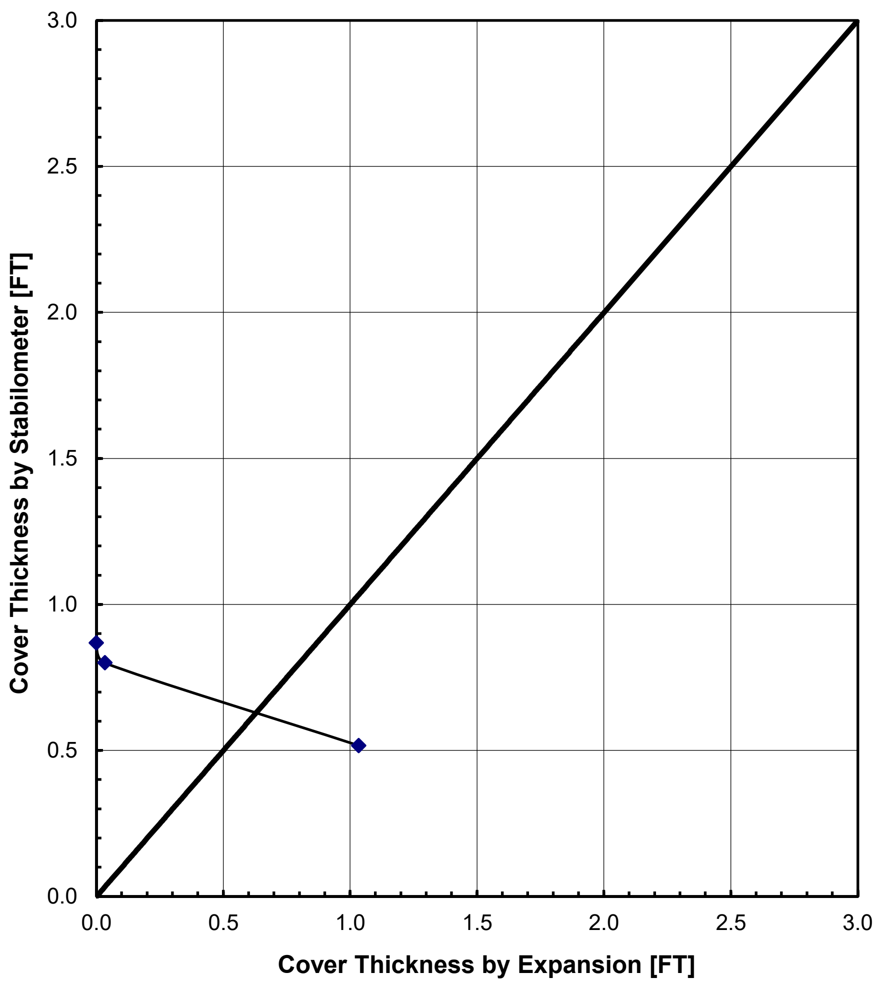
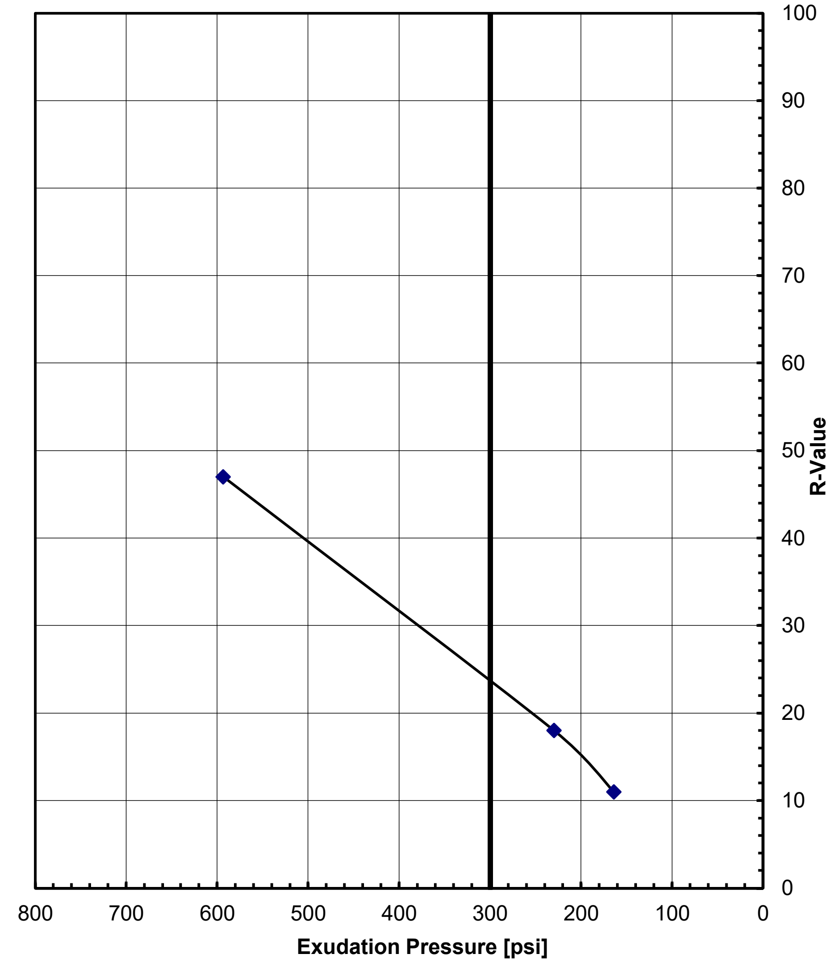
R-VALUE TEST RESULTS

