University of California, Riverside
Opportunity to Advance Sustainability, Innovation and Social Inclusion Park (OASIS Park)
Project Number: 950604

Addendum No. 3 to the Program Environmental Impact Report for the University of California, Riverside 2021 Long Range Development Plan

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Description
2023 SPP	2023 Sustainable Practices Policy
AES	Aesthetics
AFY	acre feet per year
ALUCP	Airport Land Use Compatibility Plan
AMSL	above mean sea level
APN	Assessor Parcel Number
AQMP	Air Quality Management Plan
asf	assignable square feet
ASTM	American Society for Testing and Materials
BACT	Best Available Control Technology
BIO	Biological Resources
BMP	best management practice
CAL FIRE	California Department of Forestry and Fire Protection
Cal/OSHA	California Occupational Safety and Health Administration
CalEEMod	California Emissions Estimator Model
Caltrans	California Department of Transportation
campus	University of California, Riverside main campus
CARB	California Air Resources Board
CBC	California Building Code
CBP	Continuing Best Practice
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CE-CERT	College of Engineering Center for Environmental Research and Technology
CFR	Code of Federal Regulations
City	City of Riverside
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
County	Riverside County
CRHR	California Register of Historical Resources
CR	Construction
CS	Carbon Sequestration
CUL	Cultural Resources
CVARS	Coachella Valley Agricultural Research Station
cy	cubic yards
dBA	A-weighted decibels
DTSC	Department of Toxic Substances Control
EH&S	Environmental Health & Safety
EIR	Environmental Impact Report
EN	Energy
ESA	Environmental Site Assessment
ExCITE	Center for Innovation Technology & Entrepreneurship
FL	Fuel
GEO	Geology and Soils
GHG	greenhouse gas
gsf	gross square feet
GWP	Global Warming Potential
HAZ	Hazards and Hazardous Materials
HRA	health risk assessment
HVAC	heating, ventilation, and air conditioning
I-	Interstate
IS	Initial Study
LBP	lead-based paints

Acronym/Abbreviation	Description
lbs/day	pounds per day
LEED	Leadership in Energy and Environmental Design
Leq	equivalent noise level
LID	low impact development
LRDP	Long Range Development Plan
LST	Localized Significance Threshold
MM	mitigation measure
MRZ	Mineral Resource Zone
MS4	Municipal Separate Storm Sewer System
MSHCP	Multiple Species Habitat Conservation Plan
MT CO_2e	metric tons of carbon dioxide equivalent
NAHC	Native American Heritage Commission
NM	Noise Measurement
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OASIS	Opportunity to Advance Sustainability, Innovation and Social Inclusion
PD&C	Planning, Design & Construction
PM_{10}	particulate matter 10 micrometers in diameter or less
$PM_{2.5}$	fine particulate matter 2.5 micrometers in diameter or less
PRC	Public Resources Code
PV	photovoltaic
Qof	Quaternary Old Alluvial Fan Deposits
RCDEH	Riverside County Department of Environmental Health
REC	Renewable Energy Certificate
RCHCA	Riverside County Habitat Conservation Agency
Regents	University of California Board of Regents
RFD	City of Riverside Fire Department
RivTAM	Riverside Traffic Analysis Model
ROG	Reactive organic gases
RPU	Riverside Public Utilities
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
RWQCB	Regional Water Quality Control Board
RWQCP	Riverside Water Quality Control Plant
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
sf	Square foot
SMP	Construction Site Management Plan
SO_2	Sulfur dioxide
SR	State Route
SWMP	Storm Water Management Program
SWPPP	Storm Water Pollution Prevention Plan
TAC	Toxic air contaminant
TAPS	Transportation and Parking Services
TCR	Tribal Cultural Resources
TDM	Transportation Demand Management
TR	Transportation
UC	University of California
UCPD	University of California Police Department
UCR	University of California, Riverside
UNEX	University Extension
UST	Underground Storage Tanks
UWMP	Urban Water Management Plan

Acronym/Abbreviation	Description
VHFHSZ	Very High Fire Hazard Severity Zone
VMT	Vehicle Miles Traveled
WC	Water Consumption
WF	Wildfire
WG	Waste Generation
WRCOG	Western Riverside Council of Governments

1 INTRODUCTION

1.1 PROJECT SUMMARY

The University of California, Riverside (UCR) Opportunity to Advance Sustainability, Innovation and Social Inclusion (OASIS) Park (proposed project) is evaluated in this Addendum for consistency with the UCR 2021 Long Range Development Plan (LRDP) and its associated Program Environmental Impact Report (EIR), certified November 18, 2021 (State Clearinghouse No. 2020070120).

Project title:	OASIS Park
Project location:	University of California, Riverside
Lead agency's name and address:	The Regents of the University of California 1111 Franklin Street Oakland, California 94607
Contact person:	Stephanie Tang, Assistant Director of Campus Planning University of California, Riverside Planning, Design & Construction
Project sponsor's name and address:	University of California, Riverside Planning, Design & Construction 1223 University Avenue, Suite 240 Riverside, California 92507
Location of administrative record:	See Project Sponsor
Previously Certified 2021 LRDP Program EIR:	The 2021 LRDP is a comprehensive land use plan that guides physical development on UCR's campus to accommodate projected enrollment increases and new and expanded program initiatives. This Addendum documents that the proposed project is consistent with the 2021 LRDP and that none of the conditions described in California Environmental Quality Act (CEQA) Guidelines Section 15162 calling for the preparation of a subsequent EIR have occurred, and that the proposed project will not have additional significant effects that were not already evaluated in the 2021 LRDP EIR. The 2021 LRDP and its associated EIR are available at the following locations: ▪ University of California, Riverside Planning, Design & Construction Office located at 1223 University Avenue, Suite 240, Riverside, California 92507 ▪ Online at: https://pdc.ucr.edu/environmental-planning-ceqa

1.2 BACKGROUND, PURPOSE, AND PROJECT OVERVIEW

The UCR 2021 LRDP is a comprehensive long-range land use plan that guides physical development on the UCR campus consistent with UCR's mission, priorities, strategic goals, and campus population projections through the 2035-2036 academic year (UCR 2021a). On November 18, 2021, the University of California (UC) Board of Regents (Regents) certified the 2021 LRDP Environmental Impact Report (2021 LRDP EIR; UCR 2021b), State Clearinghouse No. 2020070120, and approved the 2021 LRDP. The 2021 LRDP EIR provides a program-level analysis of environmental impacts associated with the overall proposed development and campus population projections in the 2021 LRDP, including up to 12,754,258 gross square feet (gsf) of total building space (approximately 5,549,006 gsf of net new building space) for academics and research, academic support, student life and support facilities, 14,000 total beds (approximately 7,489 new beds), and a total campus population of 42,545 students, faculty, and staff.

The proposed project entails the demolition of the existing University Extension (UNEX) building and parking structure and development of a research laboratory and classroom/office building up to three stories in height, totaling approximately 70,000 gsf. The project is consistent with the program-level growth assumptions for UCR analyzed in the 2021 LRDP EIR, as described further in Section 3, *Consistency with the 2021 LRDP*, of this Addendum.

Pursuant to CEQA Section 21166 and CEQA Guidelines Section 15162, when an EIR has been certified for a project, no subsequent or supplemental EIR shall be prepared for that project unless the lead agency determines, based on substantial evidence in light of the whole record, one or more of the following:

- Substantial changes are proposed in the project which will require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified effects;
- Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or
- New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete, shows any of the following:
    - The project will have one or more significant effects not discussed in the previous EIR;
    - Significant effects previously examined will be substantially more severe than shown in the previous EIR;
    - Mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measures or alternatives; or
    - Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

Where none of the conditions specified in Section 15162[1] are present, the lead agency must determine whether to prepare an Addendum or whether no further CEQA documentation is required (CEQA Guidelines Section 15162[b]). An Addendum is appropriate where some minor technical changes or additions to the project or the previously certified EIR are necessary, but there are no new or substantially more severe significant impacts than those identified in the previously certified EIR (CEQA Guidelines Section 15164).

This Addendum uses a checklist format to document that project-specific activities are covered by the 2021 LRDP EIR pursuant to CEQA Guidelines Section 15168(c), which states that subsequent activities in a program, "must be examined in the light of the program EIR to determine whether an additional environmental document must be prepared." This Addendum and attached supporting documents have been prepared to document that the proposed project is consistent with the 2021 LRDP and that its potential environmental impacts are within the scope of those addressed in the 2021 LRDP EIR, pursuant to CEQA Guidelines Section 15168. This Addendum also documents that none of the conditions described in CEQA Section 21166 or CEQA Guidelines Sections 15162 or 15164 calling for preparation of a subsequent or supplemental EIR have occurred.

During construction and operation of the proposed project, all applicable mitigation measures (MMs) and continuing best practices (CBPs) from the 2021 LRDP EIR would be implemented and are incorporated by reference in this document (see Section 5, *Applicable Mitigation Measures*, of this Addendum).

[1] See also Section 15163 of the State CEQA Guidelines, which applies the requirements of Section 15162 to supplemental EIRs.

1.3 CEQA DETERMINATION

UCR previously prepared the 2021 LRDP EIR, and on the basis of this evaluation and pursuant to the CEQA Guidelines:

☒ I find that the project WOULD NOT have new significant effects on the environment that have not already been addressed by the 2021 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 CEQA Guidelines Section 15164, 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 CEQA Guidelines Section 15162, 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 2021 LRDP 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 CEQA Guidelines Section 15162, a TIERED ENVIRONMENTAL IMPACT REPORT is required.

DocuSigned by:
Stephanie Tang
C0F4B51694B0438...

Signature of Project Sponsor

3/13/2024 | 11:47 AM PDT

Date

2 PROJECT DESCRIPTION

This section of the Addendum describes the regional location and setting, local setting, project setting, project background, major project features, discretionary actions needed for approval, and proposed project schedule.

2.1 REGIONAL LOCATION AND SETTING

The UCR campus is located within the City of Riverside (City) in Riverside County (County), California. It is approximately three miles east of downtown Riverside, two miles northwest of the City of Moreno Valley, and west of the Box Springs Mountains. The campus is part of a larger geographic area known as Inland Southern California, which includes western Riverside and southwestern San Bernardino counties, as well as portions of the Pomona Valley in easternmost Los Angeles County (see Figure 2-1, *Regional Location*).

The City is bordered by the City of Jurupa Valley and the unincorporated community of Highgrove to the north, the City of Moreno Valley and Box Springs Mountain Reserve to the east, the unincorporated community of Woodcrest to the south, and the City of Norco and the unincorporated community of Home Gardens to the west. Regional access to the City is provided via Interstate (I-) 215/State Route (SR) 60 freeway, which traverses northwest-southeast through the City; and SR 91 freeway, which traverses northeast-southwest through the City (see Figure 2-1).

2.2 LOCAL SETTING

The approximately 1,108-acre[2] UCR main campus is generally bounded by University Avenue and Blaine Street to the north, Watkins Drive and Valencia Hill Drive to the east, Le Conte Drive to the south, and Chicago Avenue to the west. The campus is bisected diagonally by I-215/SR 60 freeway, resulting in two areas referred to as East Campus and West Campus (see Figure 2-2, *UCR Campus*).

The East Campus is approximately 604 acres in size and contains most of the built space on the UCR campus. Nearly all the academic, research, and support facilities are in the Academic Center, which is circumscribed by Campus Drive and many original campus buildings. The northern half of East Campus is devoted to student housing and recreation. The UCR Botanic Gardens is in the southeastern area of East Campus. The terrain steepens to the south and east of East Campus surrounding the UCR Botanic Gardens; these areas are largely undeveloped.

The West Campus is approximately 504 acres in size and is largely used as agricultural research fields managed by the Agricultural Operations unit of the College of Natural and Agricultural Sciences. Several University facilities are also on West Campus: surface parking, a solar farm, UNEX (project site), and International Village—a housing complex intended for visiting international students. The University Substation, jointly owned by the City and UCR, is located at the northern edge of Parking Lot 30 adjacent to I-215/SR 60 freeway and provides electrical transmission for the campus. A California Department of Transportation (Caltrans) service yard is situated on a triangular parcel directly west of the I-215/SR 60 freeway, at the eastern terminus of Everton Place. The Gage Canal irrigation facility traverses the area north to south, with portions running underground.

[2] The UCR Palm Desert Center, UCR Natural Reserves, all other Regents-owned properties, and all off-campus leased spaces are excluded.

Figure 2-1 Regional Location

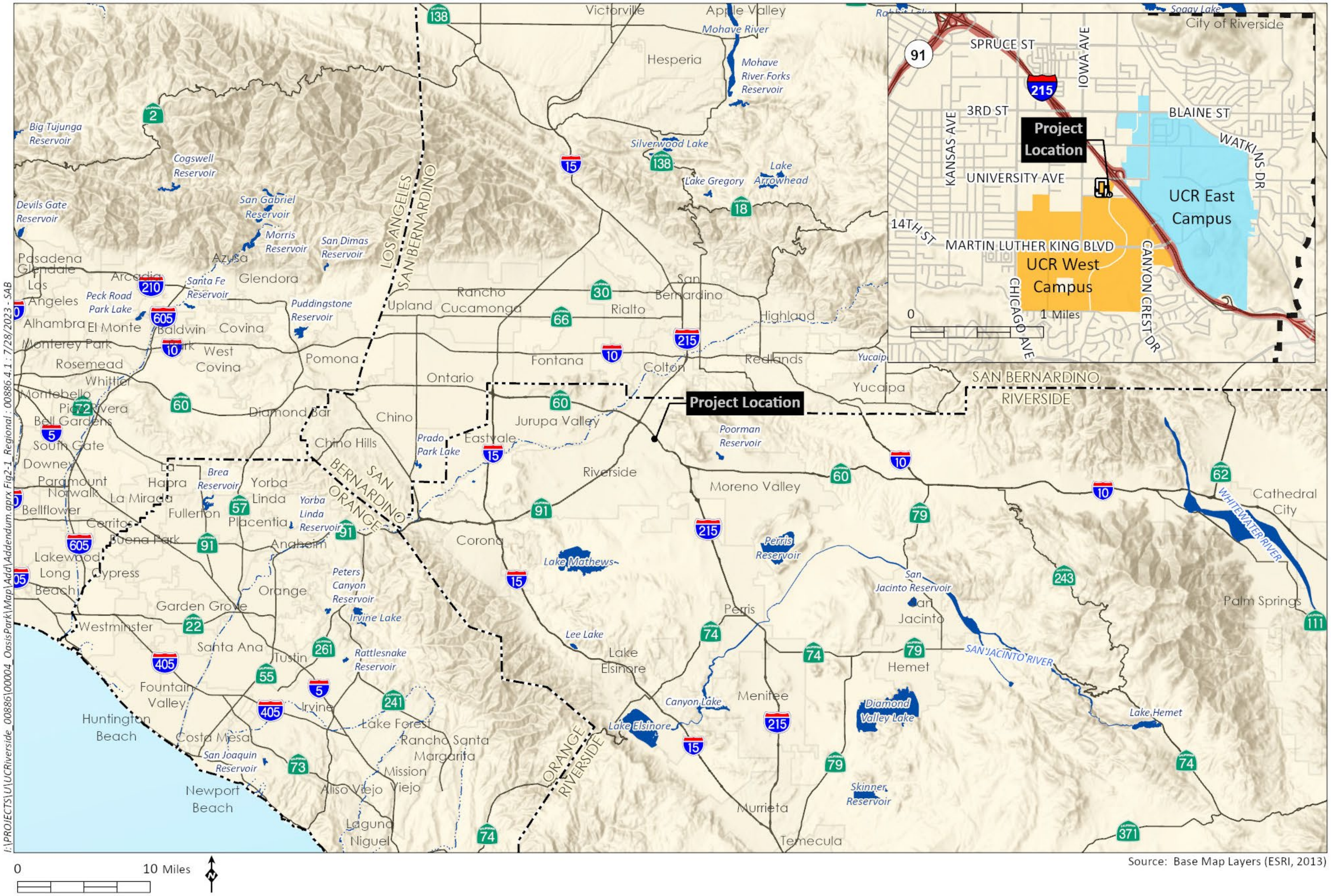
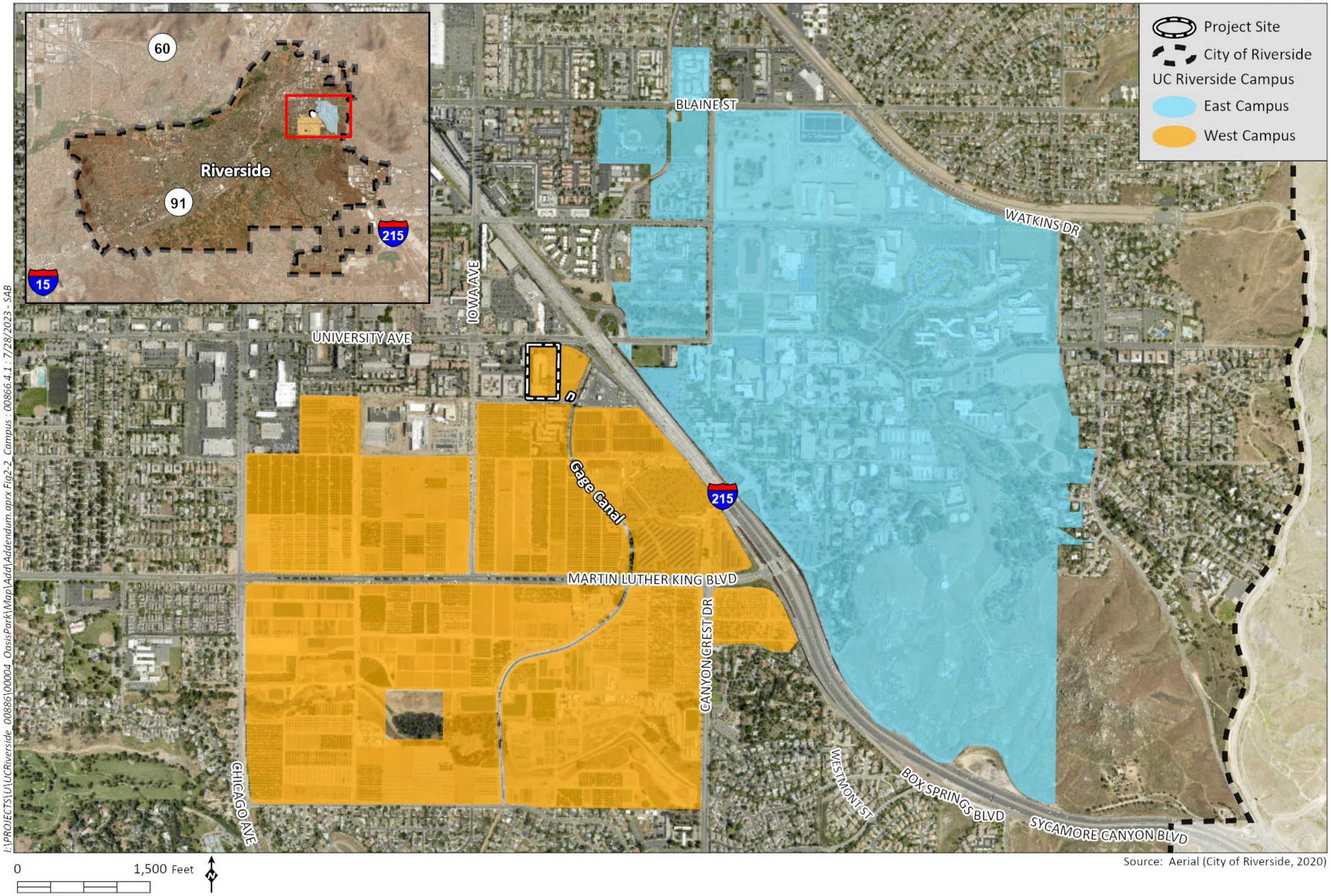


Figure 2-2 UCR Campus



Source: Aerial (City of Riverside, 2020)

2.3 PROJECT SETTING

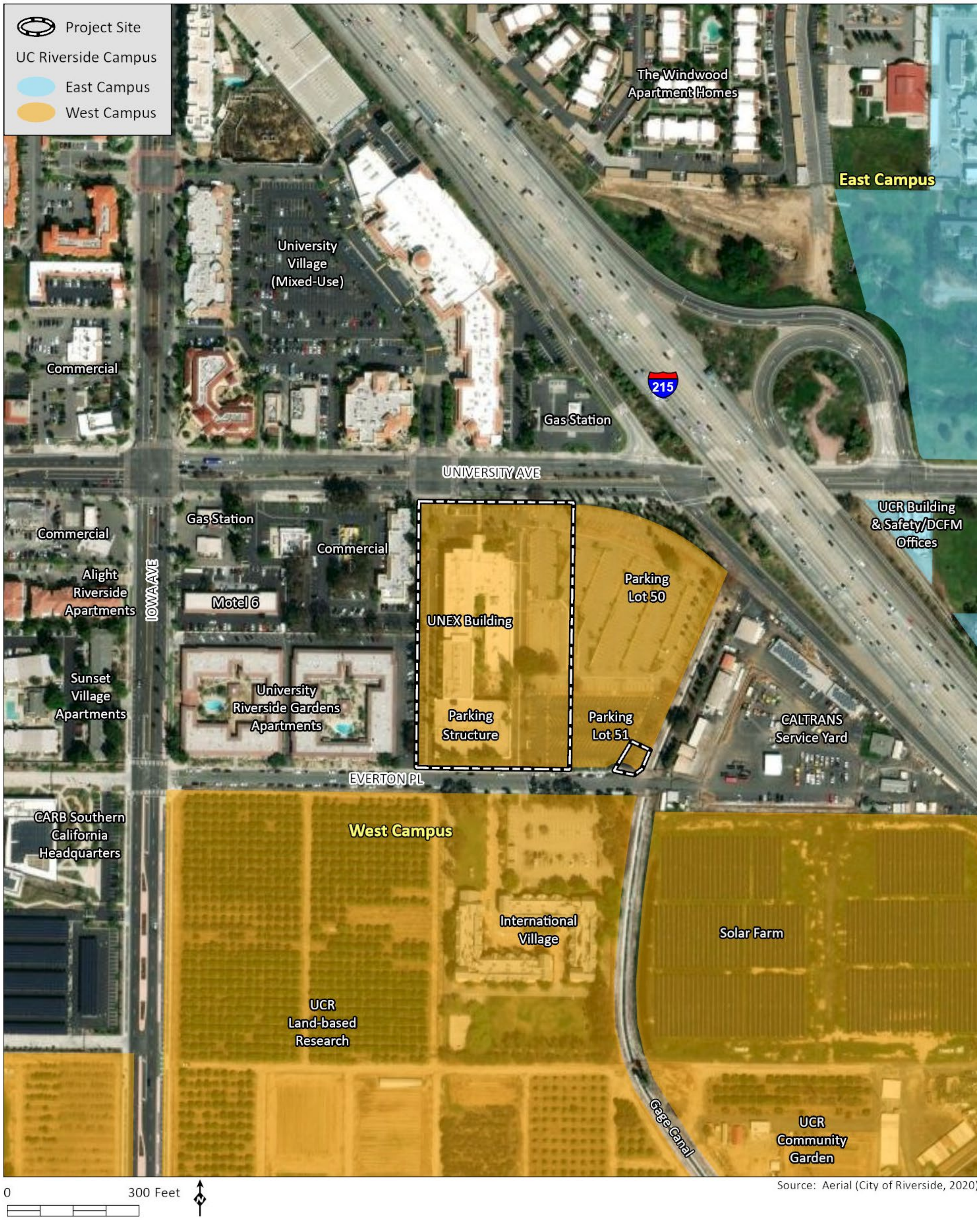
The OASIS Park site is located at 1200 University Avenue and portions of 1150 and 1160 University Avenue (Assessor's Parcel Number [APN] 253-050-005 and portions of APNs 253-050-006, 253-050-007, and 253-050-008), Riverside, California, within the UCR West Campus. The land use designation for the site in the 2021 LRDP is University Avenue Gateway. The approximately 5-acre project site includes the existing 196,641 gsf UNEX building, an approximately 54,000 square foot (sf) parking structure, surface parking, hardscape, and landscape. The site is relatively flat, with a surface elevation that varies from approximately 1,011 feet above mean sea level (AMSL) in the northwest corner, to 1,024 feet AMSL in the northeast corner, to 1,017 feet AMSL in the southeast corner, to 1,012 feet AMSL in the southwest corner of the site.