Document No. 22-0061
Project No. SD736
FIGURE B-5.4a

Sample: A-17-01, ½' - 5'

R-Value at Equilibrium: 24





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COVER AND EXUDATION CHARTS

Document No. 22-0061
Project No. SD736
FIGURE B-5.4b

BORING NO.: A-17-02 **SAMPLE DATE:** 3/17/17

BORING DEPTH: 0' - 5' **TEST DATE:** 4/3/17

SAMPLE DESCRIPTION: Dark yellow brown clayey sand (SC)

LABORATORY TEST DATA

	TEST SPECIMEN	**1**	**2**	**3**	**4**	**5**	
A	COMPACTOR PRESSURE	250	190	230			[PSI]
B	INITIAL MOISTURE	1.3	1.3	1.3			[%]
C	BATCH SOIL WEIGHT	1200	1200	1200			[G]
D	WATER ADDED	100	111	106			[ML]
E	WATER ADDED (D*(100+B)/C)	8.4	9.4	8.9			[%]
F	COMPACTION MOISTURE (B+E)	9.7	10.7	10.2			[%]
G	MOLD WEIGHT	2111.6	2112.3	2114.4			[G]
H	TOTAL BRIQUETTE WEIGHT	3204.3	3213.6	3223.4			[G]
I	NET BRIQUETTE WEIGHT (H-G)	1092.7	1101.3	1109.0			[G]
J	BRIQUETTE HEIGHT	2.40	2.43	2.45			[IN]
K	DRY DENSITY (30.3*I/((100+F)*J))	125.7	124.1	124.4			[PCF]
L	EXUDATION LOAD	6606	3000	4998			[LB]
M	EXUDATION PRESSURE (L/12.54)	527	239	399			[PSI]
N	STABILOMETER AT 1000 LBS	28	40	33			[PSI]
O	STABILOMETER AT 2000 LBS	64	96	76			[PSI]
P	DISPLACEMENT FOR 100 PSI	3.95	4.71	4.30			[Turns]
Q	R VALUE BY STABILOMETER	49	26	39			
R	CORRECTED R-VALUE (See Fig. 14)	46	25	39			
S	EXPANSION DIAL READING	0.0035	0.0011	0.0027			[IN]
T	EXPANSION PRESSURE (S*43,300)	152	48	117			[PSF]
U	COVER BY STABILOMETER	0.53	0.73	0.60			[FT]
V	COVER BY EXPANSION	1.17	0.37	0.90			[FT]

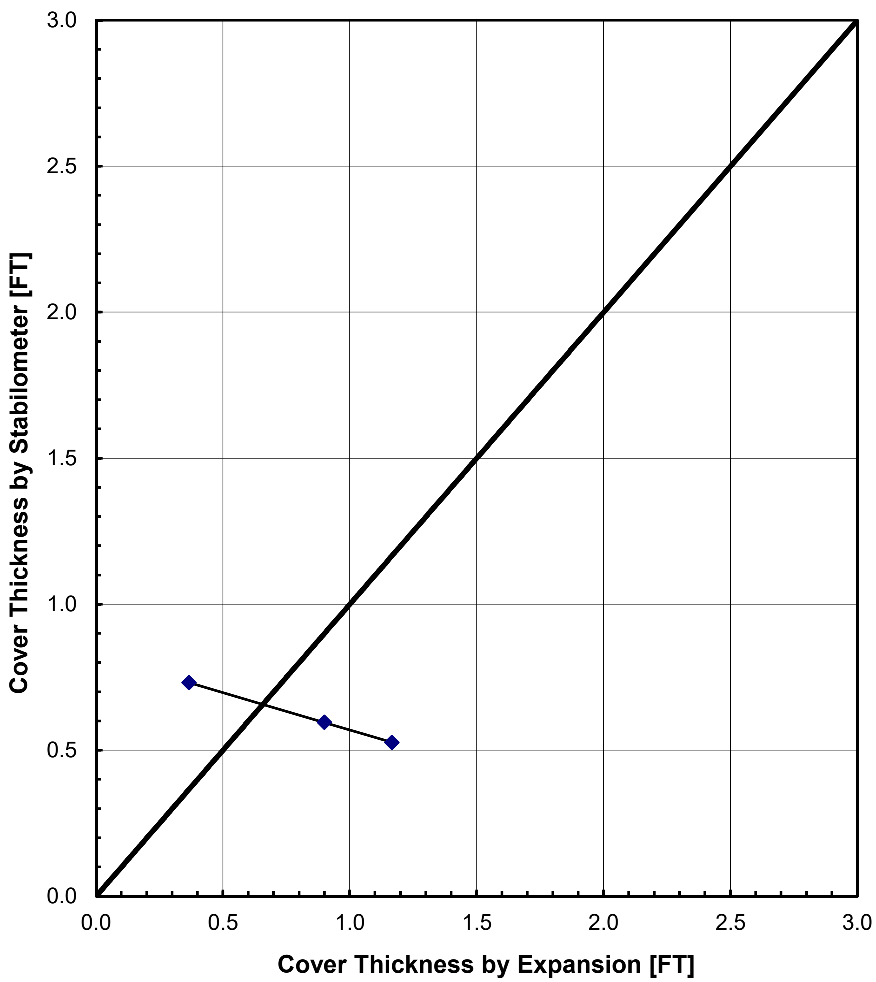
TRAFFIC INDEX:	5.0
GRAVEL FACTOR:	1.64
UNIT WEIGHT OF COVER [PCF]:	130
R-VALUE BY EXUDATION:	30
R-VALUE BY EXPANSION:	32
R-VALUE AT EQUILIBRIUM:	30

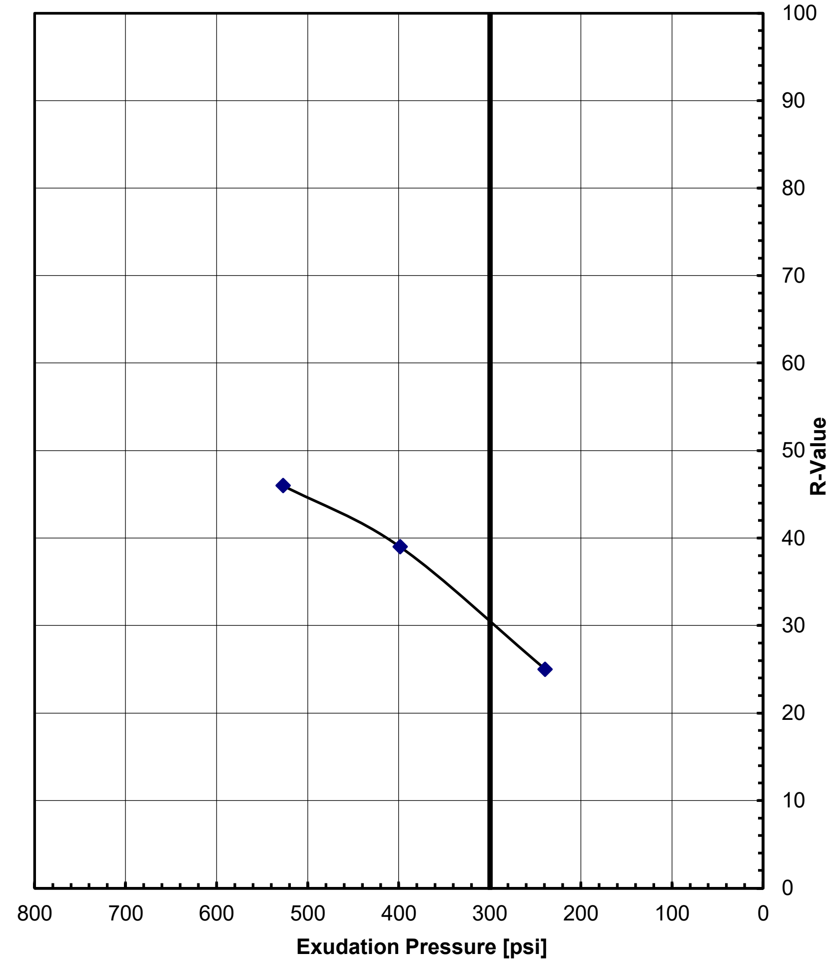
*Note: Gravel factor estimated from pavement section using CTM 301, Section C, Part b.