The existing UNEX building is a five-story concrete structure that is currently unoccupied and is slated for demolition as part of the proposed project. The building was originally built as a hotel in 1968 and expanded in 1984 to include additional rooms and the two and a half-story parking structure. Purchased by UCR in 1992, the UNEX building was converted into offices, classrooms, and gathering space for UCR's use until it was abandoned in 2022 due to seismic deficiency. Seismic analysis conducted for the parking structure indicates that major upgrades would be required to retain the structure, and it also is proposed for demolition as part of the project.

Two existing vehicular access points serve the site from University Avenue: the signalized intersection at University Village and a secondary ingress/egress driveway approximately 300 feet west of the southbound on-ramp to the I-215/SR 60 freeway. Additional access is available from Everton Place. Two internal access roads connect Everton Place from the south to University Avenue at the north. One is located along the western edge of the site and the other bisects the site, separating the UNEX building from Parking Lots 50 and 51. Parking Lot 50 consists of 355 stalls and Parking Lot 51 consists of 150 stalls. Parking is also located adjacent to the north and west sides of the existing UNEX building, including 16 stalls at the north and 67 stalls to the west. Existing parking requires a permit issued by UCR, with no public parking currently available.

Existing land uses surrounding the OASIS Park site include University Avenue followed by University Village and commercial uses to the north; Everton Place followed by surface parking, International Village, and land-based research to the south; surface parking (Parking Lots 50 and 51) followed by the Gage Canal, Caltrans service yard, and the I-215/SR 60 freeway to the east; and commercial and multi-family residential uses to the west (see Figure 2-3, *Project Site Location*). University Avenue is an active arterial and public transit corridor, lined with a mix of primarily low-rise commercial and retail uses that include restaurants, office space, a theater, and gas stations. A section of University Avenue between UCR and downtown Riverside has been designated by the City as an "Innovation Corridor," envisioned for orientation around research, innovation, and clean technology. Approximately one block southwest of the project site is the California Air Resources Board (CARB) Southern California Headquarters.

Figure 2-3 Project Site Location



2.4 PROJECT BACKGROUND

A pre-feasibility study was conducted in 2021 to evaluate the drivers and strategic objectives for development of a Sustainability, Innovation, and Social Inclusion Hub. Establishing this hub in proximity to the CARB facility and the City's Innovation Corridor would build upon existing regional partnerships. OASIS Park would include multiple programs and initiatives from across Inland Southern California that drive regional economic development through solutions-driven applied research, innovation, entrepreneurship, and workforce development around sustainability, clean technology, and social inclusion. As the first component of the OASIS Hub,[3] the proposed OASIS Park would be a collaboration among three primary groups at UCR—the College of Engineering Center for Environmental Research and Technology (CE-CERT), Office of Technology Partnerships (Innovation and Entrepreneurship), and UNEX—coming together within a shared space where research would intersect with local entrepreneurs and the future clean tech work force.

CE-CERT is the largest multidisciplinary research center at UCR and currently operates out of an off-campus facility to the north of East Campus. CE-CERT operations would continue out of its current facility, with three next-generation research labs to be established at OASIS Park that would focus specifically on the clean tech industry, benefiting from proximity to the I-215/SR 60 freeway, the City's Innovation Corridor, and the CARB facility.

One of the Office of Technology Partnerships' key programs is the Center for Innovation & Technology (ExCITE) Program, an incubator and accelerator space for start-ups within the Riverside community. The ExCITE model would be expanded within OASIS Park by providing incubator space for clean tech startups and inspiring collaboration with CE-CERT-related research initiatives.

UNEX provides an alternative higher education model for students seeking flexible or part-time academic programs. UNEX would primarily utilize OASIS Park to host short-term programs related to research, innovation, and clean technology.

2.5 PROJECT FEATURES

The proposed project entails the demolition of the existing UNEX building and parking structure and development of a research laboratory and office building up to three stories in height, totaling approximately 70,000 gsf. Three dry labs, a maker space, three office suites, five meeting rooms, classrooms, and other shared gathering spaces would be provided within this building. The project also proposes usable open space, multimodal circulation, a service area, and landscape and hardscape improvements.

2.5.1 PROPOSED PROJECT POPULATION

The 2021 LRDP assumed an approximately 46 percent increase in student population (approximately 11,000 students), with an approximately 59 percent increase in additional faculty and staff (approximately 2,800 new faculty and staff) by the 2035/2036 academic year. The proposed project would accommodate approximately 180 students and 125 employees. The 180 students to be served by the project represent fewer or a similar number of students served by UNEX under LRDP baseline conditions, and therefore, would not increase the student population. Of the 125 anticipated

[3] The OASIS Park project would be the first development of a broader effort to develop a larger site in the future on Parking Lots 50 and 51. Currently, apart from the minor surface improvements (e.g., multimodal pathway, restriping, and repaving as part of the proposed OASIS Park project), no specific plans for development within Parking Lots 50 and 51 are proposed. Development on Parking Lots 50 and 51 would be subject to future funding and separate environmental analyses, in compliance with CEQA.

employees, 5 would be existing UNEX faculty members, 40 would be existing CE-CERT employees and/or people currently conducting research within similar facilities on or near campus, and 80 would be new people employed by the Office of Technology Partnerships. The 80 new employees associated with the project represent approximately 2.9 percent of the increase in faculty and staff analyzed in the 2021 LRDP EIR.

2.5.2 CONCEPTUAL SITE PLAN

The project site would feature the proposed approximately 70,000 gsf OASIS Park building, outdoor event and gathering spaces, a service/working yard, parking, multimodal circulation, and landscape/ hardscape improvements. A conceptual site plan is presented in Figure 2-4, *Conceptual Site Plan*.

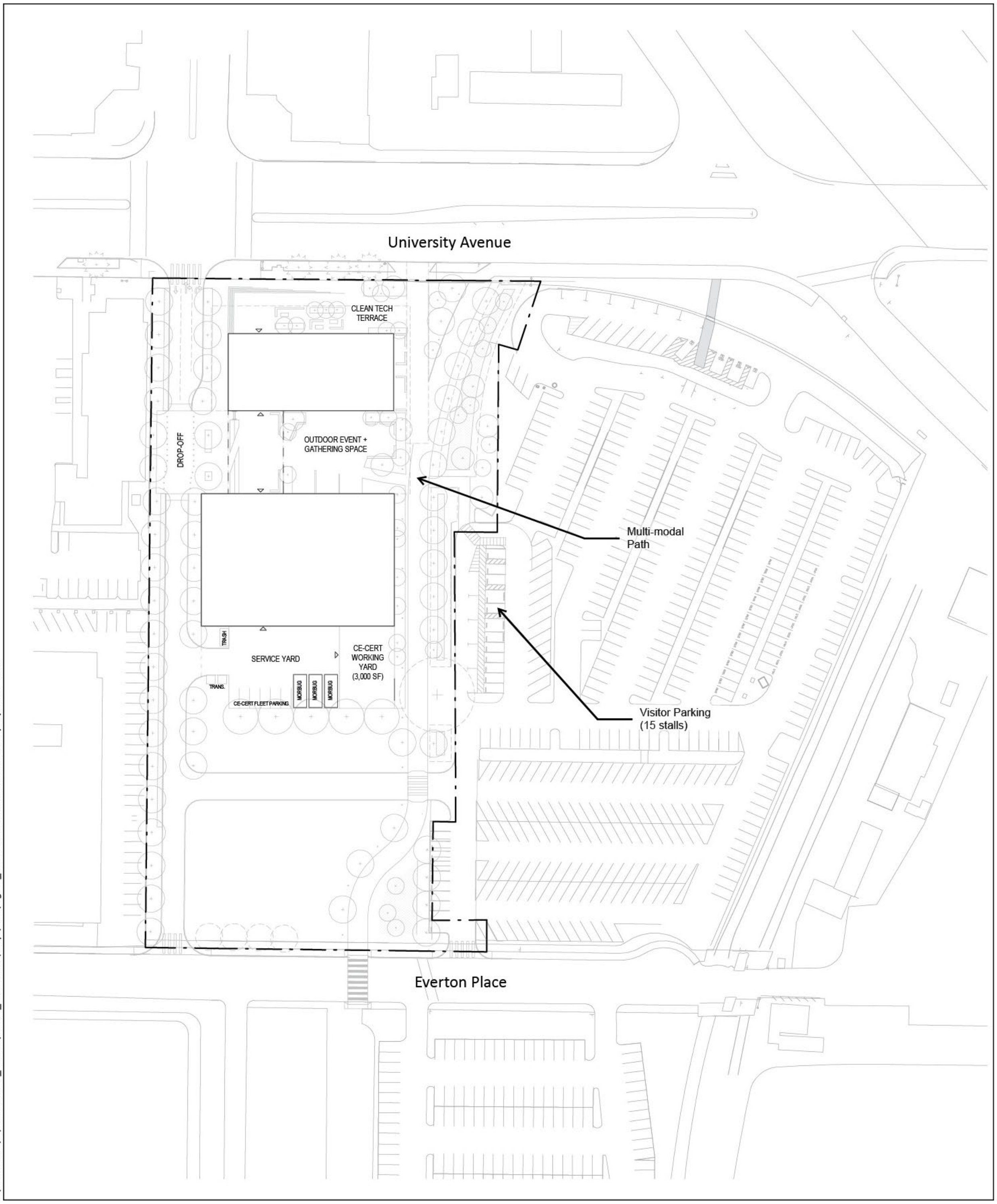
The proposed development would be concentrated in the northwestern portion of the site. The northern area of the project site, along the University Avenue frontage, would focus on community-oriented spaces. The site would feature integrated outdoor gathering spaces likely along the University Avenue frontage and adjacent to the proposed building(s).

The area immediately south of the building footprint would feature an approximately 3,000 sf CE-CERT working yard and service yard for fleet servicing and storage. The working yard and storage area would be fenced and secured, with gated access from the western drive aisle, and would include a loading dock connected to the southern portion of the building. The southern portion of the site would be left vacant for potential future development. [4]

Landscape and hardscape would be provided throughout the site, as described further in Section 2.5.4, *Open Space, Amenities, and Landscaping.* Site access and circulation are further discussed in Section 2.5.5, *Parking and Site Access*.

[4] Future development within the project site that is not currently included in the proposed project would be subject to future funding and separate environmental analyses, in compliance with CEQA.

Figure 2-4 Conceptual Site Plan



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2.5.3 BUILDING PROGRAM AND DESIGN

The approximately 70,000 gsf building(s) would be comprised of the following uses:

- 42,000 gsf of Academic Research/Laboratory facilities
- 21,000 gsf of Offices
- 7,000 gsf of Academic Instruction facilities/Assembly and Exhibition spaces

The approximately 42,000 gsf of academic research and laboratory space would include laboratories and maker space dedicated to research, development, and innovation. Three technical dry labs would be operated by CE-CERT for research in air quality monitoring, mobility, and energy infrastructure. These would primarily consist of high-bay laboratories that are flexible and adaptable to a variety of uses. An additional "maker space" would include a large creation space that would allow for the planning, preparation, fabrication, assembly, and testing of products.

The approximately 21,000 gsf of office space would include office suites with flexible groupings of enclosed and open workspaces to be used by CE-CERT, Office of Technology Partnerships (Innovation and Entrepreneurship), and UNEX. Shared community resources would include storage, lockers, printing, and kitchenettes.

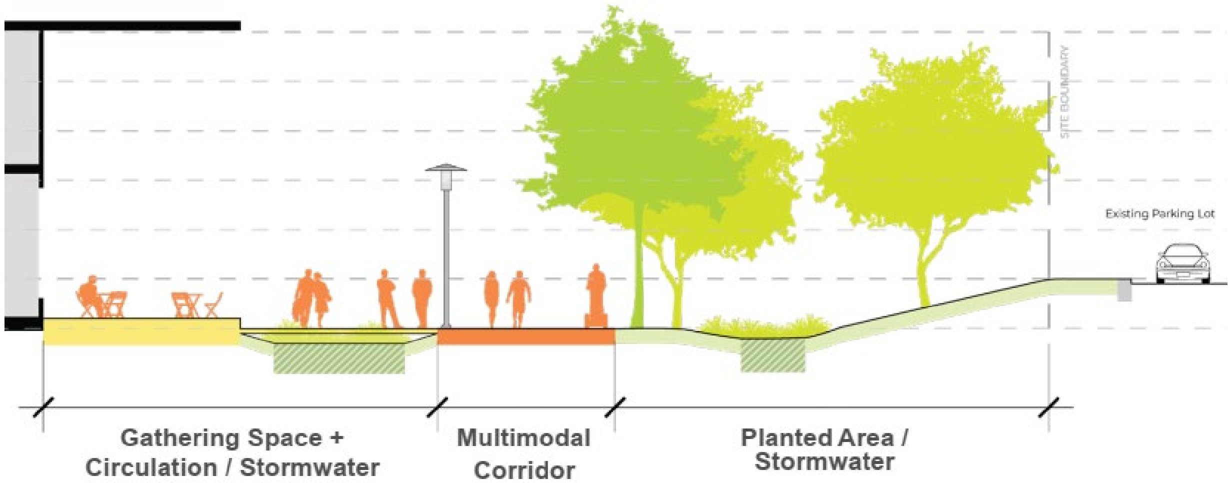
The remaining approximately 7,000 gsf of building area would be dedicated to shared community spaces, including active-hybrid learning spaces, meeting and conference rooms, a lobby and event space, and gathering areas.

2.5.4 OPEN SPACE, AMENITIES, AND LANDSCAPING

Open spaces on the project site would be provided in the form of plazas, porches, courtyards, and working yards. Features would include outdoor gathering spaces with seating areas, landscape, and pedestrian amenities such as shade, seating, and lighting throughout the landscaped areas. Shielded lighting would be integrated throughout the outdoor use areas, internal roadways, and paths for safety and wayfinding.

A multimodal path connecting University Avenue to Everton Place would also be a part of the open space framework with connections to the proposed outdoor gathering areas (refer to Figure 2-5, *Conceptual Multimodal Corridor Cross Section*). Landscaping along the multimodal corridor would provide stormwater management treatment and a buffer from Parking Lots 50 and 51. The corridor would include abundant planting and shade trees to create a campus-like connection through the site.

Figure 2-5 Conceptual Multimodal Corridor Cross Section



Landscaping would be provided along the western site boundary as a buffer to the adjacent commercial and residential properties and to support stormwater management. The southern portion of the site would be minimally landscaped following demolition of the existing parking garage to allow for future development. All landscaping would be native and/or adapted plant species that would be low-water use.

2.5.5 PARKING AND SITE ACCESS

Primary vehicular access to the project site would occur through a signalized driveway at University Avenue at the northwest corner of the site, and an unsignalized/stop-controlled driveway at Everton Place at the southwest corner of the site. The University Avenue driveway would include one lane inbound and two lanes outbound, with one outbound lane dedicated for right-turn only. The Everton Place driveway would include one lane inbound and one lane outbound. A drive aisle would be located along the western property boundary, with connections provided for private vehicular access to the CE-CERT working/service yard and east-west access to Parking Lots 50 and 51. A visitor drop-off/delivery area would be provided on the western side of the building, adjacent to the lobby. Existing southerly ingress/egress for Parking Lots 50 and 51 may be reconfigured to include two stop-controlled, two-way driveways off Everton Place.

The project site would continue to be served by the City of Riverside Fire Department for emergency services. Emergency access would be provided from the north-south drive aisle with access off University Avenue and Everton Place. The east-west drive aisle would also be designed to be accessible by emergency vehicles.

The proposed project would utilize the western portion of the existing Parking Lot 50 and would require the removal of approximately 42 stalls, resulting in a remaining total of 313 stalls in this lot. The proposed project is anticipated to require 125 permitted parking stalls and 15 visitor parking stalls, which would be accommodated within the project site and Parking Lots 50 or 51. Remaining portions of Parking Lots 50 and 51 that are included within the project site boundary are anticipated to be largely avoided; however, minor improvements may be necessary to accommodate the project design, including upgraded multimodal connections, improved fire access, lighting, utilities, restriping, curb cuts, and/or minor regrading.

A multimodal corridor for pedestrians, bicycles, and other micro-mobility vehicles would be provided along the eastern edge of the project site with connections to on-site open space areas and off-site circulation elements.

2.5.6 UTILITIES

Water and Wastewater

As documented in the 2021 LRDP EIR, the campus has a combined fire and domestic water system that is sufficient to serve the proposed project. Riverside Public Utilities (RPU) provides potable water to the campus, including the project site, which is used for buildings and landscape irrigation. The new building would utilize the existing water lateral that connects to the water main in University Avenue. No upgrades to domestic water service utilities are anticipated to be required. As no existing fire water line is known to occur on-site, the proposed project anticipates providing a new fire water line, backflow preventer, and fire hydrant.

The City's Sewage Systems Services Program and Treatment Services unit collects, treats, and disposes of all wastewater generated by the UCR campus, including the project site. The new building would utilize the existing sewer lateral that connects to the public sewer main in University Avenue and a branch would be constructed to each building footprint to accommodate the proposed project's projected flows.

Solid Waste

UCR's landfill-bound waste is picked up and hauled by UCR trucks to the CR&R Environmental Services facility in Perris, California (approximately 17 miles south of UCR). Materials for recycling are sorted out of the landfill waste stream and the remainder is used for waste-to-energy (the process of generating and capturing energy in the form of electricity and/or heat from the primary treatment of waste). UCR's recyclable materials are hauled to the UCR transfer station, just north of Parking Lot 30 (approximately 1,500 feet southeast of the project site) on the West Campus. Compost, food waste, and the commingled recycle streams are picked up from the UCR transfer station by the current contracted vendor to be recycled or composted. Green waste is currently blended back into the soil by UCR's Agricultural Operations Course. The proposed project would continue to utilize these solid waste programs and facilities.

Energy

The project would require the use of electricity for lighting, appliances, laboratory and research equipment, heating, and cooling. No natural gas is proposed for space or water heating pursuant to the University of California, Office of the President's 2023 Sustainable Practices Policy (2023 SPP; 2023a). UCR purchases electricity for campus operations from RPU and through a power purchase agreement for on-site generation from the campus' solar infrastructure which, on average, produces approximately 11.6 megawatt-hours of electricity. The proposed project's electricity demand would be served by RPU. It is anticipated that the project would connect to the existing switches at the south edge of Parking Lot 51 and install an underground electrical line along Everton Place and the western side of the project site to a transformer proposed at the southwestern corner of the building. No improvements would be required to the RPU electrical distribution system to serve the proposed project. No diesel generators or other related energy sources would be utilized on site; emergency standby power would be provided via a solar-powered battery housed in the building's electrical room. Solar panels are proposed, as well as infrastructure to support the future installment of renewable energy sources.

Stormwater

Under existing conditions, the western portion of the site generally drains to the northwest portion of the site and outlets onto University Avenue. Drainage from the central portion of Parking Lot 50 is managed through a landscaped bioretention basin within the parking lot. The remaining surface stormwater is directed via an underground storm drain to a catch basin located at the northern end of the existing central drive aisle, which discharges to University Avenue via storm drain. The central drive aisle generally serves as a low point for the eastern portion of the site.

All UC campuses are regulated under the Phase II Municipal Separate Storm Sewer System (MS4) General permit, and the campus is additionally regulated under the UCR's Storm Water Management Program (SWMP). Stormwater management measures (e.g., flow-through planters, bio-swales, bioretention basins, bio filtration stormwater planters) would be incorporated into the project design. While no major modifications to portions of the existing Parking Lots 50 and 51 are anticipated, minor improvements may be required to connect existing and proposed stormwater management components.

2.5.7 OFF-SITE IMPROVEMENTS

Off-site improvements that would be required as part of the proposed project include signal modification and crosswalk restriping. The existing traffic signal at the intersection of University Avenue and University Village at the northern entrance of the proposed project would require a modification to accommodate the change in configuration from two inbound/two outbound lanes with a dedicated outbound right-turn lane, to one inbound/two outbound lanes with a dedicated outbound right-turn lane. The project proposes to relocate and restripe an existing crosswalk across Everton Place between the International Village and project site in alignment with the on-site multimodal corridor. Signal modification and restriping would be coordinated with the City and UCR would obtain appropriate encroachment permit(s), as needed.

2.5.8 CONSTRUCTION

For purposes of this analysis, construction activities are anticipated to begin around Spring 2024 and last for approximately 28 months. Construction activities would include:

- Demolition (approximately 120 days)
- Site Preparation (approximately 20 days)
- Grading (approximately 20 days)
- Building Construction (approximately 539 days)
- Architectural Coating (approximately 21 days)
- Paving (approximately 18 days)

Development of the proposed project entails demolition of the existing UNEX building and parking structure and removal of existing hardscape and landscaping surrounding the building. Approximately 250,641 sf of building area and 100,125 sf (approximately 2.3 acres) of hardscape would be demolished during construction, resulting in approximately 16,135 tons of demolition material. The project site slopes gently from south to north and from east to west, and grading would be required to level the new development and allow a direct, accessible connection of the multimodal corridor to the University Avenue sidewalk at the northeast corner of the project site. Approximately 195,000 sf (approximately

4.5 acres) of the project site would be graded. Approximately 10,600 cubic yards (cy) of soil would be excavated (cut) and 12,190 cy would be required for fill during grading activities. Approximately 1,590 cy of soil import would be required. Approximately 90,000 sf (approximately 2.1 acres) of the project site would be surfaced with asphalt and concrete. The maximum depth of ground disturbance during project construction would be approximately 6 feet.

Depending on the construction phase, implementation of the proposed project would require the following equipment: dozers, excavators, high reach excavator, grader, tractor/loader/backhoes, concrete/industrial saw, crane, forklift, welder, paver, roller, air compressor, and cement and mortar mixers. Temporary construction staging and worker parking would occur within the project site, Parking Lot 50, and/or Parking Lot 51.

As required by the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit for projects disturbing more than one acre of land, soil erosion from the project site during construction would be controlled with best management practices (BMPs). A Storm Water Pollution Prevention Plan (SWPPP) containing appropriate construction site erosion and sedimentation control BMPs would be prepared and implemented at the beginning of the project construction phase. The SWPPP would be adapted regularly during project construction to reflect current conditions in the field and the weather. The SWPPP would also outline BMPs to be actively implemented during construction of the 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. The project contractor would be responsible for implementing the project's approved erosion control plan, as well as cleanup of all inadvertent BMP breaches into the adjacent vegetation (as applicable).

2.5.9 SUSTAINABILITY FEATURES

The 2023 SPP (UC Office of the President 2023a) covers nine areas of sustainable practices: green building, clean energy, climate action, sustainable transportation, sustainable building and laboratory operations, zero waste, sustainable procurement, sustainable food services, and sustainable water systems. The proposed project's overall design would comply with the 2023 SPP and meet minimum Leadership in Energy and Environmental Design (LEED) Gold certification but would strive for LEED Platinum certification, which would be achieved by using less water and energy and reducing greenhouse gas (GHG) emissions compared to a non-certified LEED commercial building. A building can earn credits toward LEED certification through performance in five key areas including sustainable sites, water savings, energy and atmosphere, materials and resources, and indoor environmental quality. Solar panels and water conservation elements are examples of components that would likely be incorporated into the project design to reduce the building's energy utilization and achieve minimum LEED Gold certification.

The proposed project would be 20 percent above the California State Building Energy Efficiency Standards (Title 24) requirements, which would ensure that the proposed project meets sustainable design and construction practices. Indoor water use would be reduced through installation of low-flow fixtures. Outdoor water use would be reduced through the selection of native and/or adapted plant species. Interior and exterior materials would be carefully evaluated for their health, durability, and maintenance requirements and selected through a life-cycle decision-making process. Recycled materials and materials from regional sources would be utilized where possible.

2.5.10 PROJECT APPROVALS AND SCHEDULE

The proposed project is anticipated to be constructed and occupied by Fall 2026, with the first full year of project operation anticipated to be 2027. UC is the lead agency for the proposed project and the Regents (or its delegate) has responsibility for approving the proposed project.

Anticipated actions required by the Regents (or its delegate) to implement the proposed project include, but are not limited to, those listed below.

- Consideration of Addendum No. 3 to the 2021 LRDP EIR
- Make a condition of approval implementation of the Mitigation Monitoring and Reporting Program adopted in connection with the 2021 LRDP EIR
- Adoption of the CEQA Findings
- Approval of Project Design

The proposed project may require permits/approval from other responsible agencies, including, but not limited to:

- Division of the State Architect (accessibility compliance)
- State of California Fire Marshal (fire/life safety)
- City of Riverside Fire Department (access)
- City of Riverside Public Works (encroachment permit, if necessary)

3 CONSISTENCY WITH THE 2021 LRDP

To determine whether the proposed project is consistent with UCR's 2021 LRDP and 2021 LRDP EIR, the following questions must be answered:

- Are the objectives of the proposed project consistent with the objectives adopted for the 2021 LRDP?
- Are the changes to campus population associated with the proposed project included within the scope of the 2021 LRDP's population projections?
- Is the proposed location of the proposed project in an area designated for this type of use in the 2021 LRDP?
- Is the proposed project included in the amount of the development projected in the 2021 LRDP?
- Are the proposed project activities within the scope of the environmental analysis in the 2021 LRDP EIR?
- Have the conditions described in CEQA Guidelines Section 15162 calling for the preparation of a subsequent EIR occurred?

Sections 3.1 through 3.4 document the proposed project's consistency with the objectives, population projections, land use designations, and development projections contained in the 2021 LRDP.

Section 4 contains a detailed examination of environmental topics with the potential for significant impacts that had been addressed in the 2021 LRDP EIR and includes analyses and discussions for whether the proposed project is consistent with and within the scope of the environmental impact analysis included in the 2021 LRDP EIR.

3.1 2021 LRDP OBJECTIVES

The 2021 LRDP identified key objectives to accommodate UCR's projected growth in both academic and non-academic programs. The key objectives of the 2021 LRDP, as outlined in the plan, include the following:

- Serve as good stewards of limited campus lands and natural resources as UCR continues to grow and accommodate enrollment projections of approximately 35,000 students.
- Develop approximately 5.5 million gsf of net new building space needed to accommodate student housing as well as academic and research facilities.
- Maintain existing land-based research operations on West Campus, while supporting facility modernization, research support facilities growth, and strategic partnerships and initiatives.
- Activate and enliven the East Campus through strategic mixed-use development, improved public spaces, expanded campus services, and additional on-campus housing to facilitate a living-learning campus environment.
- Accommodate approximately 40 percent of eligible students with on-campus housing, and replace aging low-density student housing units while considering demand, affordability, financial feasibility, and physical site constraints.
- Locate future growth generally adjacent to and outside of the campus loop road, thereby maintaining the character of the Mid-Century Modern Core.
- Incorporate efficient planning and design practices in support of minimizing the effects of climate change.

The proposed project would support the 2021 LRDP objectives listed above since it would develop research laboratories, a technology incubator, training facilities, hybrid-learning rooms, offices, community spaces, and other supporting uses within an existing developed site on West Campus and avoids impacts to land-based research areas. New pathways would connect the project to existing pathways and associated parking as well as provide a safer path of travel for International Village students to the campus core. Therefore, the proposed project would:

- Utilize limited campus lands and natural resources as UCR continues to grow and accommodate enrollment projections of approximately 35,000 students;
- Develop building space on campus for academic and research facilities;
- Maintain existing land-based research operations on West Campus, while supporting facility modernization, research support facilities growth, and strategic partnerships and initiatives; and
- Minimize the effects of climate change through efficient planning and design practices.

3.2 2021 LRDP CAMPUS POPULATION

The 2021 LRDP anticipated that the existing total campus population would grow by approximately 11,000 students and 2,800 faculty and staff over the 2021 LRDP planning period, resulting in a total student population of approximately 35,000 and a total faculty and staff population of approximately 7,545 by the planning horizon of 2035 (refer to Table 3.2-1).

The proposed project would accommodate approximately 180 students and 125 employees. The 180 students to be served by the project represent fewer or a similar number of students served by UNEX under LRDP baseline conditions, and therefore, would not increase the student population. Of the 125 anticipated employees, 5 would be existing UNEX faculty members, 40 would be existing CE-CERT employees and/or people currently conducting research within similar facilities on or near campus, and 80 would be new people employed by the Office of Technology Partnerships. The 80 new employees associated with the project represent approximately 2.9 percent of the increase in faculty and staff anticipated in the 2021 LRDP.

Implementation of the proposed OASIS Park project would enable UCR to manage anticipated growth by accommodating students, faculty, and staff on campus; allocating space for UNEX classrooms and offering programming options in clean technology in collaboration with CE-CERT and ExCITE; and providing incubator and accelerator space for community collaboration through the Office of Technology Partnerships. The approximately 80 new employees anticipated to utilize the OASIS Park facility through the Office of Technology Partnership's ExCITE program would generally be from the local region, similar to that of the existing ExCITE program that operates in downtown Riverside. The population growth attributed to these 80 employees is minimal and within the overall 2021 LRDP faculty and staff population projections. Therefore, it can be determined that the proposed project is consistent with the campus population projections contained in the 2021 LRDP.

Table 3.2-1
Total Campus Population Growth Projections

Category	2018/2019 (Baseline)	Fall 2023 (Actual)	Fall 2035 (Projected)[1]
Students[2]	23,922	26,426	35,000
Faculty and Staff	4,739	4,967	7,545
Total Population	**28,661**	**31,393**	**42,545**

Source: UCR 2023a

3.3 2021 LRDP LAND USE

The land use plan for the 2021 LRDP described functional land use categories for the campus that reflect activities that would be predominant and/or secondary permissible uses in any given area of campus (see Figure 2-1 in the 2021 LRDP EIR). Predominant uses are the primary programs, facilities, and/or activities in a general geographic area. Secondary permissible uses are those that are more supporting uses that are allowable within the designated land use area. The project site is designated as University Avenue Gateway in the 2021 LRDP land use plan.

The approximately 1,108-acre UCR main campus has designated approximately 29.6 acres for University Avenue Gateway land uses on its East Campus. This land use designation is envisioned as the campus' primary entryway, connecting the campus to Downtown Riverside and the broader Riverside community. The area is intended to encourage activities that express a welcoming and identifiable approach to campus, create identity, and are active during the day, evening, and weekends with an emphasis on street-oriented interaction and engagement. The University Avenue Gateway is envisioned to include a dense and diverse mix of uses that provide opportunities for greater campus-community interaction and that collectively reinforce the importance of the area as the terminus of the University Avenue corridor, which connects campus with Downtown Riverside. The predominant University Avenue Gateway uses may include academic instruction and research facilities, outpatient medical facilities, hotel/conference center(s), large lecture halls or assembly and exhibition spaces, a visitor's center, food services and cafes, student services, multimodal transportation support facilities, and other compatible non-UCR uses. Secondary permissible uses also include parking, open space, and other support uses.

The proposed project includes research laboratories, a technology incubator, training facilities, hybrid-learning rooms, offices, community spaces, and a multimodal pathway. These are allowable uses under the University Avenue Gateway land use designation. Therefore, the proposed project would be consistent with the site's land use designation in the 2021 LRDP.

3.4 2021 LRDP DEVELOPMENT SPACE

The 2021 LRDP included general types of campus development and land uses to support the projected campus population growth and to enable expanded and new program initiatives related to academic, research, student life, and other support functions. It was envisioned that development under the 2021 LRDP would primarily be infill development or expansion of already developed areas on the East Campus, and would occur primarily within previously disturbed areas and/or adjacent to previously developed and surface parking areas. In 2018, the campus had approximately 4.8 million assignable square feet (asf), or approximately 7.2 million gsf, of academic buildings and support facilities (UCR 2021a). The 2021 LRDP proposed additional development of approximately 5.5 million gsf of new building space on the campus to accommodate the projected student enrollment and increase in faculty and staff by 2035. This would result in a total of approximately 12.7 million gsf (approximately 8.5 million asf) for academic programs and support space under the campus development program by 2035, as shown in Table 3.4-1.

Table 3.4-1
Total Campus Space Projections

Facility Type	Baseline Fall 2018 (asf/gsf)	Projected Fall 2035 (asf/gsf)
Academics & Research	1,220,283/1,830,425	1,700,852/2,551,277
Academic Support	1,458,975/2,188,463	2,355,204/3,532,806
Student Life	1,875,963/2,813,945	4,198,504/6,297,756
Other Facilities	248,279/372,419	248,279/372,419
Total Space	**4,803,500/7,205,252**	**8,502,839/12,754,258**

asf = assignable square feet; gsf = gross square feet

OASIS Park would be categorized under Academics & Research or Academic Support. The proposed project would result in an overall reduction of approximately 126,641 gsf of building space from these categories and would therefore remain within the space projected for Academics & Research/Academic Support land uses in the 2021 LRDP. Since the proposed project would be within the building space projections contemplated in the 2021 LRDP, the proposed project would be consistent with the 2021 LRDP EIR.

4 ENVIRONMENTAL ANALYSIS

This Addendum documents that the proposed project would not result in any new significant environmental impacts, an increase in the severity of significant impacts previously identified in the 2021 LRDP EIR, or require the adoption of any new or considerably different MMs or project alternatives. Accordingly, this Addendum is the appropriate form of environmental review for the proposed project. This Addendum has been prepared to satisfy the requirements of CEQA Guidelines Sections 15164(a), 15164(d), and 15164(e).

4.1 PROJECT ENVIRONMENTAL IMPACTS

Checklist Explanation

2021 LRDP EIR Significance Conclusion. This column presents the significance conclusion identified in the 2021 LRDP EIR.

Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR? This column indicates whether the proposed project includes changes that require major revisions to the analysis or conclusions in the 2021 LRDP EIR.

Do New Circumstances Require Major Revisions to the 2021 LRDP EIR? This column indicates whether there are new circumstances (such as changes to the existing conditions at the project site or surrounding areas) that require major revisions to the analysis or conclusions in the 2021 LRDP EIR.

Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts? This column indicates whether there is new information that would result in a new or substantially more severe significant impact than what was analyzed in the 2021 LRDP EIR.

Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts. This column indicates whether the MMs in the 2021 LRDP EIR resolve the impacts associated with the proposed project. Where applicable, the CBPs from the 2021 LRDP EIR are also indicated in this column.

Environmental Topics Addressed

This Addendum includes an analysis of the environmental topics listed below. The following environmental analysis demonstrates that the proposed project would not require major revisions to the 2021 LRDP EIR due to new or more severe significant effects, or new information that was not known at the time the 2021 LRDP EIR was prepared. As “None” is checked below, this project is consistent with and covered by the environmental analysis contained in the 2021 LRDP EIR.

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

4.1.1 AESTHETICS

Section 4.1 of the 2021 LRDP EIR evaluates the aesthetic impacts of campus growth under the 2021 LRDP and concludes that implementation of future projects under the 2021 LRDP would result in significant and unavoidable impacts to scenic vistas of the Box Springs Mountains. However, impacts to the existing visual character or quality of the campus would be less than significant for projects implemented under the 2021 LRDP. Since the campus is not located within the viewshed of an identified State Scenic Highway, as stated in the IS prepared for the 2021 LRDP, the threshold related to this environmental topic was not further evaluated in the 2021 LRDP EIR.

MM AES-1 and MM AES-2 were identified in the 2021 LRDP EIR for future campus projects that would contribute to light and glare impacts, and implementation of the MMs would reduce impacts related to light and glare to a less than significant level. MM AES-2 applies to the placement of new parking areas and structures adjacent to residential uses, and requires the design of ingress and egress from new parking areas to direct headlights away from residential uses and utilize walls, landscaping, or other barriers where appropriate. The proposed project would remove the existing parking structure and require approximately 125 permitted and 15 visitor parking stalls, which would be accommodated on the project site and in Parking Lots 50 and 51 located to the east of the proposed building(s). One of the existing driveways along Everton Place may be required to be shifted to align with the proposed multimodal pathway and a new driveway to Parking Lots 50 and 51 may be created towards the eastern end of the Everton Place cul-de-sac.

The above-mentioned applicable MMs state the following:

MM AES-1: UCR shall incorporate site-specific consideration of the orientation of the building, use of landscaping materials, lighting design, and choice of primary façade materials to minimize potential off-site spillover of lighting and glare from new development. As part of this measure and prior to project approval, UCR shall require the incorporation of site- and project-specific design considerations (to be included in the lighting plans) to minimize light and glare, including, but not limited to, the following:

- New outdoor lighting adjacent to on-campus residences and adjacent off-campus sensitive uses shall utilize directional lighting methods with full cutoff type light fixtures (and shielding as applicable) to minimize glare and light spillover.
- All elevated light fixtures such as in parking lots, parking structures, and athletic fields shall be shielded to reduce glare.
- Provide landscaped buffers where on-campus student housing, uses identified as Open Space Reserve and UCR Botanic Gardens, and off-campus residential neighborhoods might experience noise or light from UCR activities.
- All lighting shall be consistent with the Illuminating Engineering Society of North America (IESNA) Lighting Handbook.
- The UCR Planning, Design, & Construction staff shall review all exterior lighting design for conformance with the Campus Design and Construction Standards.

Verification of inclusion in project design shall be provided at the time of design review and lighting plans shall be reviewed and approved prior to project-specific design and construction document approval.

MM AES-2: Ingress and egress from new parking areas and parking structures shall be designed and situated to direct vehicular headlights away from adjacent residential uses, as necessary. Walls, landscaping, or other light barriers and shielding shall be provided where appropriate. Site plans shall be reviewed and approved as part of project-specific design and construction document approval.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a) Have a substantial adverse effect on a scenic vista?	Significant and Unavoidable Impact	No	No	No	No mitigation required
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	No Impact	No	No	No	No mitigation required
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?	Less than Significant Impact	No	No	No	No mitigation required
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	Less than Significant with Mitigation Incorporated	No	No	No	MM AES-1 and MM AES- 2

a) Views of the Box Springs Mountains located east of UCR were considered scenic vistas in the 2021 LRDP EIR. The 2021 LRDP EIR states that from nearby roadways looking towards the campus, including W. Linden Street, Blaine Street, Watkins Drive, Canyon Crest Drive, and University Avenue, the existing built environment is either distant enough from the scenic landscape not to be visible, or dense enough not to afford expansive views of that landscape. Existing development on campus also alters scenic vistas throughout the majority of campus and infill development would not result in new impacts to scenic vistas. Therefore, the 2021 LRDP EIR concluded impacts on scenic vistas from these areas to be less than significant.

However, expansive views are available to the northeast from fields east of Canyon Crest Drive (identified as Key Vantage Point 9 in the 2021 LRDP EIR) and new buildings in this area could block views of the Box Springs Mountains. Thus, impacts on scenic vistas in this area were considered significant and unavoidable in the 2021 LRDP EIR.

The project site occurs on West Campus where scenic vistas were considered obscured under existing conditions. Views of the Box Springs Mountains are available from pedestrian walkways and roadways surrounding the project site but are interrupted by the I-215/SR 60 freeway and existing development. The project would demolish the existing UNEX building and construct a new building that would be shorter in height than the existing UNEX building. The proposed building(s), associated pedestrian and vehicular accessway improvements, hardscape areas, and landscape improvements would occur within the footprint of an existing developed/disturbed site on the campus and would not block scenic vistas. Therefore, the proposed project would be consistent with the scenic vista analysis and determination in the 2021 LRDP EIR; and proposed project impacts to scenic vistas would be **less than significant**.

b) The IS prepared for the 2021 LRDP states that the campus is not located within the viewshed of an identified State Scenic Highway, and this threshold was not further evaluated in the 2021 LRDP EIR. Any future campus development would not degrade the visual character of the campus or affect scenic resources, and any construction impacts for future projects would be limited and temporary. Thus, future projects would not result in permanent visual degradation of the existing visual character of the campus. The IS prepared for the 2021 LRDP concluded no impacts are anticipated since the campus is not located near or along a State Scenic Highway.

The project site is not located near or along a State Scenic Highway and there are no scenic resources located on the project site. Implementation of the proposed project would not result in substantial damage to scenic resources within a State Scenic Highway due to existing development and the lack of visibility from a State Scenic Highway. Therefore, the proposed project would be consistent with the scenic resources analysis and determination in the IS prepared for the 2021 LRDP; and the proposed project would have **no impact** to scenic resources within a State Scenic Highway.

c) The 2021 LRDP EIR states that physical changes to the campus under the 2021 LRDP would not degrade the visual character of the campus or surrounding areas. All new development on campus would be subject to the design review and approval processes described in the Physical Design Framework. In addition, development under the 2021 LRDP would replace deteriorating buildings and replace these with buildings that reflect the campus character. Therefore, future development impacts to the UCR visual character and quality were considered less than significant.

The project would result in infill development on the campus where the UNEX building, constructed in 1968, currently sits. UCR is part of the UC system, which is a constitutionally created entity of the State of California, with “full powers of organization and government” under Article IX, Section 9 of the California Constitution. As a constitutionally created State entity, UCR is not subject to municipal regulations of surrounding local governments, such as the City or County of Riverside general plans or land use ordinances. The applicable land use plan for the project and actions taken on the project site are accounted for in the 2021 LRDP. The proposed project is also required to comply with UCR’s Campus Construction and Design Standards and undergo review for consistency with the Physical Design Framework. The proposed project would be consistent with its applicable land use designation, allowed uses, and other regulations and guidelines pertaining to scenic quality and compatible design. Therefore, the proposed project would be consistent with the scenic quality analysis and determination in the 2021 LRDP EIR; and proposed project impacts related to regulations governing scenic quality would remain **less than significant**.

d) The 2021 LRDP EIR concludes that future campus development projects would result in increased levels of daytime glare and nighttime light associated with new exterior lighting fixtures and increased vehicle trips on campus. Therefore, light and glare impacts would be potentially significant, and MM AES-1 and MM AES-2 would be required to reduce impacts under the 2021 LRDP to a less than significant level.

Current sources of light on and surrounding the project site include security lighting from buildings, parking lot lighting, pathway lighting, roadway streetlights, headlights and taillights from vehicles traveling on University Avenue or Everton Place, and vehicles entering and exiting the on-site parking garage and adjacent Parking Lots 50 and 51.

As described in the 2021 LRDP EIR, temporary and intermittent glare during construction would occur but would not be substantial given the limited number of construction equipment on-site at any one time. Light would only be required during construction in the event of nighttime construction and would not be a long-term source of light in the project vicinity.

The proposed project would include the development of a maximum three-story building with associated hardscape and landscape improvements on previously disturbed area. Lighting installed for the project would be similar to the existing lighting sources on the site, including building lighting, parking lot lighting, security lighting, walkway lighting, accent lighting, and headlights and taillights from vehicles entering and exiting the project site. The removal of the parking structure at the south end of the project site would eliminate vehicle headlights and taillights as a source of light emanating from the upper levels of the parking structure on the site.