REV. 2, DATED 1/31/15

Sample: A-17-02, 0' - 5'

R-Value at Equilibrium: 30





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SAN DIEGO, CALIFORNIA 92126

COVER AND EXUDATION CHARTS

Document No. 22-0061
Project No. SD736
FIGURE B-5.5b

SAMPLE NO.: A-20-01
SAMPLE LOCATION: 0' - 4'
SAMPLE DESCRIPTION: Yellowish brown silty sand (SM)

SAMPLE DATE: 6/16/20
TEST DATE: 6/17/20

LABORATORY TEST DATA

	TEST SPECIMEN	**1**	**2**	**3**	**4**	**5**	
A	COMPACTOR PRESSURE	130	110	220			[PSI]
B	INITIAL MOISTURE	5.5	5.5	5.5			[%]
C	BATCH SOIL WEIGHT	1200	1200	1200			[G]
D	WATER ADDED	80	90	70			[ML]
E	WATER ADDED (D*(100+B)/C)	7.0	7.9	6.2			[%]
F	COMPACTION MOISTURE (B+E)	12.5	13.4	11.7			[%]
G	MOLD WEIGHT	2019.8	2091.0	2075.3			[G]
H	TOTAL BRIQUETTE WEIGHT	3128.0	3198.1	3162.8			[G]
I	NET BRIQUETTE WEIGHT (H-G)	1108.2	1107.1	1087.5			[G]
J	BRIQUETTE HEIGHT	2.46	2.50	2.38			[IN]
K	DRY DENSITY (30.3*I/((100+F)*J))	121.3	118.3	124.0			[PCF]
L	EXUDATION LOAD	4067	3170	6355			[LB]
M	EXUDATION PRESSURE (L/12.54)	324	253	507			[PSI]
N	STABILOMETER AT 1000 LBS	44	61	40			[PSI]
O	STABILOMETER AT 2000 LBS	125	134	90			[PSI]
P	DISPLACEMENT FOR 100 PSI	5.78	6.15	5.40			[Turns]
Q	R VALUE BY STABILOMETER	11	7	26			
R	CORRECTED R-VALUE (See Fig. 14)	11	7	24			
S	EXPANSION DIAL READING	0.0004	0.0002	0.0009			[IN]
T	EXPANSION PRESSURE (S*43,300)	17	9	39			[PSF]
U	COVER BY STABILOMETER	0.98	1.02	0.83			[FT]
V	COVER BY EXPANSION	0.13	0.07	0.30			[FT]

TRAFFIC INDEX:	5.0
GRAVEL FACTOR:	1.46
UNIT WEIGHT OF COVER [PCF]:	130
R-VALUE BY EXUDATION:	9
R-VALUE BY EXPANSION:	24
R-VALUE AT EQUILIBRIUM:	9

*Note: Gravel factor estimated from pavement section using CTM 301, Section C, Part b.