Although the project does not propose a new parking area or structure, the existing driveway along Everton Place may be shifted to align with the proposed multimodal pathway and a new driveway along Everton Place may be created towards the eastern end of the Everton Place cul-de-sac to provide access to Parking Lots 50 and 51. **MM AES-2** would be incorporated to minimize the effects of vehicular headlights towards International Village to the south. The project site is located adjacent to and within existing developed/disturbed areas that include light and glare, and the proposed project is required to conform to UCR's Campus Construction and Design Standards and California Building Code (CBC) standards and guidelines related to light and glare. Therefore, the proposed project would be consistent with the light and glare analysis and determination in the 2021 LRDP EIR; and proposed project impacts to light and glare would remain **less than significant** with incorporation of **MM AES-1 and MM AES-2**.

4.1.2 AGRICULTURE AND FORESTRY RESOURCES

Section 4.2 of the 2021 LRDP EIR addresses impacts to agricultural resources under the 2021 LRDP and concludes that impacts to Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) would be significant and unavoidable, with no adequate MM that would substantially reduce impacts. The IS prepared for the 2021 LRDP found no impact would occur on land under current Williamson Act contracts, forest lands, or timber production lands (criteria b through d, portion of criterion e) from future campus development. Therefore, these issue areas were not addressed further in the 2021 LRDP EIR.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	Significant and Unavoidable Impact	No	No	No	No mitigation required
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	No Impact	No	No	No	No mitigation required
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	No Impact	No	No	No	No mitigation required
d) Result in the loss of forest land or conversion of forest land to non-forest use?	No Impact	No	No	No	No mitigation required
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	Significant and Unavoidable Impact (Conversion of Farmland to Non-agricultural Use); No Impact (Conversion of Forest Land to Non-Forest Use)	No	No	No	No mitigation required

a,e) The 2021 LRDP EIR states that most of the land designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) is located on West Campus in areas designated in the 2021 LRDP as Agricultural/Campus Research or Land-based Research. Farmland of Statewide Importance and Unique Farmland on East Campus was not anticipated to be converted to non-agricultural use. The 2021 LRDP reinforces the commitment to the densification of the existing Academic Center and existing urban environment on East Campus, limiting sprawl into existing open space and agricultural and land-based research areas on West Campus. However, implementation of the 2021 LRDP would still reduce land available for agricultural research on Farmland in comparison to the 2021 LRDP EIR's baseline conditions. The 2021 LRDP would impact fewer acres of Farmland than previous UCR LRDPs. Consistent with the past UCR LRDP EIRs, the establishment of the Coachella Valley Agricultural Research Station (CVARS) as mitigation for impacts to Farmland does not fully offset the net reduction in farmland in the region as no new farmlands were being created in the vicinity of the campus. Therefore, even with the establishment of the CVARS, impacts to Farmland were considered significant and unavoidable.

The project site is classified as Urban and Built-Up Land (see Figure 4.2-1 in the 2021 LRDP EIR) and located within the 2021 LRDP land use designation of University Avenue Gateway on UCR's West Campus. The project site is currently developed with the UNEX building, parking structure, surface parking, hardscape, and landscape areas. The proposed project includes demolition of the UNEX building, parking structure, and associated hardscape and landscape areas. Following demolition activities, the proposed project entails infill development and would avoid the conversion of land-based research areas, as the project site does not contain Farmland. Therefore, the proposed project would be consistent with the farmland use and loss analysis and determination in the 2021 LRDP EIR; and proposed project would have **no impact** related to Farmland.

b-d) The 2021 LRDP EIR states that the campus does not contain land under current Williamson Act contracts, forest lands, or timber production lands. Therefore, the IS prepared for the 2021 LRDP determined that no impacts would occur to Williamson Act contracts, forest lands, or timber production lands for projects implemented under the 2021 LRDP; and these issue areas were not further evaluated in the 2021 LRDP EIR.

Similarly, the proposed project does not contain any forest land or timberland and is not under a Williamson Act contract. The proposed OASIS Park would be constructed in an area that currently includes the UNEX building, parking structure, portions of surface parking lots, and associated hardscape and landscaped areas that are proposed to be demolished. In addition, associated utility, hardscape, and landscape improvements would be within previously developed/disturbed areas. Therefore, the proposed project would be consistent with the Williamson Act contract, forest land, and timber production land analyses and determinations in the IS prepared for the 2021 LRDP; and the proposed project would have **no impact** on Williamson Act contracts, forest lands, or timber production land.

4.1.3 AIR QUALITY

Section 4.3 of the 2021 LRDP EIR addresses the effects of the 2021 LRDP campus growth projections on air quality. The 2021 LRDP EIR concludes that implementation of the 2021 LRDP would have less than significant impacts related to the 2016 Air Quality Management Plan (AQMP), as it would not result in population, housing, or employment growth exceeding forecasts in the 2016 AQMP. Implementation of the 2021 LRDP would not expose sensitive receptors to substantial pollutant concentrations, including carbon monoxide (CO) hotspots and toxic air contaminants (TACs) and impacts would be less than significant. The IS prepared for the 2021 LRDP concludes that there would be a less than significant impact related to other emissions, such as odors, adversely affecting a substantial number of people and the topic was not discussed in the 2021 LRDP EIR.

However, construction and operation of the 2021 LRDP would generate emissions that exceed South Coast Air Quality Management District (SCAQMD) significance thresholds for criteria pollutant emissions, even with implementation of portions of MM GHG-1, and impacts would be significant and unavoidable.

Per the air quality section of the 2021 LRDP EIR, the applicable portions of the above-mentioned MM state the following:

MM GHG-1 Implement On-Campus GHG Emissions Reduction Measures: UCR shall implement the following GHG emissions reduction measures by scope emissions category:

Scope 1 (Stationary Fuel Combustion, Refrigerant Use, Fleet Fossil Fuel Combustion)

Energy (EN)

- Measure EN1: To meet 100 percent electrification of all new campus buildings and structures, UCR shall prioritize construction of all-electric building design for new campus buildings and structures and discourage the construction and connection of new fossil fuel combustion infrastructure on campus. In addition, UCR shall focus on energy optimization through the Central Plant control systems by automating manual processes and initiating an engineering study focused on transitioning away from natural gas use at the Central Plant.

Fuel (FL)

- Measure FL1: To decarbonize the campus vehicle fleet, UCR shall reduce emissions from the campus vehicle fleet by 25 percent by 2025, by 50 percent by 2030, and by 75 percent by 2035 through replacement of fleet vehicles with electric vehicles or low-emission alternative vehicles.

Scope 3 (On-site Transportation, Water Consumption, Carbon Sequestration, and Construction)

Transportation (TR)

- Measure TR2: UCR shall update the Transportation Demand Management (TDM) program for the campus to decrease single occupancy vehicle VMT [Vehicle Miles Traveled] 5 percent by 2025 and 20 percent by 2035. In addition, UCR shall evaluate trends of current programs to expand on existing programs and establish new initiatives that utilize proven successful strategies.
- Measure TR3: UCR shall develop and implement a Campus Active Transportation Plan to shift 2 percent of baseline (2018) passenger vehicle VMT to active transportation by 2025 and 8 percent by 2035. In addition, UCR shall update the Campus Bicycle and Pedestrian Network Map every five years, including routes from off campus to on campus.
- Measure TR4: UCR shall reduce GHG emissions associated with campus commuting 10 percent by 2025 and 25 percent by 2035.

Construction (CR)

- Measure CR1: UCR shall reduce construction-related GHG emissions on campus 10 percent by 2025 and 25 percent by 2035 through emission reduction controls and/or electric equipment requirements in line with contract obligations. Specifically, UCR shall require off-road diesel-powered construction equipment greater than 50 horsepower to meet the Tier 4 emission standards as well as construction equipment to be outfitted with BACT [Best Available Control Technology] devices certified by CARB and emissions control devices that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similar-sized engine. In addition, UCR shall develop zero waste procurement guidelines and process for campus construction projects and integrate into purchasing RFP language as part of campus procurement.

The UCR Office of Sustainability, Facilities Services, Environmental Health & Safety (EH&S), Transportation and Parking Services (TAPS), and/or Planning, Design & Construction (PD&C) shall annually monitor, track, and verify implementation of these GHG emissions reduction measures.

	Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a)	Conflict with or obstruct implementation of the applicable air quality plan?	Less than Significant Impact	No	No	No	No mitigation required
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?	Significant and Unavoidable Impact	No	No	No	MM GHG-1 Measures EN1, FL1, TR2, TR3, TR4, CR1
c)	Expose sensitive receptors to substantial pollutant concentrations?	Less than Significant Impact	No	No	No	No mitigation required
d)	Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	Less than Significant Impact	No	No	No	No mitigation required

a) The 2021 LRDP EIR states that implementation of the 2021 LRDP would not generate population, housing, or employment growth exceeding forecasts in the 2016 AQMP. The 2016 AQMP, the most recent AQMP adopted by the SCAQMD at the time the 2021 LRDP EIR was certified, incorporates local city general plans and the Southern California Association of Governments (SCAG) 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) socioeconomic forecast projections of regional population, housing, and employment growth. Population growth associated with the 2021 LRDP would not exceed these forecasts that inform the AQMP; therefore, impacts were considered less than significant.

The 2021 LRDP assumes an approximately 46 percent increase in student population (approximately 11,000 students), with an approximately 59 percent increase in additional faculty and staff (approximately 2,800 new faculty and staff) by the 2035/2036 academic year. The proposed project would accommodate approximately 180 students and 125 employees. The 180 students to be served by the project represent fewer or a similar number of students served by UNEX under LRDP baseline conditions, and therefore, would not increase the student population. Of the 125 anticipated employees, 5 would be existing UNEX faculty members, 40 would be existing CE-CERT employees and/or people currently conducting research within similar facilities on or near campus, and 80 would be new people employed by the Office of Technology Partnerships. The 80 new employees associated with the project represent approximately 2.9 percent of the increase in faculty and staff analyzed in the 2021 LRDP EIR.

Implementation of the proposed OASIS Park project would enable UCR to manage anticipated growth as it would accommodate students, faculty, and staff on campus; allocate space for UNEX classrooms and offer tailored programming options in clean technology through shared resources in collaboration with CE-CERT and ExCITE; and provide incubator and accelerator space for community collaboration through the Office of Technology Partnerships. The approximately 80 new employees anticipated to utilize the OASIS Park facility through the Office of Technology Partnerships ExCITE program would generally be from the local region, similar to that of the existing ExCITE program in downtown Riverside. The population growth attributed to these 80 employees is minimal and consistent with the overall 2021 LRDP faculty and staff population projections. Therefore, it can be determined that the proposed project is consistent with the campus population projections contained in the 2021 LRDP and, therefore, would not conflict with the population forecasts that informed the 2016 AQMP and subsequently the 2022 AQMP. The proposed project would be consistent with the AQMP consistency analysis and determination in the 2021 LRDP EIR; and proposed project impacts to population and employment growth would remain **less than significant**.

b) The 2021 LRDP EIR reports significant and unavoidable regional air quality impacts with respect to construction and operation of the full development under the 2021 LRDP. Construction emissions were anticipated to exceed SCAQMD regional emissions thresholds for reactive organic gases (ROG) and nitrogen oxide (NO_X). Emissions generated as a result of operations would exceed SCAQMD regional emissions thresholds for ROG, NO_X, and particulate matter 10 micrometers in diameter or less (PM_{10}). Measures contained within MM GHG-1 were anticipated to decrease pollutant emissions but would not reduce these emissions below the respective SCAQMD thresholds and impacts were considered significant and unavoidable.

The proposed demolition of the existing UNEX building, parking structure, and hardscape, as well as construction of the new OASIS Park site, were modeled for project-specific construction emissions in the California Emissions Estimator Model (CalEEMod). The complete modeling results are attached to this Addendum as Appendix A. As shown in Table 4.1.3-1, construction emissions would be below SCAQMD regional thresholds and Localized Significance Thresholds (LSTs) for all criteria pollutants. The emissions projections provided in Table 4.1.3-1 assume the use of Tier 4 equipment for construction equipment greater than 50 horsepower, as required by **MM GHG-1 Measure CR1**.

Table 4.1.3-1
Maximum Daily Construction Emissions

	Maximum Emissions (lbs/day)					
	ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
Construction Year 2024	35.0	10.0	82.0	0.1	3.7	1.5
Construction Year 2025	0.6	3.5	14.7	<0.1	0.5	0.2
Construction Year 2026	31.0	3.4	14.5	<0.1	0.5	0.2
Maximum Daily Emissions	35.0	10.0	82.0	0.1	3.7	1.5
SCAQMD Regional Thresholds	75	100	550	150	150	55
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**
Maximum On-site Emissions	34.8	7.2	79.1	0.1	2.8	1.4
SCAQMD LSTs	N/A	118	602	N/A	4	3
Threshold Exceeded?	**N/A**	**No**	**No**	**N/A**	**No**	**No**

Source: Calculations were made in CalEEMod, see Appendix A for full model output.

Notes: Emission quantities may not add precisely due to rounding. Applicable LSTs for Source Receptor Area 23 (Metropolitan Riverside County), disturbance area of 1 acre per day, and sensitive receptors within 25 meters of construction.

lbs/day = pounds per day; ROG = reactive organic gases; NO_x = nitrogen oxide; CO = carbon monoxide; SO_2 = Sulfur dioxide; PM_{10} = Particulate matter 10 micrometers in diameter or less; $PM_{2.5}$ = Particulate matter 2.5 micrometers in diameter or less; SCAQMD = South Coast Air Quality Management District; LSTs = Localized Significance Thresholds

Emissions associated with operation of the proposed OASIS Park project were also calculated in CalEEMod. The CalEEMod modeling results are provided as Appendix A to this Addendum. The emissions projections for project operation provide a conservative analysis, as modeling does not consider emissions generated under LRDP baseline conditions by UNEX operations. Emissions from operation of the proposed project are anticipated to be decreased from existing LRDP baseline conditions (operation of UNEX) since the project would not have on-site pollutant emissions from energy sources and would decrease the building area on the site. As shown in Table 4.1.3-2, project operational emissions would be well below regulatory thresholds. In addition, applicable portions of **MM GHG-1 (Measures EN1, FL1 and TR2 through TR4)** would continue to be implemented at the campus level and would reduce air pollutant emissions from the project and other campus development under the 2021 LRDP. Therefore, the proposed project would not exceed the emissions projections in the 2021 LRDP EIR and would be consistent with the criteria pollutant emissions analysis and determination in the 2021 LRDP EIR; and proposed project impacts to air quality would be **less than significant**. While no potentially significant project-level impacts would result, applicable portions of **MM GHG-1** would still be implemented by the project (**Measure CR1**) and at the campus level (**Measures EN1, FL1 and TR2 through TR4**), consistent with the 2021 LRDP EIR.

Table 4.1.3-2
Regional Operational Emissions

Emission Source	Maximum Daily Emissions (lbs/day)					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Area	2.2	<0.1	3.0	<0.1	<0.1	<0.1
Energy	0.0	0.0	0.0	0.0	0.0	0.0
Mobile	0.9	0.7	5.6	<0.1	1.1	0.3
Maximum Daily Project Emissions	**3.1**	**0.7**	**8.6**	**<0.1**	**1.1**	**0.3**
SCAQMD Regional Thresholds	55	55	550	150	150	55
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**

Source: Calculations were made in CalEEMod, see Appendix A for full model output.

Notes: Emission quantities may not add precisely due to rounding.

lbs/day = pounds per day; ROG = reactive organic gases; NO_x = nitrogen oxide; CO = carbon monoxide; SO_2 = Sulfur dioxide; PM_{10} = Particulate matter 10 micrometers in diameter or less; $PM_{2.5}$ = Particulate matter 2.5 micrometers in diameter or less; SCAQMD = South Coast Air Quality Management District

c) The 2021 LRDP EIR states that localized construction emissions generated from full development under the 2021 LRDP would be less than significant, as emissions would be below SCAQMD LSTs and would result in TAC emissions in one location for only a short period of time. The 2021 LRDP EIR states operation under the 2021 LRDP would not expose sensitive receptors to substantial pollutant concentrations from CO hotspots or TACs.

As shown in Table 4.1.3-1, project construction emissions would be below the applicable LSTs. In addition, as anticipated in the 2021 LRDP EIR, construction activities would generate diesel particulate matter (a TAC) but such activities would occur temporarily. Construction of the project is anticipated to occur over an approximately 28-month period, which is a small fraction of the potential health risk exposure period for assessment. Therefore, consistent with the analysis in the 2021 LRDP EIR, project construction would not create unsafe or potentially hazardous conditions for sensitive receptors.

The 2021 LRDP EIR did not anticipate the creation or exacerbation of CO hotspots based on low background CO levels, maximum campus CO emissions of approximately 513 pounds per day, and improved vehicle emissions standards for new cars in accordance with State and federal regulations. The project does not propose substantial vehicle trips and would not generate CO emissions that would create new CO hotspots or contribute substantially to existing hotspots.

The 2021 LRDP EIR included a programmatic health risk assessment (HRA) for the existing and future scenarios of UCR's campus operations. The HRA identified potential risk to both on-site and off-site receptors, including residents, students, staff, and children at the UCR Child Development Center. The HRA found that incremental excess cancer risk increases attributable to the development of the 2021 LRDP would not exceed the SCAQMD threshold of 10 in 1 million at off- or on-campus receptors. Additionally, the HRA determined that chronic and acute hazard indices under the 2021 LRDP would not exceed the SCAQMD threshold of 1.0 at the on- or off-campus receptors. The project proposes development consistent with the 2021 LRDP and is not anticipated to result in increased health risks for sensitive receptors.

Further, as shown in Table 4.1.3-3, the project's operational emissions would be below SCAQMD LSTs for operation. Therefore, the proposed project would be consistent with the sensitive receptor analysis and determination in the 2021 LRDP EIR; and proposed project impacts to sensitive receptors would remain **less than significant**.

Table 4.1.3-3
Localized Operational Emissions

	Maximum Emissions (lbs/day)			
	NO_x	CO	PM_{10}	$PM_{2.5}$
Maximum On-site Daily Emissions	2.2	3.0	<0.1	<0.1
SCAQMD LSTs	*170*	*883*	*2*	*1*
Threshold Exceeded?	**No**	**No**	**No**	**No**

Source: Calculations were made in CalEEMod, see Appendix A for full model output.

Notes: Emission quantities may not add precisely due to rounding. Maximum on-site emissions are the highest emissions that would occur on the project site from on-site sources, such as area and energy sources, and excludes off-site emissions from mobile sources. Applicable LSTs for Source Receptor Area 23 (Metropolitan Riverside County), 2-acre project site, and sensitive receptors within 25 meters.

lbs/day = pounds per day; NO_x = nitrogen oxide; CO = carbon monoxide; PM_{10} = Particulate matter 10 micrometers in diameter or less; $PM_{2.5}$ = Particulate matter 2.5 micrometers in diameter or less; SCAQMD = South Coast Air Quality Management District; LST = Localized Significance Threshold

d) The IS prepared for the 2021 LRDP states that there would be a less than significant impact related to other emissions, such as odors, adversely affecting a substantial number of people; therefore, this criterion was not further discussed in the 2021 LRDP EIR.

The land use and operational activities for the proposed project would be consistent with the land uses and operational activities identified in the 2021 LRDP and analyzed in the 2021 LRDP EIR. Odor sources generated by the proposed project and proposed uses are anticipated to be the same or less than those identified in the IS prepared for the 2021 LRDP. Construction odor sources would include equipment exhaust, asphalt, and architectural coatings but would be temporary and intermittent in nature. Operational odor sources are typically associated with sewage treatment plants, waste transfer stations, recycling facilities, petroleum refineries, biomass operations, coating operations, autobody shops, landfills, livestock operations, foundries, fiberglass manufacturing, and rendering plants, none of which are proposed by the project. The proposed project, as well as other development under the 2021 LRDP, would be required to comply with SCAQMD rules on construction and operational nuisance odor emissions. Therefore, the proposed project would be consistent with the odor impacts identified and analyzed in the IS prepared for the 2021 LRDP; and proposed project odor impacts would remain **less than significant**.

4.1.4 BIOLOGICAL RESOURCES

Section 4.4 of the 2021 LRDP EIR addresses the effects of the 2021 LRDP on biological resources. The 2021 LRDP EIR states that the campus is not located within one of the designated Riverside County Habitat Conservation Agency (RCHCA) reserve areas, and that implementation of the 2021 LRDP would not locate substantial development near Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) conservation areas that may contain potential wildlife habitat, movement corridors, or native nursery sites.[5] However, UCR is still subject to compliance with Sections 6.1.2 (Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools), Section 6.1.3 (Protection of Narrow Endemic Plant Species), Section 6.3.2 (Additional Survey Needs and Procedures), and Section 6.1.4 (Guidelines Pertaining to the Urban/Wildlands Interface) of the MSHCP when specific campus projects are proposed. In addition, UCR is not a permittee to the MSHCP, and therefore is not subject to the conservation efforts established in the plan. Therefore, the IS prepared for the 2021 LRDP concludes that impacts due to conflicts with local policies, ordinances, or adopted habitat conservation plans (criteria e and f) would be less than significant, and these issues were not further discussed in the 2021 LRDP EIR.

The 2021 LRDP EIR concludes that impacts to burrowing owl (*Athene cunicularia*), sensitive species or vegetation communities, and State or federally protected wetlands or jurisdictional delineated waters could be potentially significant as a result of implementing the 2021 LRDP. Therefore, MM BIO-1A through MM BIO-9 were identified in the 2021 LRDP EIR for projects that would impact biological resources. Implementation of these measures would reduce potential direct and indirect project impacts to burrowing owls and birds, bats, special-status plants and wildlife species, sensitive wildlife and vegetation communities, and jurisdictional waters and wetlands to less than significant levels. The proposed project would avoid impacts to burrowing owls, special-status plants and wildlife, sensitive vegetation communities, Open Space Reserve areas, MSHCP Conservation Area, and jurisdictional waters and wetlands, as the project site is developed and does not contain such resources or suitable habitat. Therefore, MM BIO-1A, MM BIO-1B, MM BIO-5, MM BIO-6, MM BIO-7, MM BIO-8, and MM BIO-9 would not be applicable to the proposed project. However, the project could impact nesting birds, flying birds (bird strikes), or roosting bats.