REV. 2, DATED 1/31/15

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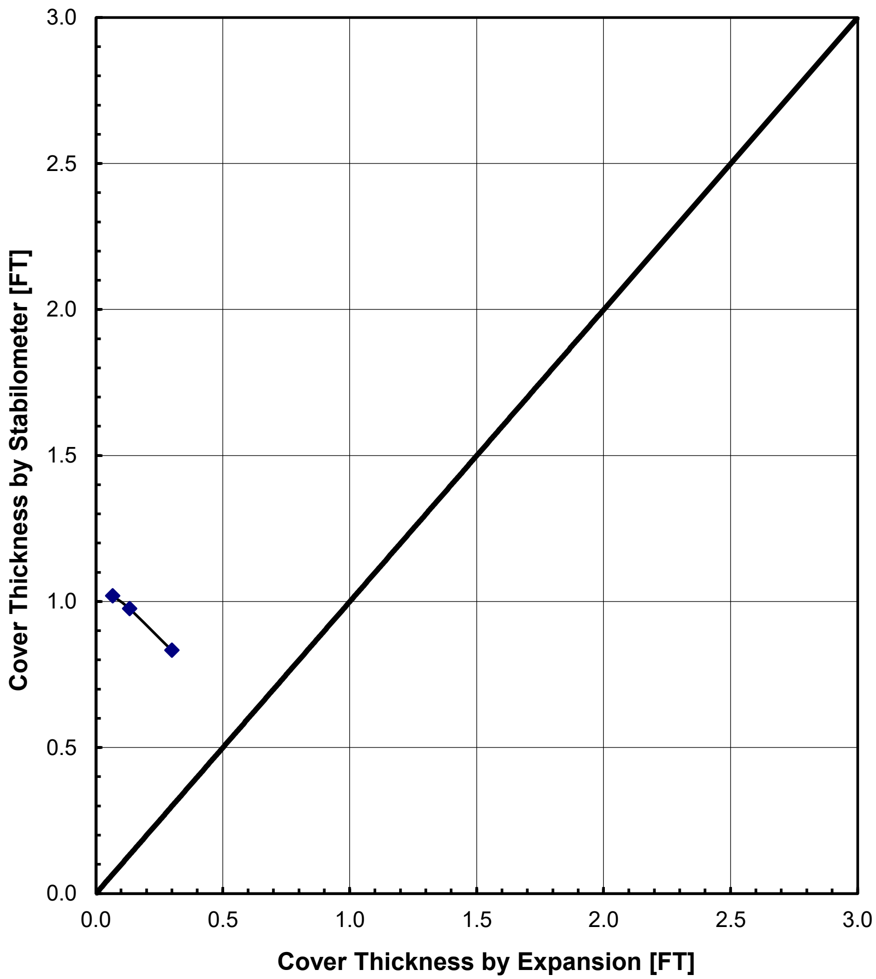
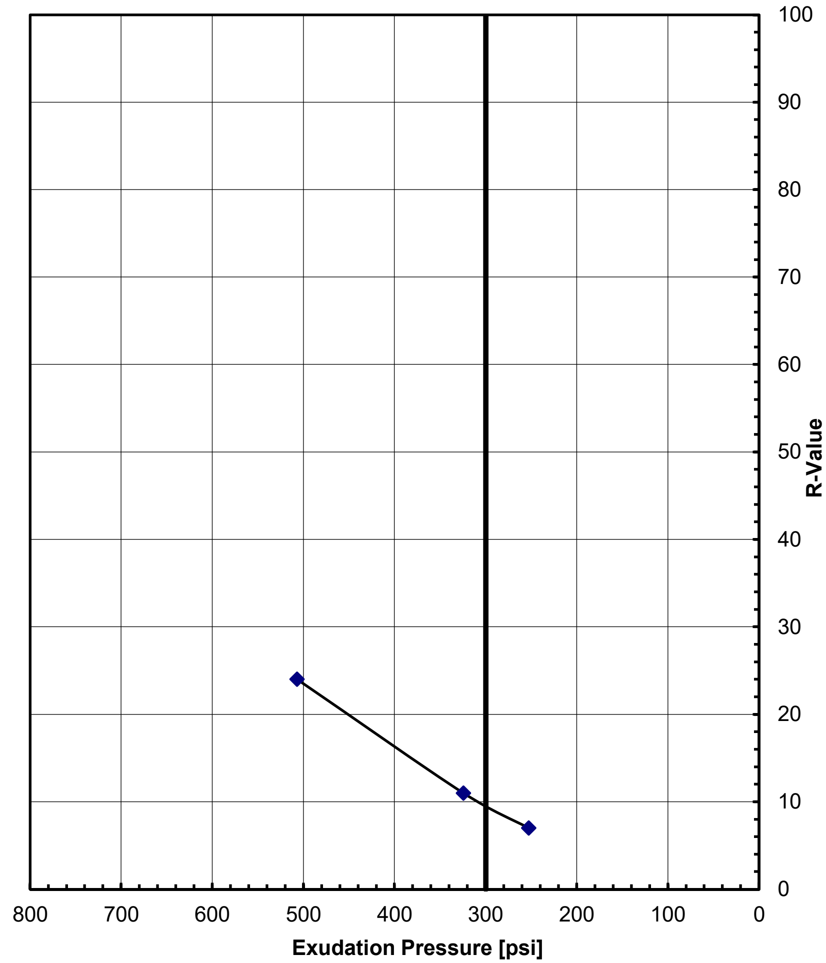
R-VALUE TEST RESULTS
CT301

Document No. 20-0122
Project No. SD736
FIGURE B-5.6a

Sample: A-20-01, 0' - 4'

R-Value at Equilibrium: 9





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COVER AND EXUDATION CHARTS

Document No. 20-0122
Project No. SD736
FIGURE B-5.6b

SAMPLE NO.: A-22-01 **SAMPLE DATE:** 6/7/22

SAMPLE LOCATION: 0'-4' **TEST DATE:** 6/14/22

SAMPLE DESCRIPTION: Yellowish brown clayey sand (SC)

LABORATORY TEST DATA

	TEST SPECIMEN	1	2	3	4	5	
A	COMPACTOR PRESSURE	220	185	250			[PSI]
B	INITIAL MOISTURE	3.4	3.4	3.4			[%]
C	BATCH SOIL WEIGHT	1200	1200	1200			[G]
D	WATER ADDED	120	130	109			[ML]
E	WATER ADDED (D*(100+B)/C)	10.3	11.2	9.4			[%]
F	COMPACTION MOISTURE (B+E)	13.7	14.6	12.8			[%]
G	MOLD WEIGHT	2011.0	2078.4	2012.0			[G]
H	TOTAL BRIQUETTE WEIGHT	3120.2	3152.2	3125.5			[G]
I	NET BRIQUETTE WEIGHT (H-G)	1109.2	1073.8	1113.5			[G]
J	BRIQUETTE HEIGHT	2.55	2.51	2.52			[IN]
K	DRY DENSITY (30.3*I/((100+F)*J))	115.9	113.1	118.7			[PCF]
L	EXUDATION LOAD	4181	2641	5902			[LB]
M	EXUDATION PRESSURE (L/12.54)	333	211	471			[PSI]
N	STABILOMETER AT 1000 LBS	44	45	40			[PSI]
O	STABILOMETER AT 2000 LBS	88	106	65			[PSI]
P	DISPLACEMENT FOR 100 PSI	5.45	5.90	5.00			[Turns]
Q	R VALUE BY STABILOMETER	27	18	42			
R	CORRECTED R-VALUE (See Fig. 14)	27	18	42			
S	EXPANSION DIAL READING	0.0000	0.0000	0.0002			[IN]
T	EXPANSION PRESSURE (S*43,300)	0	0	9			[PSF]
U	COVER BY STABILOMETER	0.76	0.86	0.61			[FT]
V	COVER BY EXPANSION	0.00	0.00	0.07			[FT]

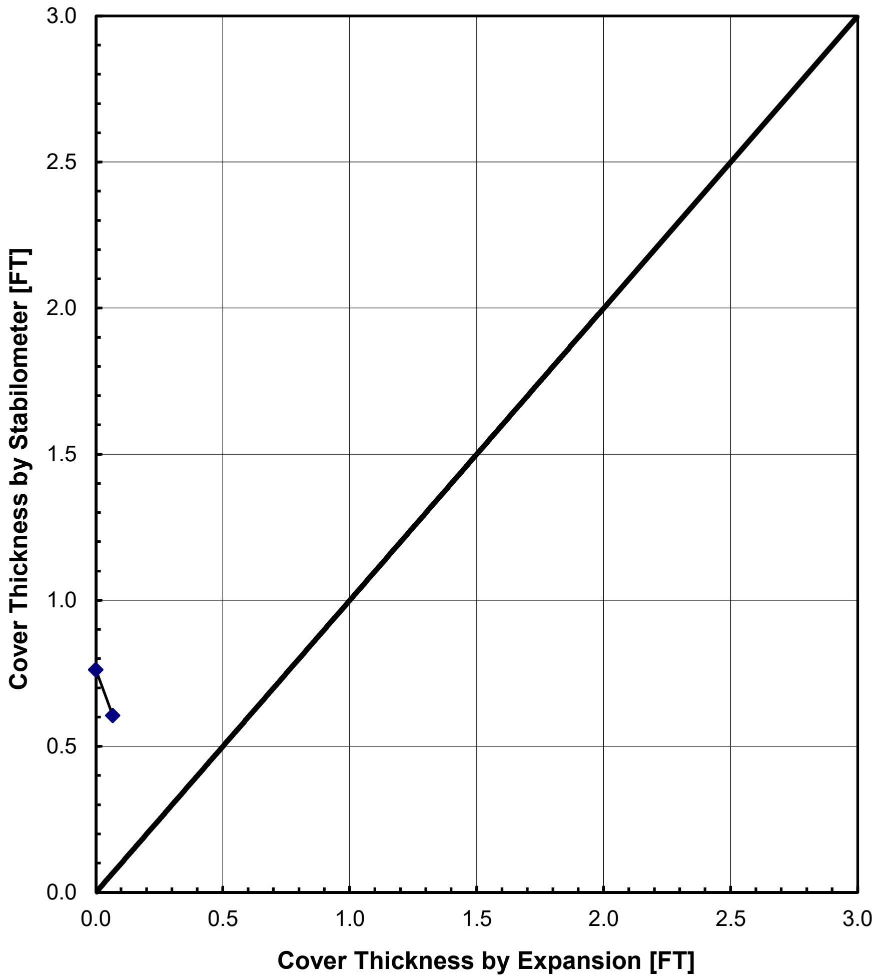
TRAFFIC INDEX:	5.0
GRAVEL FACTOR:	1.53
UNIT WEIGHT OF COVER [PCF]:	130
R-VALUE BY EXUDATION:	24
R-VALUE BY EXPANSION:	42
R-VALUE AT EQUILIBRIUM:	24