Therefore, applicable MMs state the following:

MM BIO-2 Nesting Bird Avoidance: Prior to issuance of grading permits, the following measures shall be implemented:

- To avoid disturbance of nesting and special-status bird species protected by the Migratory Bird Treaty Act and California Fish and Game Code, activities related to the project, including but not limited to, vegetation removal, ground disturbance, and construction and demolition shall occur outside of the bird breeding season (February 15 through August 31). If construction must be initiated during the peak nesting season, vegetation removal and/or tree removal should be planned to occur outside the nesting season (September 1 to February 14), and a preconstruction nesting bird survey shall be conducted no more than 3 days prior to initiation of construction activities. The nesting bird preconstruction survey shall be conducted on foot inside the project site disturbance areas. If an active avian nest is discovered during the preconstruction clearance survey, construction activities shall stay outside of a 50- to 200-foot buffer for common nesting birds around the active nest, as determined by a biologist. For listed and raptor species, this buffer shall be expanded to 500 feet or as determined by a biologist.
- Inaccessible areas shall be surveyed from afar using binoculars to the extent practical. The survey shall be conducted by a qualified biologist familiar with the identification of avian species known to occur in western Riverside County. If nests are found, an appropriate avoidance buffer shall be

[5] The MSHCP is a comprehensive, multi-jurisdictional plan that focuses on the conservation of species and their associated habitats in Western Riverside County. The MSHCP is used to allow the participating jurisdictions to authorize the "take" of plant and wildlife species identified within the Plan Area. UCR is in the MSHCP area and is given the option of utilizing the MSHCP as a Participating Special Entity. Furthermore, a Participating Special Entity is any regional public facility provider (e.g., a utility company, public district, or agency) that operates and/or owns land within the MSHCP Plan Area and that applies for Take Authorization pursuant to Section 11.8 of the Implementing Agreement. (County of Riverside 2003)

determined by a qualified biologist and demarcated by a qualified biologist with bright orange construction fencing, flagging, construction lathe, or other means to mark the boundary. Effective buffer distances are highly variable and based on specific project stage, bird species, stage of nesting cycle, work type, and the tolerance of a particular bird pair. The buffer may be up to 500 feet in diameter, depending on the species of nesting bird found and the biologist's observations.

- If nesting birds are located adjacent to the project site with the potential to be affected by construction activity noise above 60 dBA Leq (see Section 4.11, *Noise*, of the LRDP EIR for definitions and discussion of noise levels), a temporary noise barrier shall be erected consisting of large panels designed specifically to be deployed on construction sites for reducing noise levels at sensitive receptors. If 60 dBA Leq is exceeded, an acoustician would require the construction contractor to make operational and barrier changes to reduce noise levels to 60 dBA during the breeding season (February 15 through August 31). Noise monitoring shall occur during operational changes and installation of barriers to ensure their effectiveness. All construction personnel shall be notified as to the existence of the buffer zone and to avoid entering the buffer zone during the nesting season. No parking, storage of materials, or construction activities shall occur within this buffer until the avian biologist has confirmed that breeding/nesting is completed, and the young have fledged the nest. Encroachment into the buffer shall occur only at the discretion of the qualified biologist, if it is determined such encroachment will not adversely impact the nesting birds.

MM BIO-3 Bird Strike Avoidance: To reduce bird strike mortality and injury of special-status bird species from collisions with clear and reflective sheet glass and plastic, construction of glass-fronted buildings or other structures using exposed glass (e.g., glass-topped walls) shall incorporate measures to minimize the risk of bird strikes. This may include: (1) the use of opaque or uniformly textured/patterned/etched glass, (2) angling of glass downward so that the ground instead of the surrounding habitat or sky is reflected, (3) installation of one-way film that results in opaque or translucent covering when viewed from either side of the glass, (4) installation of a uniformly dense dot pattern created as ceramic frit on both sides of the glass, and/or (5) installation of a striped or grid pattern of clear ultraviolet-reflecting and ultraviolet-absorbing film applied to both sides of the glass. It should be noted that single decals (e.g., falcon silhouettes or large eye patterns) are ineffective and are not recommended unless the entire glass surface is uniformly covered with the objects or patterns.

MM BIO-4 Bat Preconstruction Survey: To avoid disturbance of special-status bat species during maternity season (approximately March through September), a preconstruction roosting bat survey shall be conducted by a qualified bat biologist on potential roost structures identified by the bat biologist and mature vegetation no more than 30 days prior to initiation of construction activities if construction activities must occur during the roosting season. If future projects would impact rocky outcrops, mature vegetation, existing buildings, or other structures that could be used for roosting, a passive acoustic survey shall identify the species using the area for day/night roosting. If special-status roosting bats are present and their roosts would be impacted, a qualified bat biologist should prepare a plan to identify the proper exclusionary methods. Removal of mature trees should be monitored by a qualified bat biologist and occur by pushing down the entire tree (without trimming or limb removal) using heavy equipment and leaving the felled tree on the ground untrimmed and undisturbed for a period of at least 24 hours. To exclude bats from buildings/structures or rocky outcrops, exclusion measures should be installed on crevices by placing one-way exclusionary devices that allow bats to exit but not enter the crevice.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
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 United States Fish and Wildlife Service?	Less than Significant Impact with Mitigation Incorporated	No	No	No	MM BIO-2 through MM BIO-4
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 United States Fish and Wildlife Service?	Less than Significant Impact with Mitigation Incorporated	No	No	No	No mitigation required
c) Have a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	Less than Significant Impact with Mitigation Incorporated	No	No	No	No mitigation required
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	Less than Significant Impact	No	No	No	No mitigation required
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	Less than Significant Impact	No	No	No	No mitigation required
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?	Less than Significant Impact	No	No	No	No mitigation required

a) The 2021 LRDP EIR states that construction and operation of projects developed under the 2021 LRDP would have potentially substantial adverse effects on special-status species, but impacts would be reduced to less than significant levels with incorporation of MM BIO-1A through MM BIO-8, which require pre-construction surveys, avoidance of sensitive-species and their habitats, vegetation mitigation, and noise reduction adjacent to conservation areas. Areas of potential habitat for special-status species primarily include the southeastern portion of East Campus (mainly in lands designated Open Space Reserve) and scattered areas of West Campus, as shown in Figure 4.4-3 of the 2021 LRDP EIR.

The project site is currently developed/disturbed (see Figure 2-3, *Project Site Location*), as it was identified in the 2021 LRDP EIR (Figure 4.4-2 in the 2021 LRDP EIR). The project site was not identified as containing special-status species or habitat areas (see Figure 4.4-3 in the 2021 LRDP EIR). No sensitive habitat is present on the project site and MM BIO-5 and MM BIO-7 would not apply to the project. In addition, the project site is not adjacent to Open Space Reserve lands and indirect impacts to sensitive communities in these areas would not occur; therefore, MM BIO-6A and MM BIO-6B do not apply to the project. The project site is not located near MSHCP conservation areas, which are located on East Campus, and MM BIO-8 would not be required.

The project site is located outside of any survey area for burrowing owls designated by the MSHCP (Figure 4.4-1 in the 2021 LRDP EIR), the closest of which is located approximately 50 feet south of the proposed project, across Everton Place, within the land-based research agricultural areas. Burrowing owl typically occupies open areas with short vegetation and bare ground within shrub, desert, and grassland environments. The project site is developed/disturbed, with no suitable burrowing owl habitat occurring on site. Therefore, implementation of MM BIO-1A and MM BIO-1B requiring a preconstruction survey and focused surveys would not be required.

Vegetation communities and trees within and surrounding the campus, including the project site, have the potential to provide for avian nesting that could be affected by construction activities involving the removal of trees. Birds flying in the area could be impacted by the installation of glass surfaces. Furthermore, several bat species, including the special-status western yellow bat (*Lasiurus xanthinus*) and pallid bat (*Antrozous pallidus*), may forage and roost in areas in and around the project site on existing buildings, culverts, mature trees, and rock outcrops. Consistent with the 2021 LRDP EIR, impacts to nesting birds, flying birds, and bats would be reduced to less than significant levels with implementation of **MM BIO-2 through MM BIO-4**.

Indirect impacts to sensitive species related to water quality, noise, dust, night lighting, and human activity were anticipated to occur where development is proposed near MSHCP conservation areas, which is not the case for the proposed project. Further, compliance with stormwater permits and SCAQMD dust suppression regulations would ensure indirect impacts related to water quality and dust, respectively, remain less than significant during construction. Noise affecting nesting birds would be reduced to less than significant levels with implementation of **MM BIO-2**.

The project has the potential to result in significant direct and indirect impacts to nesting birds, flying birds, and bats due to the presence of potential nesting and roosting sites within and surrounding the project site. However, the proposed project would be consistent with the special-status species analyses and determination in the 2021 LRDP EIR; and proposed project impacts to sensitive or special-status species would remain **less than significant** with incorporation of **MM BIO-2 through MM BIO-4**.

b) The 2021 LRDP EIR states that construction and operation of projects developed under the 2021 LRDP would potentially have substantial adverse effects on riparian habitat or other sensitive natural communities on the campus. Direct impacts to these natural communities and indirect impacts associated with water quality and fugitive dust were anticipated to be avoided, while indirect impacts associated with invasive species, edge effects, and inadvertent encroachment were considered potentially significant. Impacts would be reduced to less than significant levels with incorporation of MM BIO-6A, MM BIO-6B, and MM BIO-7.

The project site is developed/disturbed and does not contain riparian habitat or other sensitive natural communities (see Figure 4.4-2 in the 2021 LRDP EIR). In addition, the areas adjacent to the project site do not contain riparian habitat or other sensitive natural communities. Therefore, mitigation related to indirect impacts to sensitive vegetation communities would not be required for the proposed project. The proposed project would be consistent with the riparian and sensitive habitat analyses and determination in the 2021 LRDP EIR; and proposed project impacts to riparian habitat and other sensitive natural communities would remain **less than significant**.

c) The 2021 LRDP EIR states that construction and operation of projects developed under the 2021 LRDP could result in significant adverse effects on State and federally protected wetlands; however, impacts would be reduced to less than significant levels with incorporation of MM BIO-9.

No potentially jurisdictional resources were identified within the project site; however, Gage Canal borders Parking Lots 50 and 51 east of the project site and is a potentially jurisdictional resource (see Figure 4.4-4 in the 2021 LRDP EIR). The project would avoid impacts to Gage Canal, as it is outside of the project site limits, and MM BIO-9 would not be required. Therefore, the proposed project would be consistent with the wetlands analysis and determination in the 2021 LRDP EIR; and proposed project impacts to wetland areas and habitats would remain **less than significant**.

d) The 2021 LRDP EIR states that the campus is located at the edge of urban development in the eastern portion of the City and, as a result, contains no regional connection to open space areas to the north or west. The southeastern portion of East Campus consists of undeveloped open space that would remain under the 2021 LRDP and links the Box Springs Mountains to the northeast with Sycamore Canyon Wilderness Park to the southwest. The 2021 LRDP did not propose development within open space that would impede wildlife movement and impacts were determined to be less than significant.

The project site is located on West Campus, is developed/disturbed, and is surrounded by existing development and agricultural uses. Development of the proposed project would not preclude wildlife movement since wildlife corridors or linkages connecting open space and resources are not present on the campus, including the project site. Therefore, the proposed project would be consistent with the wildlife movement and native nursery analyses and determination in the 2021 LRDP EIR; and proposed project impacts to wildlife movement areas would remain **less than significant**.

e) The IS prepared for the 2021 LRDP stated that there were no tree preservation policies or ordinances in place for campus projects, and that UCR's Tree Preservation and Replacement Guidelines was being drafted, which would include applicable tree replacement guidelines for the removal of specific trees. In addition, it was stated that the campus is outside of RCHCA reserve areas and is not subject to the restrictions associated with these areas. The IS prepared for the 2021 LRDP concludes that the 2021 LRDP would have a less than significant impact related to local policies or ordinances protecting biological resources.

UCR's Tree Preservation and Replacement Guidelines have been adopted since certification of the 2021 LRDP EIR and the proposed project would adhere to such guidelines for the removal of existing trees on the project site. The project, at a minimum, would replace trees removed by the project at a 1:1 ratio. Therefore, the proposed project would be consistent with the local biological resources policies and ordinances analysis and determination in the IS prepared for the 2021 LRDP; and proposed project impacts related to these policies would remain **less than significant**.

f) The IS prepared for the 2021 LRDP states that UCR is not a Permittee to the Western Riverside County MSHCP and therefore is not subject to the conservation efforts established in the plan. However, UCR is subject to Sections 6.1.2 (Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools), 6.1.3 (Protection of Narrow Endemic Plant Species), 6.3.2 (Additional Survey Needs and Procedures), and 6.1.4 (Guidelines Pertaining to the Urban/Wildlands Interface) of the MSHCP. Specific projects would be required to comply with the applicable MSHCP sections and impacts were determined to be less than significant.

The project site is not located within a MSHCP Criteria Cell and therefore is not subject to conservation efforts. The project site is located within developed land and does not contain a drainage feature, or riparian or riverine areas; thus, the proposed project does not conflict with Section 6.1.2 of the MSHCP. The project site is not within areas of potential habitat for special-status species. However, the proposed project may result in potentially significant impacts to nesting birds, flying birds, and/or bats due to the presence of existing habitat opportunities in and around the project site and would incorporate **MM BIO-2 through MM BIO-4**.

The project site is not located within MSHCP survey areas and would not conflict with Section 6.1.3 or 6.3.2 of the MSHCP. The project site is not located adjacent to existing or proposed MSHCP Conservation Area and is not subject to Urban/Wildlands Interface guidelines; therefore, no conflict with Section 6.1.4 of the MSHCP would occur. The proposed project would be consistent with the MSHCP consistency analysis and determination in the IS prepared for the 2021 LRDP; and proposed project impacts related to adopted conservation plans would remain **less than significant** with the incorporation of **MM BIO-2 through MM BIO-4** specified in criterion 4.1.4 a) above.

4.1.5 CULTURAL RESOURCES

Section 4.5 of the 2021 LRDP EIR addresses the effects of campus growth on cultural resources under the 2021 LRDP. The 2021 LRDP EIR concludes impacts to the built environment historical resources would be significant and unavoidable even with the adoption of MM CUL-1, while impacts to archaeological resources would be less than significant with implementation of MM CUL-2 through MM CUL-4. The 2021 LRDP EIR anticipates ground disturbance associated with development facilitated by the 2021 LRDP would have a low potential to disturb or damage known or unknown human remains and existing regulations would further ensure impacts to unknown human remains are less than significant. The project site does not contain listed or eligible historical resources or other historically significant features and MM CUL-1 would not apply to the project.

The above-mentioned applicable MMs state the following:

MM CUL-2 Tribal Cultural Resources/Archaeological Monitoring: Prior to commencement of ground disturbing activities into an area with a medium or high potential to encounter undisturbed native soils including Holocene alluvium soils, as determined by UCR, UCR shall hire a qualified archaeological monitor meeting the Secretary of the Interior's Professional Qualification Standards for archaeology (National Park Service 1983) to identify archaeological resources and cultural resources of potential Native American origin. Where development occurs in the southeastern quadrant of campus, and in areas containing Val Verde Pluton geologic features considered highly sensitive to prehistoric archaeological resources, UCR shall hire a qualified archaeologist and a Native American monitor to reduce impacts to potential archaeological and/or tribal cultural resources. The monitor(s) shall be on-site during any construction activities that involve ground disturbance. The on-site monitoring shall end when project-related ground disturbing activities are completed, or, in consultation with the lead agency and tribes as appropriate and based on observed conditions, monitoring may be reduced or eliminated prior to completion of ground-disturbing activities, when the monitor(s) has indicated that the project site has a low potential to encounter tribal cultural resources (TCR)/archaeological resources. Consolidated monitoring efforts (e.g., archaeological monitoring/tribal cultural/ paleontological monitoring) may occur if the individual monitor meets the applicable qualifications, except for development in the southeastern quadrant as detailed above.

MM CUL-3 Construction Worker Training: For projects requiring TCR/archaeological monitoring, the monitor shall provide preconstruction training for all earthmoving construction personnel prior to the start of any ground disturbing activities, regarding how to recognize the types of TCRs and/or archaeological resources that may be encountered and to instruct personnel about actions to be taken in the event of a discovery. UCR Planning, Design & Construction Project Manager/contractor shall retain documentation showing when training of personnel was completed.

MM CUL-4 Unanticipated Discovery of Tribal Cultural Resources/Archaeological Resources: If previously undiscovered TCRs and/or archaeological resources are identified during construction, all ground disturbing activities within 100 feet of the resource shall halt, UCR Planning, Design & Construction staff shall be notified, and the find shall be evaluated by a qualified archaeologist meeting the Secretary of the Interior standards to determine whether it is a unique archaeological resource, as defined by CEQA. If the discovery appears to be Native American in origin, a tribal representative will be contacted within 24 hours of discovery to determine whether it is a TCR, as defined by CEQA. If the find is neither a unique archaeological resource nor a TCR, work may resume. If the find is determined to be a unique archaeological resource or TCR, the archaeologist and the tribal representative, as appropriate, shall make recommendations to UCR Planning, Design & Construction staff on the measures that will be implemented, including, but not limited to, preservation in place, excavation, relocation, and further evaluation of the discoveries pursuant to CEQA. Preservation in place (i.e., avoidance) is the preferred method of mitigation for impacts to TCRs/archaeological resources. If UCR determines that preservation in place is not feasible, the archaeologist shall design and implement a treatment plan, prepare a report, and salvage the material, as appropriate. Any important artifacts recovered during monitoring shall be cleaned, catalogued, and analyzed, with the results presented in a report of findings that meets professional standards. Work on-site may commence upon completion of any fieldwork components of the treatment plan.

	Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a)	Cause a substantial adverse change in the significance of a historical resource as pursuant to Section 15064.5?	Significant and Unavoidable Impact	No	No	No	No mitigation required
b)	Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	Less than Significant Impact with Mitigation Incorporated	No	No	No	MM CUL-2 through MM CUL-4
c)	Disturb any human remains, including those interred outside of dedicated cemeteries?	Less than Significant Impact	No	No	No	No mitigation required

a) The 2021 LRDP EIR and associated UCR Historic Resources Survey (Appendix E to the 2021 LRDP EIR) state that implementation of the 2021 LRDP would adversely affect historical resources through the full and partial demolition of historical resources, renovation/rehabilitation of historical resources, and new construction adjacent to historical resources. Impacts were determined to be significant and unavoidable even with incorporation of MM CUL-1.

The project site is developed with the existing UNEX building and parking structure, which would be demolished to construct the proposed OASIS Park facility. The UNEX building was previously a Holiday Inn that was designed and built in two phases: the original construction of the hotel in 1968 and expansion of the hotel in 1984 to provide additional banquet and hotel rooms, the three-story parking garage, and other related improvements. The property was purchased by UCR in 1992 and converted to classrooms, offices, and gathering space for use by the UNEX program. At the time the 2021 LRDP EIR and associated UCR Historic Resources Survey were prepared, the existing UNEX building was over 50 years old, but not deemed eligible for listing on the California Register of Historical Resources (CRHR) or National Register of Historic Places (NRHP) and was not considered a historical resource (refer to Appendix B of the UCR Historic Resources Survey [Appendix E to the 2021 LRDP EIR], building identification number P5722).

A detailed evaluation of the eligibility of the UNEX building for listing on the CRHR and NRHP is documented in the Historic Resources Evaluation prepared for the UNEX building by HELIX Environmental Planning (Appendix B). As confirmed and documented in the Historic Resources Evaluation, the UNEX building does not meet any of the criteria for designation as a historical resource. The building is not associated with a prominent individual who played a significant role in UCR's founding, development, or achievements, and does not represent an important example of a major period of UCR campus or Riverside County history. The project would not eliminate important examples of the major periods of California history. Consistent with the conclusion of the 2021 LRDP EIR and associated UCR Historic Resources Survey, the UNEX building is not deemed eligible for listing on the CRHR or NRHP and is not considered a historical resource. Therefore, the project would not result in adverse changes to a historical resource and MM CUL-1 would not be required. The proposed project would be consistent with the historical resources analysis and determination in the 2021 LRDP EIR; and proposed project impacts to historical buildings would be **less than significant**.

b) The 2021 LRDP EIR states that new development under the 2021 LRDP would generally avoid disturbance in areas of recorded historic-age or prehistoric archaeological resources on campus. However, development under the 2021 LRDP has the potential to damage or destroy unrecorded historic-age or prehistoric archaeological resources, particularly in areas of undisturbed soils or when excavation depths exceed those attained for past development. The 2021 LRDP EIR states that the southeastern portion of the LRDP area is considered to have high sensitivity for encountering archaeological resources. The majority of the areas considered to have a high sensitivity are within the 2021 LRDP land use designation of Open Space Reserve or UCR Botanic Gardens. Areas within the northern portions of East Campus have low resource sensitivity. Areas with potential for new development on West Campus would primarily occur within infill sites that have previously primarily been used for agricultural uses and have low tribal cultural sensitivity (see Section 4.1.18 for additional information related to Tribal Cultural Resources). The 2021 LRDP concluded impacts would be less than significant with incorporation of MM CUL-2 through MM CUL-4. MM CUL-2 and MM CUL-3 specifically apply to projects for which ground-disturbing activities would occur within an area with medium or high potential to encounter undisturbed native soils, including Holocene alluvium soils.

The proposed project would be constructed in an area that currently includes the UNEX building, parking structure, and portions of surface parking lots that are proposed to be demolished. In addition, associated utility, hardscape, and landscape improvements would be within previously disturbed areas. Geotechnical investigations conducted for the proposed project indicated that the site is underlain by 1 to 8 feet of undocumented fill that varies in thickness across the site, with an average depth of approximately 3.5 feet (see Geotechnical Investigation Report in Appendix C). The undocumented fill is underlain by alluvial fan deposits, which have the potential to contain undiscovered archaeological resources, as cited in the 2021 LRDP EIR. UCR's standard contract specifications address the protection and recovery of buried archaeological resources, including human remains, as required by **MM CUL-2 through MM CUL-4**. These measures identify steps to be taken if previously undiscovered archaeological resources, including human remains, are discovered during ground disturbing activities. Therefore, the proposed project would be consistent with the archaeological resources analyses and determination in the 2021 LRDP EIR; and proposed project impacts to archaeological resources would remain **less than significant** with incorporation of **MM CUL-2 through MM CUL-4**.

c) The 2021 LRDP EIR states that no formal cemeteries are known to have occurred on the campus; therefore, the likelihood of encountering human remains is considered low. However, ground-disturbing construction activities associated with development under the 2021 LRDP could uncover previously unknown human remains, which could be archaeologically or culturally significant. Compliance with applicable regulations would avoid or minimize the disturbance of human remains and the 2021 LRDP EIR concluded impacts would be less than significant.