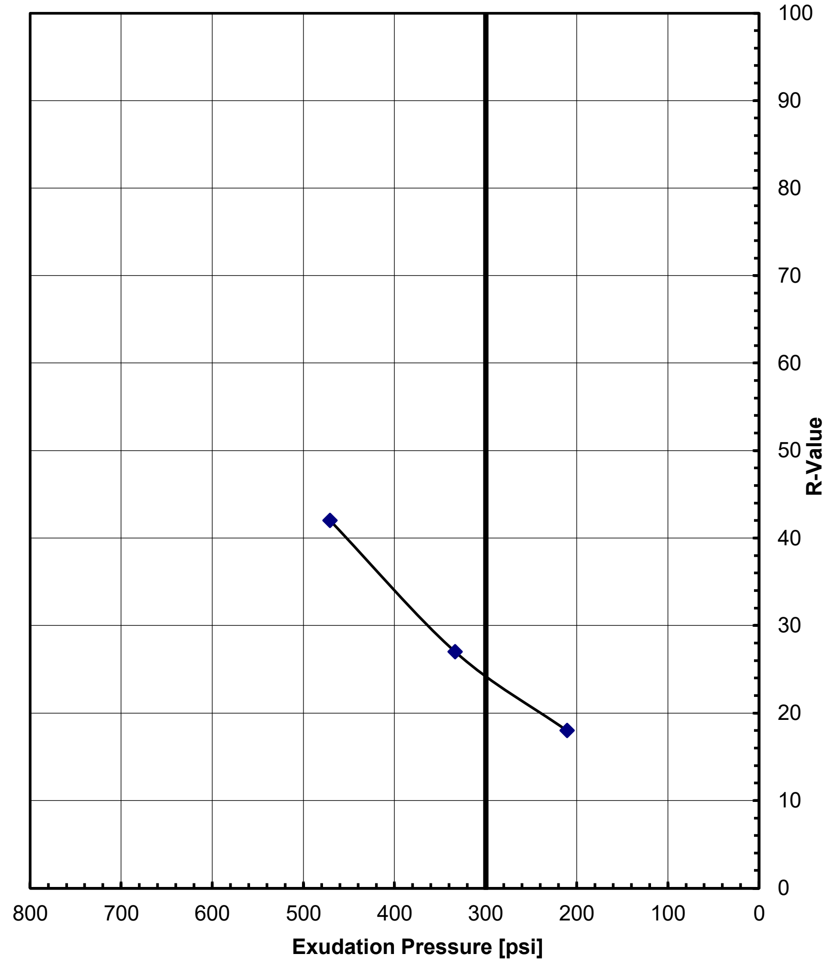
*Note: Gravel factor estimated from pavement section using CTM 301, Section C, Part b.

REV. 2, DATED 1/31/15

Sample: A-22-01 @ 0'-4'

R-Value at Equilibrium: 24





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COVER AND EXUDATION CHARTS

Document No. 22-0061
Project No. SD736
FIGURE B-5.7b

Appendix C: VFVRC Hydrology Study

700 South Flower St., Suite 2100 Los Angeles, CA 90017 213.418.0201 kpff.com

MEMO

DATE: 08/19/2022

TO: Juli Smith, UCSD

FROM: Elainey Fetene, KPFF Civil

RE: CEQA Analysis Documentation - 5301 VFVRC Hydrology Study

The 100,000 square feet, 5-story Viterbi building is located at the Health Sciences Campus of UC San Diego. It is located adjacent to the Shiley Eye Institute and Anne Ratner Children's Eye Center along the east side, and Koman Family Outpatient Pavilion (KOP) along the south side. The Viterbi project area is approximately 2.9-acres and is currently occupied by the existing parking lot #751.

No surface waters are present on the project site or nearby, and site runoff is captured and discharged in two directions: to the west via a 30-inch underground storm drain line along Medical Center Drive (POC 1) and to the south-east via a 12-inch underground storm drain (POC 2). Construction SWPPP BMPs (Best Management Practices) will be implemented throughout construction. Biofiltration BMPs will be utilized for post-construction stormwater BMPs.

Campus infrastructure master plan studies for hydrology was reviewed to verify pipe flow, capacity, and condition of existing utilities. These studies were prepared to support the 2018 UC San Diego Long Range Development Plan (LRDP) to analyze UC San Diego's existing infrastructure and investigate the feasibility of the campus's planned 30-year build out condition.

The LRDP hydrology report indicated that the existing 30-inch RCP storm drain line has adequate downstream capacity of approximately 60% during a 100-year storm event. The LRDP hydrology report also indicated that although the 12-inch storm drain line reaches capacity during a 100-year storm event, the existing storm drain line is not required to be upsized due to the drainage area decreasing in the final build-out condition.