As is the case for the rest of the campus, the project site is not known to contain buried human remains. The procedures for the treatment of human remains, including those that are Native American in origin, are contained in California Health and Safety Code Sections 7050.5 and 7052 and California Public Resources Code (PRC) Section 5097. If human remains are discovered during construction activities, potentially damaging ground-disturbing activities in the area of the remains and a 100-foot-buffer area shall be halted immediately, and UCR shall notify the Riverside County Coroner and the Native American Heritage Commission (NAHC) immediately in accordance with applicable regulations. If the remains are determined by the NAHC to be Native American, the guidelines of the NAHC shall be adhered to in the treatment and disposition of the remains. Following the Coroner's findings, UCR and the NAHC-designated most likely descendant shall recommend the ultimate treatment and disposition of the remains and take appropriate steps to ensure that additional human interments are not disturbed. The responsibilities for acting upon notification of a discovery of Native American human remains are identified in California PRC Section 5097.94. Compliance with California Health and Safety Code Sections 7050.5 and 7052 and California PRC Section 5097 would provide an opportunity to avoid or minimize the disturbance of human remains, and to appropriately treat any remains that are discovered. Therefore, the proposed project would be consistent with the human remains analysis and determination in the 2021 LRDP EIR; and proposed project impacts to previously unknown human remains would remain **less than significant**.

4.1.6 ENERGY

Section 4.6 of the 2021 LRDP EIR addresses the impacts of the 2021 LRDP on wasteful, inefficient, or unnecessary consumption of energy resources during construction or operation and conflicts or obstructions with applicable plans for renewable energy and energy efficiency. The 2021 LRDP EIR concludes projects under the 2021 LRDP would have less than significant impacts to applicable plans, policies, or regulations adopted for the purpose of avoiding or mitigating environmental effects related to energy. The 2021 LRDP EIR also states that impacts related to construction energy consumption would be less than significant. However, the 2021 LRDP EIR concludes that implementation of future projects would consume electricity and natural gas during operation that would exceed the UCR 2018 per capita energy use and annualized regional 2018 per capita energy use thresholds. MM GHG-1 (Measures EN3 and EN5) were identified in the 2021 LRDP EIR to reduce operational consumption of electricity and natural gas by stationary equipment.

Per the energy section of the 2021 LRDP EIR, the applicable portions of the above-mentioned MM state the following:

MM GHG-1 Implement On-Campus GHG Emissions Reduction Measures: UCR shall implement the following GHG emissions reduction measures by scope emissions category:

Scope 2 (Electricity Consumption and Generation)

Energy (EN)

- Measure EN3: UCR shall work to obtain 100 percent clean-sourced electricity through either Riverside Public Utilities (RPU) and/or through the installation of on-site clean-sourced electricity sources for all new buildings by 2025. In addition, UCR shall establish annual budgets that include funding to purchase 100 percent clean-sourced energy. Furthermore, all newly constructed building projects, other than wet lab research laboratories, shall be designed, constructed, and commissioned to outperform the California Building Code (Title 24 portion of the California Code of Regulations [CCR]) energy efficiency standards by at least 20 percent. Finally, UCR shall incorporate solar PV [photovoltaic] as feasibly possible for newly constructed and majorly-renovated buildings with the maximum system size, highest solar panel efficiency, and greatest system performance.[6]

- Measure EN5 (Parts A, B, C): In order to prioritize energy efficiency and green building initiatives for building/facility upgrades and new construction as well as reduced energy use, UCR shall identify aging equipment throughout the campus such as equipment associated with the Central Plant, electrical distribution system, and building HVAC [heating, ventilation, and air conditioning] systems and develop a strategy and schedule to upgrade such equipment with high-energy efficiency systems and optimize HVAC systems through heat zoning, high-efficiency filters, and shut-down times expansion. The strategy shall include an evaluation and cost analysis related to upgrading/retrofitting equipment versus retirement of equipment if no longer needed with future initiatives (i.e., Central Plant boiler retirement). The schedule and upgrade strategy must meet a 2 percent energy efficiency improvement annually through 2035. In addition, UCR shall require new buildings to incorporate occupancy sensors and controls such that lighting of shared spaces is on occupancy sensors, building temperature set points are widened and aligned with occupancy schedules, and ventilation systems are converted from constant volume to variable so ventilation rates are occupancy-based. Furthermore, UCR shall develop a plan to identify existing buildings and projects that could undergo upgrades to the control systems and establish a schedule for upgrade incorporation. Finally, UCR shall develop a tracking program to monitor and share campus energy efficiency activities and progress towards increased energy efficiency.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	Less than Significant Impact with Mitigation Incorporated	No	No	No	MM GHG-1 Measures EN3 and EN5
b) Conflict with or obstruct a State or local plan for renewable energy or energy efficiency?	Less than Significant Impact	No	No	No	No mitigation required

a) The 2021 LRDP EIR states that energy use in the form of fuels during construction would occur in accordance with applicable idling and equipment-efficiency regulations, and impacts would be less than significant. Development under the 2021 LRDP would consume electricity and natural gas during operation that would exceed the UCR 2018 per capita energy use and annualized regional 2018 per capita energy use threshold. However, implementation of MM GHG-1 would reduce energy impacts during operation to less than significant levels.

Project construction activities would result in a temporary increase in energy consumption, primarily through the combustion of fuels in construction vehicles, worker commute vehicles,

[6] The EIR GHG modeling efforts assume that clean energy is in line with California-defined renewable sources.

and construction equipment. As required by **MM GHG-1**, the project would utilize construction equipment with Tier 4 engines. No wasteful, inefficient, or unnecessary use of energy resources would occur during project construction.

The proposed project would consume energy during operation for building heating and cooling, refrigeration, lighting, electricity, and equipment when occupied and in use. New employee vehicle trips and fleet vehicle trips associated with project operations would also be a source of energy consumption. However, the proposed project would be required to comply with the energy conservation strategies expressed in the 2023 SPP and **MM GHG-1 (Measures EN3 and EN5)**.

As stated in the Project Description, the proposed project would incorporate project design features that would minimize energy usage, including the achievement of minimum LEED Gold certification and 20 percent beyond CBC Title 24 energy efficiency standards. Indoor water use would be reduced with low-flow fixtures. Outdoor water use would be reduced through the selection of native and/or adapted plant species that reduce irrigation requirements. Recycled materials and materials from regional sources would be used where possible. In addition, project-specific VMT would not exceed the Western Riverside Council of Governments (WRCOG) regional thresholds (further discussed in Section 4.1.17, *Transportation*, of this Addendum). The proposed project would not result in wasteful, inefficient, or unnecessary use of energy during construction or operation, and is consistent with the energy analysis evaluated in the 2021 LRDP EIR. Therefore, the proposed project would be consistent with the energy demand analysis and determination in the 2021 LRDP EIR; and proposed project impacts to energy use would remain **less than significant** with incorporation of **MM GHG-1 Measures EN3 and EN5**.

b) The 2021 LRDP EIR states that projects developed under the 2021 LRDP would be required to comply with applicable State and UC energy policies and regulations, including CBC Title 24; SB 100, which mandates 100 percent clean electricity for California by 2045; and the UC Policy on Sustainable Practices. Therefore, the 2021 LRDP EIR concludes impacts related to conflicts with energy plans, policies, and regulations would be less than significant.

Consistent with the conclusion of the 2021 LRDP EIR, the proposed project would be required to comply with all building design standards set in CBC Title 24, which mandates implementation of energy efficient building design to avoid the wasteful, inefficient, or unnecessary consumption of energy resources during operation. The proposed project would abide by SB 100 standards, as it would be powered by an existing State electricity grid. Additionally, the proposed project would comply with the 2023 SPP and other UC requirements related to energy reduction and carbon-free energy use. Construction of the OASIS Park would also incorporate sustainability measures identified in Section 2.5.9 of this Addendum and would not conflict with nor obstruct a State or local plan for renewable energy or energy efficiency. Therefore, the proposed project would be consistent with the renewable energy and energy efficiency plan consistency analysis and determination in the 2021 LRDP EIR; and proposed project impacts on the implementation of energy plans and policies would remain **less than significant**.

4.1.7 GEOLOGY AND SOILS

Section 4.7 of the 2021 LRDP EIR addresses the impacts of campus growth on the geology, soils, and paleontological resources for the campus and vicinity. The IS prepared for the 2021 LRDP concludes that there would be no impact or less than significant impacts for criterion b (soil erosion or topsoil loss), criterion d (expansive soils), and criterion e (soil adequacy to support alternative wastewater disposal systems); therefore, these thresholds were not further evaluated in the 2021 LRDP EIR.

The 2021 LRDP EIR concludes that implementation of future projects that comply with applicable regulations related to geologic and soils hazards would result in less than significant impacts to seismic hazards and unstable geologic or soil conditions. The 2021 LRDP EIR also concludes that construction impacts to paleontological resources could be a potentially significant impact and identifies MM GEO-1 and MM GEO-2, which would reduce potential impacts to paleontological resources to less than significant levels.

The above-mentioned applicable MMs state the following:

MM GEO-1 Inadvertent Discovery of Paleontological Resources: If any paleontological resources are encountered during ground-disturbing activities, the contractor shall ensure that activities in the immediate area of the find are halted and that UCR is informed. UCR shall retain a qualified paleontologist to evaluate the discovery and recommend appropriate treatment options pursuant to guidelines developed by the Society of Vertebrate Paleontology, including development and implementation of a paleontological resource impact mitigation program by a qualified paleontologist for treatment of the particular resource, if applicable. These measures may include, but not limited to, the following:

- Salvage of unearthed fossil remains and/or traces (e.g., tracks, trails, burrows)
- Washing of screen to recover small specimens
- Preparation of salvaged fossils to a point of being ready for curation (e.g., removal of enclosing matrix, stabilization and repair of specimens, and construction of reinforced support cradles)
- Identification, cataloging, curation, and provisions for repository storage of prepared fossil specimens

MM GEO-2 Paleontological Resources Monitoring: UCR shall implement the following measures if projects are proposing earth-moving activities exceeding 5 feet below previously undisturbed alluvial-fan soils within “high paleontological sensitivity” (i.e., Qof and Qvof):

- Retain a qualified professional paleontologist to prepare and implement a Paleontological Resources Impact Mitigation Plan for the project. A qualified paleontologist is an individual who meets the education and professional experience standards as established by the SVP [Society of Vertebrate Paleontology] (2010), which recommends the paleontologist shall have at least a master’s degree or equivalent work experience in paleontology, shall have knowledge of the local paleontology, and shall be familiar with paleontological procedures and techniques. The Paleontological Resources Impact Mitigation Plan shall describe mitigation recommendations in detail, including paleontological monitoring procedures; communication protocols to be followed if an unanticipated fossil discovery is made during project development; and preparation, curation, and reporting requirements. Consolidated monitoring efforts (e.g., archaeological monitoring/tribal cultural/paleontological monitoring) may occur if the individual monitor has the applicable qualifications.
- Prior to the commencement of ground disturbing activities, the qualified paleontologist or their designee, shall conduct training for grading and excavation personnel regarding the appearance of fossils and the procedures for notifying paleontological staff if unanticipated fossils are discovered by construction staff. The Paleontological Worker Environmental Awareness Program shall be fulfilled at the time of a pre-construction meeting. In the event a fossil is discovered by construction personnel anywhere in the project area, all work in the immediate vicinity of the find shall cease and a qualified paleontologist shall be contacted to evaluate the find before re-starting work in the area.

If it is determined that the fossil(s) is (are) scientifically significant, the qualified paleontologist shall complete the mitigation outlined below to mitigate impacts to significant fossil resources.

- If paleontological resources are encountered during ground-disturbing activities, MM GEO-1 shall apply.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
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.	Less than Significant Impact	No	No	No	No mitigation required
ii) Strong seismic ground shaking?	Less than Significant Impact	No	No	No	No mitigation required
iii) Seismic-related ground failure, including liquefaction?	Less than Significant Impact	No	No	No	No mitigation required
iv) Landslides?	Less than Significant Impact	No	No	No	No mitigation required
b) Result in substantial soil erosion or the loss of topsoil?	Less than Significant Impact	No	No	No	No mitigation required
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	Less than Significant Impact	No	No	No	No mitigation required
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	Less than Significant Impact	No	No	No	No mitigation required

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
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?	No Impact	No	No	No	No mitigation required
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	Less than Significant Impact with Mitigation Incorporated	No	No	No	MM GEO-1 and MM GEO-2

a) According to the 2021 LRDP EIR, the campus is located approximately 5 miles southwest of the nearest fault zone (San Jacinto Fault Zone), and at this distance, ground rupture events are unlikely to occur on the campus. However, the 2021 LRDP EIR states that existing and proposed campus development has the potential to be subject to ground shaking generated from seismic events that originate from regional fault zones, which have the potential to cause moderate to large earthquakes. According to the 2021 LRDP EIR, most of the campus has a low potential for liquefaction, with portions of the campus having moderate risk for liquefaction. No landslide hazard zones were identified on campus in the 2021 LRDP EIR; however, some development occurring below steep hillsides could be subject to damage in the event of off-campus seismically induced landslides. Compliance with the UC Seismic Safety Policy, UC Facilities Manual Seismic Program Guidelines, and CBC regulations would ensure new structures constructed under the 2021 LRDP are designed to withstand seismically-induced hazards including ground shaking, liquefaction, and landslides. Therefore, impacts related to seismic hazards were considered less than significant in the 2021 LRDP EIR.

Seismic analysis was conducted for the UNEX building and parking structure which indicated that major upgrades would be required to retain the structures and bring them into compliance with the UC Seismic Safety Policy requirements; as such, they are proposed for demolition as part of the project.

A Geotechnical Investigation Report was prepared for the proposed project (Appendix C) and provides geotechnical information about the project site, which will inform geotechnical recommendations to be incorporated into the final project design. Consistent with the 2021 LRDP EIR, the project's Geotechnical Investigation Report did not identify faults within the project site but did identify the potential for strong ground shaking resulting from regional faults, including the San Jacinto Fault 6.21 miles northeast of the project site. Based on the depth of groundwater at the project site (approximately 150 feet below ground), the potential for liquefaction to occur on the project site was considered low, as mapped in the 2021 LRDP EIR. The project site is flat and no landslide hazard was identified on the project site or as a result of nearby slopes.

Proper engineering design and construction in conformance with CBC standards and project-specific geotechnical recommendations would ensure that seismic ground shaking would be reduced to less than significant levels. Additionally, the project would be required to comply with the UC Facilities Manual Seismic Program Guidelines and the UC Seismic Safety Policy Requirements. The UC Seismic Safety Policy addresses interior and exterior building elements that may fall or slide during an earthquake and requires anchorage for seismic resistance of nonstructural building elements such as furnishings, fixtures, material storage facilities, and utilities that could dislodge, fall, or rupture during an earthquake. The CBC Title 24, Part 2 provides building codes and standards for the design and construction of structures in California specially related to seismically resistant construction, and foundation. The CBC also establishes grading requirements that apply to excavation and fill activities and requires the implementation of erosion control measures. While no substantial hazard related to ground rupture, liquefaction, or landslides exists on the project site, compliance with these policies related to the site's geologic setting would further ensure no seismic hazards occur as a result of the project. Therefore, the proposed project would be consistent with the seismic hazards analysis and determination in the 2021 LRDP EIR; and proposed project impacts from seismic hazards, including ground rupture, shaking, liquefaction, and landslides, would remain **less than significant**.

b) The IS for the 2021 LRDP states that projects constructed under the 2021 LRDP would be required to comply with the NPDES Construction Stormwater General Permit and adhere to UCR's Plan Review and Building Permit Program. The implementation of BMPs required of individual projects as a result of these permits would prevent substantial erosion during construction. Development activities under the 2021 LRDP were anticipated to cover topsoil and no long-term erosion was anticipated to occur. Given adherence to applicable rules under the UCR Plan Review and Building Permit Program would prevent erosion and topsoil loss, the IS prepared for the 2021 LRDP concluded impacts would be less than significant.

Consistent with the analysis contained in the IS for the 2021 LRDP, the project would be subject to erosion prevention requirements under statewide and UCR policies, including the NPDES Construction Stormwater General Permit, the Campus Construction and Design Standards, the UCR SWMP, and the MS4 Permit. These permits and policies require the incorporation of low impact development (LID) and erosion and sediment control BMPs. During project operation, soils would be stabilized with paved surfaces or landscaping and no substantial long-term erosion is anticipated. The proposed project would be required to adhere to all applicable campus permits, reviews, and approvals, which would reduce and/or prevent erosion and loss of topsoil during and after project construction activities. Therefore, the proposed project would be consistent with the erosion and soil loss potential analysis and determination in the 2021 LRDP EIR; and proposed project impacts from erosion or soil loss would remain **less than significant**.

c) The 2021 LRDP EIR states that UCR is underlain by soils with low potential for liquefaction and other soil-related hazards. Projects developed under the 2021 LRDP, including the proposed project, would be required to comply with CBC requirements as well as the UC Seismic Safety Policy. Impacts were determined to be less than significant.

As described previously, the Geotechnical Investigation Report prepared for the project (Appendix C) concludes that there is low potential for landslide and liquefaction at the project site. Seismic settlement was identified as a potential occurrence at the project site and would be addressed in the final geotechnical recommendations for the project. The geotechnical recommendations identified for the final site plan would be incorporated into the project design and would ensure conformance with the CBC and UCR standards related to the site's underlying geologic conditions/soils. The potential for on- or off-site landslide, lateral spreading, subsidence, liquefaction, and collapse would be reduced to less than significant levels. Therefore, the proposed project would be consistent with the soil stability and risk analysis and determination in the 2021 LRDP EIR; and proposed project impacts related to landslides, lateral spreading, subsidence, liquefaction, or collapse would remain **less than significant**.

d) The IS prepared for the 2021 LRDP states that the majority of soils underlying the campus have low to moderate shrink-swell characteristics. Therefore, the potential for soil expansion to result in risks to life or property was considered low. In addition, project-specific geotechnical investigations would identify project-specific soil characteristics and development would be subject to the design and construction requirements of the CBC related to expansive soils. Impacts were considered less than significant.

Consistent with the findings of the IS prepared for the 2021 LRDP, the Geotechnical Investigation Report prepared for the project (Appendix C) concludes that project site soils have very low expansion potential. Therefore, the proposed project would be consistent with the expansive soils analysis and determination in the IS prepared for the 2021 LRDP; and proposed project impacts related to expansive soils would remain **less than significant**.

e) The IS prepared for the 2021 LRDP states that the campus is served by the existing municipal sewer system and projects under the 2021 LRDP would not require the construction or use of septic tanks or other alternative wastewater disposal systems. Therefore, the IS prepared for the 2021 LRDP concluded there would be no impact related to soils incapable of supporting these wastewater systems.

As anticipated in the IS prepared for the 2021 LRDP, the project would be served by the existing municipal sewer system and does not propose the construction or use of septic tanks or other alternative wastewater disposal systems. Therefore, the proposed project would be consistent with the analysis and determination regarding soils supporting alternative wastewater systems in the IS prepared for the 2021 LRDP; and there would be **no impact**.

f) The 2021 LRDP EIR states that development under the 2021 LRDP could cause substantial adverse impacts to known or unknown paleontological resources due to construction activities in previously undisturbed soils, particularly those with high paleontological sensitivity as identified in the 2021 LRDP EIR. MM GEO-1 and MM GEO-2 were required and determined to reduce project impacts under the 2021 LRDP to less than significant levels. No impact to paleontological resources would occur during operation of projects developed under the 2021 LRDP.

Although the proposed project is an infill development within a previously developed area, the project site is located within an area of high paleontological sensitivity (Qof – old alluvial fan deposits). The proposed project entails the demolition of existing on-site structures and construction of a new building, hardscape, landscape, and off-site improvements. Ground disturbing construction activities exceeding 5 feet below previously undisturbed alluvial-fan soils within high paleontological sensitivity (such as grading, excavation, etc.) have the potential to damage or destroy undiscovered, scientifically important paleontological resources. Consequently, compliance with **MM GEO-1** for inadvertent discovery of paleontological resources and construction monitoring in accordance with **MM GEO-2** would be required. Therefore, the proposed project would be consistent with the paleontological resources analysis and determination in the 2021 LRDP EIR; and proposed project impacts to paleontological resources would remain **less than significant** with incorporation of **MM GEO-1 and MM GEO-2**.

4.1.8 GREENHOUSE GAS EMISSIONS

Section 4.8 of the 2021 LRDP EIR addresses the effects of the 2021 LRDP on climate change and concludes that the 2021 LRDP would generate GHG emissions during construction and operation that would exceed the State targets and UC-derived GHG emission thresholds. As a result, the 2021 LRDP EIR states that implementation of the 2021 LRDP would conflict with the goals of the CARB 2017 Scoping Plan, SB 32, Executive Order (EO) B-55-18, and UC Policy on Sustainable Practices. However, impacts related to GHG emissions would be less than significant with the implementation of MM GHG-1 and MM GHG-2. MM GHG-1 includes sub measures that would reduce GHG emissions from all scopes and MM GHG-2 requires UCR to purchase carbon offsets to reduce the effect of GHG emissions above the applicable targets after implementation of MM GHG-1.

Update to the UC Sustainable Practices Policy: After certification of the 2021 LRDP EIR, the UC Office of the President updated its Sustainable Practices Policy. The 2023 SPP revised the Clean Energy section to indicate that the UC Clean Power Program is already achieving the Clean Electricity goals and to update the goals and timelines around centrally purchased biomethane to reflect current plans. The 2023 SPP also replaced the former goal of achieving carbon neutrality for scope 1 and 2 emissions by 2025 with a goal that is aligned with State goals in the most recent 2022 CARB Scoping Plan (CARB 2022) of achieving carbon neutrality for all scopes of emissions by 2045. The 2023 SPP reflects the UC's desire to prioritize direct, total emissions reductions to support achievement of the State's updated reduction targets established in Assembly Bill (AB) 1279, signed into law in September 2022, that requires that statewide anthropogenic GHG emissions be reduced to at least 85 percent below 1990 levels. The 2023 SPP sets a new long-term reduction target of 90 percent below 2019 levels by 2045 for all scopes of emissions, which is more aggressive than the reduction targets established in AB 1279.[7] After 2045, the 2023 SPP requires that any residual emissions beyond the 90 percent reduction will be negated by carbon removal to achieve complete carbon neutrality in alignment with the State's goals and the 2022 CARB Scoping Plan. As part of the update to its Sustainable Practices Policy, UCR is required to prepare a decarbonization study by January 1, 2025 that will be used to establish new interim GHG emissions reduction targets for 2030, 2035, and 2040. The decarbonization study will specifically address decarbonizing UCR's central plant. These planning efforts are underway.