The Q10 and Q100 flow generated from the VFVRC project site before construction was calculated to be 7.98 cfs and 11.94 cfs, respectively. The Q10 and Q100 flow after construction was calculated to be 8.58 cfs and 12.84 cfs, respectively (note: the post-construction flow will be mitigated by hydromodification BMP).

Existing Condition									
DMA	Area (Acres)	% Impervious	C	Tc (min)	I10 (in/hr)	I100 (in/hr)	Q10 (cfs)	Q100 (cfs)	POC
EX-1	1.72	58%	0.67	5.00	3.93	5.88	4.53	6.78	1
EX-2	1.13	78%	0.78	5.00	3.93	5.88	3.45	5.16	2
Total	**2.85**	**66%**					**7.98**	**11.94**	

Table 1: Existing Condition Hydrology for 10-Year and 100-Year Storm

Proposed Condition									
Drainage Area	Area (Acres)	% Impervious	C	Tc (min)	I10 (in/hr)	I100 (in/hr)	Q10 (cfs)	Q100 (cfs)	POC
P-1	1.34	84%	0.81	5.00	3.93	5.88	4.26	6.38	1
P-2	0.25	69%	0.73	5.00	3.93	5.88	0.71	1.07	1
P-3	0.73	80%	0.79	5.00	3.93	5.88	2.27	3.39	2
P-4	0.53	53%	0.64	5.00	3.93	5.88	1.34	2.00	1
Total	**2.85**	**66%**					**8.58**	**12.84**	

Table 2: Proposed Condition Hydrology for 10-Year and 100-Year Storm

Due to the 10-year, 6-hour peak flow increasing at the discharge point to the west (POC 1) in the post-construction condition, hydromodification measures will be met by reducing the peak flow by 0.4 cfs minimum. Peak flows will be reduced by implementing UCSD design standards for storm water mitigation. This will be done by increasing the proposed BMP square footage to detain additional volumes and providing flow control. See below for the 10-year, 6-hr hydrograph. Required detention volume was calculated to be 291 CF. Minimum basin square footage required for Viterbi is 3,900 SF.

Duration (min)	Q_N Post (cfs)	Q Pre (cfs)	Duration (min)	Q_N Post (cfs)	Q Pre (cfs)
5.00	0.14	4.53	135.00	0.24	4.53
10.00	0.15	4.53	140.00	0.25	4.53
15.00	0.15	4.53	145.00	0.26	4.53
20.00	0.15	4.53	150.00	0.27	4.53
25.00	0.15	4.53	155.00	0.28	4.53
30.00	0.16	4.53	160.00	0.29	4.53
35.00	0.16	4.53	165.00	0.30	4.53
40.00	0.16	4.53	170.00	0.32	4.53
45.00	0.16	4.53	175.00	0.33	4.53
50.00	0.17	4.53	180.00	0.35	4.53
55.00	0.17	4.53	185.00	0.37	4.53
60.00	0.17	4.53	190.00	0.40	4.53
65.00	0.17	4.53	195.00	0.42	4.53
70.00	0.18	4.53	200.00	0.46	4.53
75.00	0.18	4.53	205.00	0.49	4.53
80.00	0.19	4.53	210.00	0.56	4.53
85.00	0.19	4.53	215.00	0.61	4.53
90.00	0.19	4.53	220.00	0.75	4.53
95.00	0.20	4.53	225.00	0.85	4.53
100.00	0.20	4.53	230.00	1.25	4.53
105.00	0.21	4.53	235.00	1.76	4.53
110.00	0.21	4.53	240.00	6.31	4.53
115.00	0.22	4.53	245.00	1.00	4.53
120.00	0.22	4.53	250.00	0.67	4.53
125.00	0.23	4.53	255.00	0.52	4.53

130.00	0.24	4.53	260.00	0.44	4.53

Duration (min)	Q_N Post (cfs)	Q Pre (cfs)
265.00	0.38	4.53
270.00	0.34	4.53
275.00	0.31	4.53
280.00	0.28	4.53
285.00	0.26	4.53
290.00	0.25	4.53
295.00	0.23	4.53
300.00	0.22	4.53
305.00	0.21	4.53
310.00	0.20	4.53
315.00	0.19	4.53
320.00	0.18	4.53
325.00	0.18	4.53
330.00	0.17	4.53
335.00	0.16	4.53
340.00	0.16	4.53
345.00	0.15	4.53
350.00	0.15	4.53
355.00	0.15	4.53
360.00	0.14	4.53

Table 3: Proposed Condition Hydrograph Calculations for 10-Year Storm

Juli Smith, UCSD
5301 Viterbi Family Vision Research Center
KPFF Job #2100467
08/19/2022