Under the 2023 SPP, UCR may purchase voluntary carbon offsets per MM GHG-2, provided the offsets represent real, additional, quantifiable, durable, and enforceable emissions reduction or carbon removal, and have undergone third-party verification. However, by implementing **MM GHG-1**, as described below, the proposed project eliminates fossil-fuel consumption on site by replacing an existing building with a smaller, more efficient, all-electric facility, thereby decreasing emissions relative

[7] The 2023 SPP reduction target is more aggressive than the reduction target established in AB 1279, as UC's target aims to achieve a 90 percent reduction relative to 2019 GHG emission levels, versus the goal of 85 percent reduction relative to 1990 GHG emission levels established by AB 1279. Additionally, the greater percentage reduction in the 2023 SPP is relative to 2019 GHG emissions levels that are higher at UCR, compared to 1990 emission levels, resulting in a greater total GHG emission reduction than would be achieved under a target based on 1990 emissions levels.

to LRDP baseline conditions, while supporting the 2023 SPP's goal to prioritize direct, total emissions reductions without reliance on voluntary offsets.

The above-mentioned applicable MM states the following:

MM GHG-1 Implement On-Campus GHG Emissions Reduction Measures: UCR shall implement the following GHG emissions reduction measures by scope emissions category:

Scope 1 (Stationary Fuel Combustion, Refrigerant Use, Fleet Fossil Fuel Combustion)

Energy (EN)

- Measure EN1: To meet 100 percent electrification of all new campus buildings and structures, UCR shall prioritize construction of all-electric building design for new campus buildings and structures and discourage the construction and connection of new fossil fuel combustion infrastructure on campus. In addition, UCR shall focus on energy optimization through the Central Plant control systems by automating manual processes and initiating an engineering study focused on transitioning away from natural gas use at the Central Plant.
- Measure EN2: To address on-campus natural gas combustion, starting in 2025 and continuing through 2035, UCR shall purchase biogas for at least 40 percent of the total on-campus natural gas usage.

Global Warming Potential (GWP)

- Measure GWP1: To reduce emissions from refrigerants used on campus, UCR shall phase out of high global warming potential chemical refrigerants on campus to achieve 100 percent relative carbon neutrality by 2045. This may include the replacement of chemical refrigerants with lower global warming potential in the interim of full phase out while an alternative technology is determined. Furthermore, UCR shall prohibit the use of equipment in new buildings or construction projects that do not utilize low global warming potential or Significant New Alternatives Policy Program accepted refrigerants.

Fuel (FL)

- Measure FL1: To decarbonize the campus vehicle fleet, UCR shall reduce emissions from the campus vehicle fleet by 25 percent by 2025, by 50 percent by 2030, and by 75 percent by 2035 through replacement of fleet vehicles with electric vehicles or low-emission alternative vehicles.

Scope 2 (Electricity Consumption and Generation)

Energy (EN)

- Measure EN3: UCR shall work to obtain 100 percent clean-sourced electricity through either Riverside Public Utilities (RPU) and/or through the installation of on-site clean-sourced electricity sources for all new buildings by 2025. In addition, UCR shall establish annual budgets that include funding to purchase 100 percent clean-sourced energy. Furthermore, all newly constructed building projects, other than wet lab research laboratories, shall be designed, constructed, and commissioned to outperform the California Building Code (Title 24 portion of the California Code of Regulations) energy efficiency standards by at least 20 percent. Finally, UCR shall incorporate solar PV as feasibly possible for newly constructed and majorly-renovated buildings with the maximum system size, highest solar panel efficiency, and greatest system performance.[8]
- Measure EN4: To obtain electricity from 100 percent renewable source(s) for all existing buildings by 2045, UCR shall renegotiate its contractual agreement with RPU to establish a schedule and specific

[8] The 2021 LRDP EIR GHG modeling efforts assumed that clean energy was in line with California-defined renewable sources.

goals for obtaining 100 percent renewable electricity for the campus. In addition, UCR shall conduct an evaluation of existing buildings for structural suitability in terms of accommodating a solar photovoltaic system capacity with highest energy generation yield and for installing energy storage technology on campus and then installing such systems on identified buildings and facilities.

- Measure EN5 (Parts A, B, C): In order to prioritize energy efficiency and green building initiatives for building/facility upgrades and new construction as well as reduced energy use, UCR shall identify aging equipment throughout the campus such as equipment associated with the Central Plant, electrical distribution system, and building HVAC systems and develop a strategy and schedule to upgrade such equipment with high-energy efficiency systems and optimize HVAC systems through heat zoning, high-efficiency filters, and shut-down times expansion. The strategy shall include an evaluation and cost analysis related to upgrading/retrofitting equipment versus retirement of equipment if no longer needed with future initiatives (i.e., Central Plant boiler retirement). The schedule and upgrade strategy must meet a 2 percent energy efficiency improvement annually through 2035. In addition, UCR shall require new buildings to incorporate occupancy sensors and controls such that lighting of shared spaces is on occupancy sensors, building temperature set points are widened and aligned with occupancy schedules, and ventilation systems are converted from constant volume to variable so ventilation rates are occupancy-based. Furthermore, UCR shall develop a plan to identify existing buildings and projects that could undergo upgrades to the control systems and establish a schedule for upgrade incorporation. Finally, UCR shall develop a tracking program to monitor and share campus energy efficiency activities and progress towards increased energy efficiency.

Scope 3 (Waste Generation, Business Air Travel, On-site Transportation, Water Consumption, Carbon Sequestration, and Construction)

Waste Generation (WG)

- Measure WG1: UCR shall implement and enforce SB 1383 organics and recycling requirements to specifically reduce landfilled organics waste emissions to 75 percent by 2025.
- Measure WG2: UCR shall reduce campus waste sent to landfills 90 percent by 2025 and 100 percent by 2035. In addition, UCR shall reduce waste generation at campus events 25 percent by 2025 and 50 percent by 2035, with goals of being zero waste and plastic free events. Furthermore, UCR shall establish purchasing and procurement policies and guidelines prioritizing vendors that limit packaging waste and purchase reusable and compostable goods.

Transportation (TR)

- Measure TR1: To reduce GHG Emissions related to business air travel, UCR shall provide incentives to faculty for emission-reducing behaviors and utilizing travel options that are less carbon intensive, promote the use of virtual meetings, and encourage alternative forms of travel other than air travel.
- Measure TR2: UCR shall update the Transportation Demand Management (TDM) program for the campus to decrease single occupancy vehicle VMT 5 percent by 2025 and 20 percent by 2035. In addition, UCR shall evaluate trends of current programs to expand on existing programs and establish new initiatives that utilize proven successful strategies.
- Measure TR3: UCR shall develop and implement a Campus Active Transportation Plan to shift 2 percent of baseline (2018) passenger vehicle VMT to active transportation by 2025 and 8 percent by 2035. In addition, UCR shall update the Campus Bicycle and Pedestrian Network Map every five years, including routes from off campus to on campus.
- Measure TR4: UCR shall reduce GHG emissions associated with campus commuting 10 percent by 2025 and 25 percent by 2035.

Water Consumption (WC)

- Measure WC1: UCR shall reduce per-capita water consumption 20 percent by 2025 and 35 percent by 2035 compared to academic year 2018/2019 per capita consumption.

Carbon Sequestration (CS)

- Measure CS1: UCR shall increase carbon sequestration through increasing tree planting and green space 5 percent by 2025 and 15 percent by 2035.

Construction (CR)

- Measure CR1: UCR shall reduce construction-related GHG emissions on campus 10 percent by 2025 and 25 percent by 2035 through emission reduction controls and/or electric equipment requirements in line with contract obligations. Specifically, UCR shall require off-road diesel-powered construction equipment greater than 50 horsepower to meet the Tier 4 emission standards as well as construction equipment to be outfitted with BACT devices certified by CARB and emissions control devices that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similar-sized engine. In addition, UCR shall develop zero waste procurement guidelines and processes for campus construction projects and integrate into purchasing RFP language as part of campus procurement.

The UCR Office of Sustainability, Facilities Services, EH&S, TAPS, and/or PD&C shall annually monitor, track, and verify implementation of these GHG emissions reduction measures.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	Less than Significant Impact with Mitigation Incorporated	No	No	No	MM GHG-1
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose or reducing the emissions of greenhouse gases?	Less than Significant Impact with Mitigation Incorporated	No	No	No	MM GHG-1

a) The 2021 LRDP EIR states that implementation of the 2021 LRDP would generate GHG emissions that would have a potentially significant impact on the environment. Construction emissions from implementing the 2021 LRDP between 2022 and 2035 would be approximately 1,618 metric tons of carbon dioxide equivalent (MT CO_2e) per year. Unmitigated campus-wide operational emissions were estimated to total 139,920 MT CO_2e per year by 2025, including annualized construction emissions. Impacts from GHG emissions were determined to be less than significant with incorporation of MM GHG-1 and MM GHG-2, which require on-campus GHG reduction measures and the purchase of carbon offsets.

The project proposes an approximately 70,000 gsf building(s), as compared to the existing 196,641 gsf UNEX building, and would be constructed in accordance with the latest energy efficiency standards, would be an all-electric facility, and would eliminate scope 1 emissions from on-site burning of natural gas.

CalEEMod was used to calculate estimated GHG emissions resulting from ongoing operation of the UNEX building for comparison with the proposed project operation emissions. The modeling results are attached to this Addendum as Appendix A. Based on the existing building size and the energy and water use intensities reported in the 2021 LRDP EIR,[9] the UNEX building was anticipated to result in 709 MT CO_2e per year as calculated for 2027 (the project's first full year of operations).

GHG emissions associated with proposed project construction and operations were calculated in CalEEMod and the complete modeling results are attached to this Addendum as Appendix A. As shown in Table 4.1.8-1, construction emissions generated by the proposed project would result in a total of approximately 1,176 MT CO_2e over the 28-month construction period, with average annual emissions of approximately 107 MT CO_2e over the remaining LRDP development program period of 11 years. The proposed project's annualized construction emissions would be less than seven percent of the annualized construction emissions identified in the 2021 LRDP EIR (i.e., 1,618 MT CO_2e per year). In combination with other projects proposed at UCR within the same period (School of Business, Undergraduate Teaching and Learning Facility, and North District Phase 2), annualized construction emissions would total approximately 416 MT CO_2e per year over the development program period and would represent approximately 26 percent of the annual construction emissions anticipated in the 2021 LRDP EIR.

Operational emissions were calculated for the first full year of project operation, anticipated to be 2027. Emissions sources would include energy and water demand for the proposed building(s) and solid waste and mobile trips generated by the population increase of 80 employees. As required by **MM GHG-1 Measure EN3**, the project would achieve 20 percent beyond Title 24 Energy Efficiency requirements and the associated reduction of GHG emissions was calculated in CalEEMod. By the time the project is operational, **MM GHG-1 Measure EN3** requires UCR to purchase 100 percent clean-sourced energy[10]; therefore, the emissions calculations apply the emissions factors for RPU's clean power mix to the project's electricity demand (RPU 2022). **MM GHG-1 Measure EN3** also requires the provision of PV solar systems on new buildings. The proposed project would include PV systems but because the capacity of the on-site PV solar systems is not yet known, emissions calculations conservatively assume no on-site electricity would be generated and all electricity required to serve the project would be purchased from RPU.

As shown in Table 4.1.8-1, with incorporation of these project features and the addition of annualized construction emissions, project emissions would be approximately 314 MT CO_2e per year. This is an approximately 55 percent decrease in emissions as compared to those estimated

[9] The emissions calculation does not consider emissions associated with mobile trips or solid waste generation, as existing populations using the UNEX building would continue to be part of the UCR campus community and contribute to these emissions sources for the campus.

[10] UCR's purchased electricity from RPU is covered by Renewable Energy Certificates (RECs) procured by the UC Office of the President Energy and Sustainability Department through an "Indirect Access Program" that must be "retired" on UCR's behalf starting in 2025 and annually thereafter to comply with the 2023 SPP for 100 percent clean purchased electricity by 2025. In addition to, or in lieu of RECs procured through the Indirect Access Program, UCR may also undertake Power Purchase Agreements and/or purchase the RPU Green Power Mix to comply with this requirement in future.

for continued operation of the existing UNEX building (i.e., 709 MT CO_2e). Therefore, the project would not result in GHG emissions above those anticipated in the 2021 LRDP EIR.

Table 4.1.8-1
Project Construction and Operational GHG Emissions

Emission Source	Project Emissions ($MTCO_2e$)
Construction	
2024	592.1
2025	386.5
2026	197.6
Total Project Construction	**1,176.1**
Total Amortized (15 year) Project[1]	**106.9**
Operational	
Scope 1	1.6
Area	1.4
Refrigerants	0.2
Natural Gas	0.0
Scope 2	32.9
Electricity[1]	26.2
Water	6.8
Scope 3	172.5
Mobile	151.3
Solid Waste	21.2
Total Project Operations	**207.0**
Total Project	**313.9**

Source: Calculations were made in CalEEMod, see Appendix A for full model output.

$MTCO_2e$ = metric tons of carbon dioxide equivalent

Note: [1] Electricity emissions account for the building(s) achieving 20 percent efficiency above Title 24 and purchase of 100 percent clean-sourced energy by UCR.

Other measures identified in **MM GHG-1** would continue to be implemented at the campus level or are not readily quantifiable for the project. However, the project would not conflict with or prevent continued implementation of such measures. The proposed project would result in decreased operational emissions compared to 2021 LRDP baseline conditions and would not cause UCR to exceed applicable GHG emissions thresholds. However, as the proposed project is part of UCR, its emissions would be counted towards annual campus-wide operational emissions and included in the emissions quantifications used to determine compliance with the 2023 SPP and UCR's total emissions goals.

The proposed project would reduce GHG emissions by implementing applicable portions of **MM GHG-1** identified in the 2021 LRDP EIR and would decrease GHG emissions compared to LRDP baseline conditions. Therefore, the proposed project would be consistent with the GHG emissions analysis and determination in the 2021 LRDP EIR; and the proposed project would have **a less than significant impact** with respect to GHG emissions.

b) The 2021 LRDP EIR concludes development under the 2021 LRDP would be consistent with applicable GHG reduction plans and impacts related to GHG reduction plans would be less than significant with incorporation of MM GHG-1 and MM GHG-2.

As described above, the project is consistent with the GHG emissions analysis in the 2021 LRDP EIR and would result in decreased GHG emissions compared to UNEX building operations. Through implementation of applicable GHG emissions reduction measures outlined in **MM GHG-1** (Scope 1 pertaining to energy and fuel; Scope 2 pertaining to energy efficiency and green building initiatives for upgrades and new construction; Scope 3 pertaining to waste generation, transportation, and construction), the project would contribute towards campus-wide GHG emission reductions. The project would similarly support the goals of the 2023 SPP, as described above, by achieving direct, on-campus GHG reductions through the elimination of on-site combustion of natural gas. By purchasing 100 percent clean-sourced energy from RPU by the time the project is operational, electricity-related GHG emissions from the all-electric building(s) also would be eliminated. Therefore, the proposed project would be consistent with applicable GHG emissions reduction plans and policies as analyzed and determined in the 2021 LRDP EIR; and proposed project impacts to implementing applicable GHG emissions reduction plans and policies would remain **less than significant** with incorporation of applicable measures from **MM GHG-1.**

4.1.9 HAZARDS AND HAZARDOUS MATERIALS

Section 4.9 of the 2021 LRDP EIR addresses the impacts of campus growth on hazards and hazardous materials for the campus area. The IS prepared for the 2021 LRDP concludes that there would be a less than significant impact for criterion a (hazards from routine transport, use, or disposal of materials) during construction with adherence to regulatory standards; therefore, this threshold was not further evaluated in the 2021 LRDP EIR for construction impacts. It should be noted that emergency response plan (criterion f) and wildland fire (criterion g) were also not discussed further in Section 4.9 of the 2021 LRDP EIR, but rather addressed in depth in Sections 4.15, *Transportation*, and 4.18, *Wildfire*, of the 2021 LRDP EIR, respectively.

The 2021 LRDP EIR concludes that future campus development would have a less than significant impact related to increased use, transport, or disposal of hazardous materials during facility operations given adherence to applicable federal, State, and UCR policies. Similarly, compliance with such policies would minimize upset and accident conditions, and impacts related to hazardous materials releases would be less than significant during operation. The 2021 LRDP EIR states that facility construction and renovation under the 2021 LRDP could disturb or emit hazardous materials during reasonably foreseeable upset and accident conditions; however, these impacts would be less than significant with implementation of MM HAZ-1 through MM HAZ-4. Furthermore, impacts related to handling hazardous materials within 0.25 mile of a school and impacts related to the development of sites listed on hazardous material sites pursuant to California Government Code Section 65926.5 (Cortese List) would be less than significant with implementation of MM HAZ-1 through MM HAZ-4. Impacts related to airport safety hazards and excessive noise impacts for people residing or working on the campus would also be less than significant.

The proposed project is not located on a site with abandoned in-place underground storage tanks (USTs) and is not located within the Department of Toxic Substances Control (DTSC) Certified Land Use Restriction; therefore, MM HAZ-2 and MM HAZ-3 do not apply to the proposed project.

The above-mentioned applicable MMs state the following:

MM HAZ-1 Property Assessment – Phase I and II ESAs: During the pre-planning stage of campus projects on previously developed sites or on agricultural lands (current or historic), and in coordination with EH&S, UCR shall obtain documentation from EH&S or prepare a Phase I Environmental Site Assessment (ESA) assessing the land use history of the proposed project site and identify potential hazardous materials concerns, including, but not limited to, fuel tanks, chemical storage, presence of elemental mercury, elevator pistons and associated hydraulic oil reservoirs and piping, heating-oil USTs, or agricultural uses. If the Phase I ESAs, or similar documentation, identify recognized environmental conditions or potential concern areas, a Phase II ESA would be conducted in coordination with EH&S to determine whether the soil, groundwater, and/or soil vapor has been impacted at concentrations exceeding regulatory screening levels for residential or commercial/industrial type land uses (as applicable). If the Phase II ESA concludes that the site is or may be impacted and could affect the planned development, assessment, remediation, or corrective action (e.g., removal of contaminated soil, in-situ treatment, capping, engineering controls) would be conducted prior to or during construction under the oversight of federal, State, and/or local agencies (e.g., USEPA [United States Environmental Protection Agency], DTSC, RWQCB [Regional Water Quality Control Board], RFD [City of Riverside Fire Department], RCDEH [Riverside County Department of Environmental Health]) and in full compliance with current and applicable federal and State laws and regulations, including but are not limited to the California Environmental Quality Act (CEQA). Assessment, remediation, or corrective action must be evaluated under CEQA prior to commencing the assessment, remediation, or correction action. Additionally, Voluntary Cleanup Agreements may be used for parcels where remediation or long-term monitoring is necessary.

MM HAZ-4 Construction Site Management Plan: If impacted soils are identified pursuant to activities conducted through Mitigation Measures MM HAZ-1, MM HAZ-2, or MM HAZ-3; or encountered during construction (soil disturbance), UCR shall prepare a Construction Site Management Plan (SMP) for the proposed redevelopment project area to address potential issues that may be encountered during redevelopment activities involving subsurface work. The Construction SMP objectives shall include:

- Communicating information to proposed project construction workers about environmental conditions
- Presenting measures to mitigate potential risks to the environment, construction workers, and other nearby receptors from potential exposure to hazardous substances that may be associated with unknown conditions or unexpected underground structures
- Presenting protocols for management of known contaminated soil or groundwater encountered during construction activities

The Construction SMP shall identify the proposed project contacts, responsibilities, and notification requirements and outline the procedures for health and safety, soil management, contingency measures for discovery of unexpected underground structures, erosion, dust, and odor management, groundwater management, waste management, stormwater management, and written records and reporting. The Construction SMP shall be reviewed and approved by UCR prior to issuance of grading permits.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	Less than Significant Impact	No	No	No	No mitigation required
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?	Less than Significant Impact with Mitigation Incorporated	No	No	No	MM HAZ-1 and MM HAZ-4
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?	Less than Significant Impact with Mitigation Incorporated	No	No	No	MM HAZ-1 and MM HAZ-4
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Section 65962.5 and, as a result, create a significant hazard to the public or the environment?	Less than Significant Impact with Mitigation Incorporated	No	No	No	MM HAZ-1 and MM HAZ-4
e) Result in a safety hazard or excessive noise for people residing or working in the project area (or a project located within an airport land use plan or, where such a plan has not been adopted within 2 miles of a public airport or public use airport)?	Less than Significant Impact	No	No	No	No mitigation required
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	Discussion pertaining to project impacts on emergency response plans are discussed under criterion d in Section 4.1.17, *Transportation*, and criterion a in Section 4.1.20, *Wildfire*, of this Addendum.				
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	Discussion pertaining to project impacts on wildland fire risks are discussed in Section 4.1.20, *Wildfire*, of this Addendum.				

a) The IS prepared for the 2021 LRDP concludes that construction activities would have a less than significant impact related to transport, use, and disposal of hazardous materials based on the existing regulatory framework protecting the public and environment from such materials. The 2021 LRDP EIR states that uses under the 2021 LRDP could result in an increased use, transport, or disposal of hazardous materials during facility operations; however, adherence to federal, State, and UCR policies would minimize risk of endangerment to the campus population, the public, and the environment. Impacts were determined to be less than significant.

The proposed project entails the demolition of existing structures and construction of a new building(s) including lab and research facilities. As anticipated in the IS prepared for the 2021 LRDP, project construction would require the use of hazardous materials such as fuel, paint products, lubricants, solvents, and cleaning products. The use and storage of these materials would occur in accordance with applicable regulations and construction would not result in substantial hazards to the public or environment during project construction.

UCR is currently a licensed generator of hazardous waste, which includes chemical, radioactive, and biohazardous (infectious) waste. The laboratory uses proposed by the project would involve the routine transport, use, and disposal of hazardous materials. Hazardous materials were anticipated to be required for future laboratory development under the 2021 LRDP; the use, storage, transport, and disposal of hazardous materials within OASIS Park would be guided by existing and future UCR, County, State, and federal regulations designed to maximize the safety of UCR personnel, students, the public, and the environment. Therefore, the proposed project would be consistent with the operational hazardous materials analysis and determination in the 2021 LRDP EIR and the construction hazardous materials assessment in the IS for the 2021 LRDP; and proposed project impacts from hazardous materials would remain **less than significant**.

b) The 2021 LRDP EIR states that operations of facilities and use of hazardous materials would be subject to federal, State, County, and UCR policies designed to minimize upset and accident conditions. However, construction and renovation under the 2021 LRDP could disturb or emit hazardous material from impacted soil, soil vapor, or groundwater, which could emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste during reasonably foreseeable upset and accident conditions. Impacts were determined to be less than significant with mandatory compliance with existing regulations pertaining to the identification, handling, and disposing of hazardous materials, and incorporation of MM HAZ-1 through MM HAZ-4.

As described above, the proposed laboratory uses for the project would require the use of hazardous materials, which would be handled and stored in accordance with applicable regulations such that upset and accident conditions would not result in substantial hazards. In addition, the project would implement a SWPPP and would comply with the UCR MS4 permit requirements related to stormwater discharges; no hazardous discharges into stormwater are anticipated to occur.

Numerous buildings on the campus are assumed to contain some form of asbestos containing materials and/or lead-based paints (LBP) due to their age, as well as fluorescent light ballasts containing polychlorinated biphenyls. Building materials may also be contaminated by spills or aerosol releases of radioactive or chemical hazardous materials used in the building, and elemental mercury may be present in research laboratory sink traps, cupboard floor spaces, or in sewer pipes. If such contamination is identified to be present during demolition of the existing structures on the project site, exposure to potentially hazardous materials would be minimized through required worker training, appropriate engineering and administrative controls, and in combination with the use of protective equipment in accordance with existing campus health and safety practices (such as the UCR Asbestos Management Plan) and federal and State regulations. In the event that LBP and other lead-containing materials are present during construction, protocol pursuant to California Division of Occupational Safety and Health (Cal/OSHA) regulations regarding LBPs and lead-containing materials would be followed. California Code of Regulations Title 8, Section 1532.1, requires testing, monitoring, containment, and disposal of LBPs and lead-containing materials in such a manner that exposure levels do not exceed Cal/OSHA standards. If potentially hazardous materials are encountered during construction or redevelopment, EH&S would conduct a comprehensive assessment of the situation in coordination with the appropriate regulatory authority, such as the RCDEH.

The proposed project includes demolition of the UNEX building as well as the associated parking structure and hardscape areas. The 2021 LRDP EIR states that unanticipated hazardous materials may be encountered during demolition or redevelopment of previously developed sites on the campus. Disturbance of soil containing existing hazardous materials, soil vapor, and/or contaminated groundwater during construction could create a significant hazard to the public or the environment. In accordance with **MM HAZ-1**, UCR conducted a comprehensive Hazardous Materials Report in which all visible and readily accessible asbestos-containing building materials in the existing structures, along with their quantities and locations, were identified. The construction contractor would be responsible for remediation of all hazardous materials and must follow all applicable safety protocols in accordance with Cal/OSHA, EPA, and EH&S requirements. Per **MM HAZ-4**, preparation of a SMP would be required. Additionally, the proposed project would adhere to applicable UCR, County, State, and federal regulations for managing hazardous materials during project construction and operation. Therefore, the proposed project would be consistent with the hazardous materials analysis and determination in the 2021 LRDP EIR; and proposed project impacts from hazardous materials would remain **less than significant** with incorporation of **MM HAZ-1 and MM HAZ-4**.

c) The 2021 LRDP EIR states that while there are multiple schools within 0.25 mile of the campus, facility operation would be subject to federal, State, County, and UCR policies, and would not result in hazardous emissions within 0.25 mile of schools. Construction and redevelopment under the 2021 LRDP could disturb or emit hazardous materials or waste within 0.25 mile of an existing or proposed school and the 2021 LRDP EIR concludes that impacts would be less than significant with compliance with existing regulations pertaining to hazardous wastes and materials and incorporation of MM HAZ-1 through MM HAZ-4.

The school closest to the project site is the Islamic Academy of Riverside, located approximately 0.2 mile northeast of the project site across the I-215/SR 60 freeway. Project construction and deliveries during operation may require occasional transport of hazardous materials, including oils, lubricants, paints, or other construction equipment chemicals along roadways adjacent to schools; however, transport of such materials would be conducted in accordance with all applicable federal, State, and County regulations, and UCR policies designed to minimize hazardous emissions and spills. As described above, **MM HAZ-1 and MM HAZ-4** would be implemented during construction to ensure hazardous materials encountered during construction do not result in hazards to the public, including at school sites. Operation of the proposed laboratory uses requiring hazardous materials would occur in accordance with existing and future UCR, County, State, and federal regulations designed to maximize the safety of the public, including nearby schools. Compliance with these regulations would ensure that risks associated with hazardous emissions or materials would be eliminated or reduced through proper handling techniques, disposal practices, and/or cleanup procedures. Therefore, the proposed project would be consistent with the school hazards analysis and determination in the 2021 LRDP EIR; and proposed project impacts to nearby schools would remain **less than significant** with incorporation of **MM HAZ-1 and MM HAZ-4**.

d) The 2021 LRDP EIR states that the campus contains several listed and closed UST release sites and is adjacent to a site with restricted land use covenants. Disturbance of hazardous material impacted soil, soil vapor, or groundwater during construction could create a significant hazard to the public or the environment. Impacts would be less than significant with the incorporation of MM HAZ-1 through MM HAZ-4.

The project site does not contain known USTs and is not a site with a restricted land use covenant; therefore, MM HAZ-2 and MM HAZ-3 do not apply to the project. According to the California State Water Resources Control Board GeoTracker database, there are six closed cleanup sites within 1,000 feet of the project site, including a closed former underground storage tank site (Case number T10000011461) in Parking Lots 50 and 51 east of the project site (California State Water Resources Control Board 2023). No open cases were identified in GeoTracker within 1,000 feet of the project site. No cases within 1,000 feet of the project site were identified in the DTSC EnviroStor database (DTSC 2023). There are no cleanup sites listed in the GeoTracker or EnviroStor databases on the project site. While no hazardous materials site has been identified, per **MM HAZ-1**, UCR conducted a comprehensive Hazardous Materials Report in which all visible and readily accessible asbestos-containing building materials in the existing structures, along with their quantities and locations, were identified. The construction contractor would be responsible for remediation of all hazardous materials and adherence to Cal/OSHA, EPA, and EH&S safety requirements. Additionally, per **MM HAZ-4**, preparation of a SMP would be required. Therefore, the proposed project would be consistent with the contaminated sites analysis and determination in the 2021 LRDP EIR; and proposed project impacts to contaminated sites would remain **less than significant** with incorporation of **MM HAZ-1 and MM HAZ-4**.

e) The 2021 LRDP EIR states that the campus is in Area E of the March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan (ALUCP) influence area, and noise levels in Area E of the March Air Reserve Base/Inland Port ALUCP are low and outside of the 55-Community Noise Equivalent Level (CNEL) contour. The safety risk related to aircrafts in Area E of the March Air Reserve Base/Inland Port ALUCP level is also considered low. Area E has no limit on residential or other land use population density or requirement for open space. Impacts were determined to be less than significant.

The project site is not within two miles of an airport. The closest airport, Flabob Airport, is located approximately four miles west of the project site and March Air Reserve Base/Inland Port Airport is located approximately six miles southeast of the project site. Consistent with the 2021 LRDP EIR, the project site is not located near principal airplane arrival or departure tracks and is outside of the noise contours and safety hazard zones for nearby airports. Therefore, the proposed project would not result in airport-related safety hazards or excessive noise impacts to construction workers, faculty/staff, students, employees, and visitors of the project. The proposed project would be consistent with the airport hazards analysis and determination in the 2021 LRDP EIR; and proposed project impacts related to airport hazards would remain **less than significant**.

f) The 2021 LRDP EIR discussed emergency response plan impacts in Sections 4.15, *Transportation*, and 4.18, *Wildfire*; emergency response plan impacts are not discussed in Section 4.9 of the 2021 LRDP EIR. As such, discussion pertaining to project impacts on emergency response plans is provided in Sections 4.1.17, *Transportation*, and 4.1.20, *Wildfire*, of this Addendum.

g) The 2021 LRDP EIR discussed wildland fire impacts in Section 4.18, *Wildfire*; wildland fire impacts are not discussed in Section 4.9 of the 2021 LRDP EIR. As such, discussion pertaining to project impacts on wildland fire risks is provided in Section 4.1.20, *Wildfire*, of this Addendum.

4.1.10 HYDROLOGY AND WATER QUALITY

Section 4.10 of the 2021 LRDP EIR addresses hydrology and water quality impacts that would occur with development under the 2021 LRDP. The 2021 LRDP EIR concludes that development under the 2021 LRDP would have less than significant impacts with regard to waste discharge requirement violations that would substantially degrade surface or groundwater quality; substantial decreases in groundwater supplies; alterations to drainage in a manner which would result in substantial erosion, increased runoff resulting in flooding, exceedance of the storm water system capacity, increased polluted runoff, or impediments to flood flows; and conflicts with a water quality control plan or sustainable groundwater management plan. No mitigation measures were required. The 2021 LRDP EIR notes that the IS prepared for the 2021 LRDP concludes that the campus is not within a tsunami or seiche zone; therefore, the campus is not subject to inundation by either activity, and this issue area was not further analyzed in the 2021 LRDP EIR. Potential effects related to overall water supply or the potential need for construction of new or expanded water and wastewater infrastructure are discussed in Section 4.1.19, *Utilities and Service Systems*, of this Addendum.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a) Violate any water quality standards or waste discharge requirements, or otherwise substantially degrade surface or groundwater quality?	Less than Significant Impact	No	No	No	No mitigation required
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	Less than Significant Impact	No	No	No	No mitigation required

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
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 off-site; (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?	Less than Significant Impact	No	No	No	No mitigation required
d) Risk release of pollutants due to project inundation in flood hazard, tsunami, or seiche zones?	Less than Significant Impact	No	No	No	No mitigation required
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	Less than Significant Impact	No	No	No	No mitigation required

a) The 2021 LRDP EIR states that all operation and construction would occur in compliance with applicable water quality standards and waste discharge requirements. Specifically, for development under the 2021 LRDP, a SWPPP would be implemented during construction and a SWMP would be implemented during operation of individual projects. Adherence to these regulations and project-specific plans would ensure development does not result in polluted runoff violating discharge and water quality requirements. Impacts were determined to be less than significant.

As described in the 2021 LRDP EIR, all construction, including for the proposed project, would be required to comply with the provisions of the NPDES Construction Stormwater General Permit that specifies the implementation of BMPs through a SWPPP. A SWPPP typically includes both source-control and treatment-control BMPs to reduce water quality impacts, including but not limited to proper storage, use and disposal of construction materials; watering exposed soils; installing sandbags to minimize off-site runoff; creating temporary desilting basins; containing construction vehicle maintenance in staging areas to avoid leaks or spills of fuels, motor oil, coolant, and other hazardous materials; installation of silt fences and erosion control blankets;

timing grading to avoid the rainy season (November through April); stabilizing cleared or graded slopes; protecting or stabilizing stockpiled soils; and continual inspection and maintenance of all specified BMPs through the duration of construction. NPDES Construction Stormwater General Permit requirements also require inspection, monitoring, and reporting; and corrective action is required within 72 hours of identifying any issue of non-compliance during monitoring and inspections.

During operation of the proposed project, as anticipated in the 2021 LRDP EIR, BMPs and SWMP requirements including LID measures, runoff reduction measures, source-control BMPs, and treatment BMPs would be implemented and followed. The Preliminary Stormwater Quality Management Plan prepared for the project (Appendix D) recommends post-construction BMPs including 6,965 sf of bioretention basins throughout the project site, permeable pavers at the vehicle entrance from University Avenue, and an infiltration basin. With implementation of a SWPPP and SWMP to address and treat construction and post-construction runoff from the project site, the project would not result in violations of applicable water quality standards or waste discharge requirements such that surface or groundwater quality would be degraded. Therefore, the proposed project would be consistent with the water quality and waste discharge analyses and determination in the 2021 LRDP EIR; and proposed project impacts to water quality and waste discharge would remain **less than significant**.

b) The 2021 LRDP EIR states that the campus is presently characterized by large areas of impervious surfaces and there are existing stormwater drainage systems in place to convey surface flows across impermeable areas to permeable areas where the water is allowed to infiltrate to the subsurface. Development under the 2021 LRDP would be required to implement LID methods in compliance with NPDES and MS4 permit regulations. As such, development under the 2021 LRDP would not interfere substantially with groundwater recharge and impacts were determined to be less than significant. Groundwater supply availability impacts are discussed further in Section 4.1.19, *Utilities and Service Systems*, of this Addendum.

Consistent with the 2021 LRDP EIR, temporary water supplies would be required during construction, primarily for dust suppression during grading and grubbing activities, but would not specifically require the use of groundwater supplies. Based on the limited nature of these water supply demands and the availability of water supplies for campus operation, project construction would not substantially decrease groundwater supplies.

As was anticipated for the majority of development under the 2021 LRDP, the proposed project is an infill development and would be constructed within a previously developed area. Construction of the proposed project would not substantially decrease groundwater supplies, impede sustainable groundwater management, or interfere substantially with groundwater recharge with compliance with the 1969 Western-San Bernardino Judgment (“Adjudication Judgment”), availability of supplemental water supplies, and implementation of standard construction BMPs applicable to dewatering practices. Site-specific drainage features are proposed to convey surface flows across and around impermeable areas to those areas where flows may infiltrate to the subsurface in accordance with the NPDES program and the Phase II MS4 Permit. The project proposes an increase in pervious surface area on the project site, from approximately 15 percent under existing conditions to approximately 26 percent under the proposed project (Appendix E). As the project would comply with MS4 Permit requirements, implement LID methods, implement a SWMP during operation of the project, and reduce impervious surface area on the project site, the project would not interfere with groundwater recharge. In addition, the proposed project would not impede the creation or implementation of a groundwater sustainability plan and would comply with existing groundwater sustainability plans. Therefore, the proposed project would be consistent with the groundwater analysis and determination in the 2021 LRDP EIR; and proposed project impacts to groundwater would remain **less than significant**.

c) The 2021 LRDP EIR concludes that construction and operation of projects under the 2021 LRDP would not alter the course of any streams of rivers and would not alter regional stormwater drainage patterns. Implementation of project-specific SWPPPs during construction and BMPs in accordance with UCR's SWMP during operation would prevent substantial increases in erosion or polluted runoff. Impacts were determined to be less than significant.

The proposed project would not substantially alter localized drainage patterns on the project site. The project's Preliminary Hydrology Study (Appendix E) concludes that the project would reduce runoff from the project site based on the proposed increase in pervious surface areas. During construction of the proposed project, excavation, grading, and stockpiling of soils may accelerate erosion and siltation if disturbed soils are not secured. A project-specific SWPPP would detail BMPs to avoid or minimize erosion, siltation, and flooding associated with drainage pattern alternations. Additionally, as discussed above for criterion b, localized drainage pattern alterations would be addressed through site-specific drainage and flood control features, in accordance with the NPDES and MS4 Permit requirements. Therefore, the proposed project would be consistent with the drainage, erosion, and runoff analyses and determination in the 2021 LRDP EIR; and proposed project impacts to drainage, erosion, and runoff would remain **less than significant**.

d) The IS prepared for the 2021 LRDP notes the campus is not located within a tsunami hazard area or near a standing body of water that could experience a seiche, or large wave activity associated with a seismic event. In addition, the campus is identified as an Area of Minimal Flood Hazard and is not anticipated to be inundated by dam failure. Therefore, no inundation of the campus was anticipated and impacts were determined to be less than significant.

As was the case in the IS prepared for the 2021 LRDP, the project site is not within a hazard zone for tsunami, seiche, flood, or dam failure. The project site remains within Flood Zone X, or an Area of Minimal Flood Hazard (Federal Emergency Management Agency 2023). The project would not increase or otherwise alter the area's potential to be inundated by tsunami, seiche, flood, or dam inundation. Further, hazardous materials that could be potential pollutants would be used and stored in compliance with the MS4 Permit such that risks related to pollutant release would be minimal. Therefore, the proposed project would be consistent with the flood, tsunami, and seiche hazards analyses and determination in the IS prepared for the 2021 LRDP; and proposed project impacts to flood, tsunami, and seiche hazards would remain **less than significant**.

e) The campus is within the Santa Ana River Basin Water Quality Control Plan (Basin Plan) area (RWQCB 2019). The Basin Plan, as developed and implemented by the Santa Ana RWQCB in accordance with the federal Clean Water Act, designates beneficial uses for surface waters in the Santa Ana Region and associated water quality objectives to fulfill such uses. The campus is located in the Upper Santa Ana Valley Groundwater Basin and is mostly underlain by the Riverside-Arlington Groundwater Subbasin where groundwater use and replenishment is regulated by the Adjudication Judgement. The 2021 LRDP EIR states that BMPs would be implemented for projects under the 2021 LRDP to avoid conflicting with a water quality control plan or sustainable groundwater management plan. Impacts were determined to be less than significant.

The project is subject to the Basin Plan and within the Riverside-Arlington Groundwater Subbasin. As described in the 2021 LRDP EIR, project construction and operation would be conducted in compliance with applicable regulatory requirements related to stormwater runoff to minimize the potential for pollutants to enter receiving waters. Specifically, the proposed project would also comply with the provisions of the NPDES Construction Stormwater General Permit that specifies the implementation of BMPs as well as the UCR MS4 Permit. A project-specific SWPPP would be implemented during construction activities and a SWMP would be implemented during operation and maintenance of the proposed project. The proposed project would incorporate site design, source control, and treatment BMPs to prevent pollutants from reaching receiving waters. Therefore, the proposed project would be consistent with the water quality control plan and sustainable groundwater management plan analysis and determination in the 2021 LRDP EIR; and proposed project impacts to water quality would remain **less than significant**.

4.1.11 LAND USE AND PLANNING

Section 1.3 of the 2021 LRDP EIR states that impacts to land use and planning are not further analyzed in the 2021 LRDP EIR since analysis included in the IS prepared for the 2021 LRDP concludes that implementation of the 2021 LRDP would have less than significant impacts on land use and planning.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a) Physically divide an established community?	Less than Significant Impact	No	No	No	No mitigation required
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?	Less than Significant Impact	No	No	No	No mitigation required

a) The campus is developed with academic, research, agricultural, recreational, athletic, maintenance, housing, and campus support facilities, and designated open space areas. The IS prepared for the 2021 LRDP states the implementation of the proposed 2021 LRDP would develop buildings and facilities within the existing campus framework and would not divide the on-campus or surrounding community. In addition, the 2021 LRDP encouraged installation of multimodal facilities that would provide increased connections throughout the campus and surrounding areas. Impacts were determined to be less than significant.

The proposed project would be constructed in an area that currently includes the UNEX building, parking structure, portions of surface parking lots, and associated hardscape and landscaped areas that are proposed to be demolished. Construction of the project, including associated utility, hardscape, and landscape improvements, would occur within previously disturbed areas. Off-site improvements to crosswalks and traffic signal modifications would occur within existing rights-of-way and would not result in construction of new linear features with the potential to divide existing communities. Since the proposed project would not involve development outside of established campus properties or boundaries, and no incursion into or division of the surrounding residential communities would occur, the proposed project would not physically divide an established community. Therefore, the proposed project would be consistent with the community division analysis and determination in the IS prepared for the 2021 LRDP; and proposed project impacts to the established campus and adjacent communities would remain **less than significant**.

b) The City of Riverside General Plan, which includes the UCR main campus, identifies UCR as a public facility/institutional land use (City 2019). UCR is part of the UC school system, a constitutionally created entity of the State of California; as such, the campus is not subject to municipal regulations, such as the general plans for the County and City of Riverside. The IS prepared for the 2021 LRDP states that implementation of the 2021 LRDP would primarily affect existing land and facilities within the campus and development would be guided by the 2021 LRDP. The IS stated that the 2021 LRDP EIR would determine the consistency of the 2021 LRDP with the SCAG's 2016 RTP/SCS, the Santa Ana RWQCB Basin Plan, and the 2016 AQMP in the applicable environmental impact areas. Discussion regarding the consistency of the 2021 LRDP and proposed project with these regional plans is similarly contained in the applicable environmental impact analysis in this Addendum. Impacts were determined to be less than significant.

As described in Section 3 of this Addendum, the proposed project is consistent with the land use designations, objectives, population forecasts, and building space projections in the 2021 LRDP, which is the applicable land use plan for the UCR main campus. As shown on Figure 2-1 in the 2021 LRDP EIR, the project site is located in West Campus, in an area designated as University Avenue Gateway, which allows for the development of the proposed project. The 2020-2045 RTP/SCS and 2022 AQMP have replaced the 2016 RTP/SCS and 2016 AQMP, respectively, as the plans applicable to the project. However, given the proposed project is consistent with the campus population projections contained in the 2021 LRDP, which inform local and regional planning efforts, the project would be consistent with the updated versions of these plans. Therefore, the proposed project would be consistent with the applicable land use plans, policies, and regulations as analyzed in the IS prepared for the 2021 LRDP; and proposed project impacts to applicable land use plans, policies, and regulations would remain **less than significant**.

4.1.12 MINERAL RESOURCES

Section 1.3 of the 2021 LRDP EIR states that impacts to mineral resources are not further analyzed in the 2021 LRDP EIR since analysis included in the IS prepared for the 2021 LRDP concludes that implementation of the 2021 LRDP would have no impact on mineral resources.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a) Result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the State?	No Impact	No	No	No	No mitigation required
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	No Impact	No	No	No	No mitigation required

a-b) The IS prepared for the 2021 LRDP states that the campus is located on lands classified as Mineral Resource Zone (MRZ) 3, which are areas of undetermined mineral resource significance. There are no known mineral resources on the campus and the 2021 LRDP would not allow for mining activities on the campus. It was determined that there would be no impact to mineral resources from future campus development under the 2021 LRDP.

The project does not propose mining activities or uses, and development of the project site would not result in the loss of available valuable or locally important mineral resources. Therefore, the proposed project would be consistent with the mineral resources analysis and determination in the IS prepared for the 2021 LRDP; and there would remain **no impact**.

4.1.13 NOISE

Section 4.11 of the 2021 LRDP EIR evaluates the noise effects of campus growth under the 2021 LRDP. The 2021 LRDP EIR concludes that future projects under the 2021 LRDP would result in significant and unavoidable impacts related to construction noise even with the incorporation of MM N-1 and less than significant impacts related to operational noise with incorporation of MM N-2 through MM N-4. The 2021 LRDP EIR concludes that future projects under the 2021 LRDP would result in less than significant impacts related to groundborne vibration or groundborne noise levels with incorporation of MM N-5. The proposed project does not involve the relocation of the Corporation Yard and would not involve substantial vibration generation; thus, MM N-4 and MM N-5 would not be applicable to the proposed project.

The 2021 LRDP EIR states that the nearest airport to the campus is the Flabob Airport, located approximately 4.7 miles west of the campus. The 2021 LRDP EIR concludes that projects under the 2021 LRDP would not expose people residing or working on the campus to excessive noise levels from an airport or airport influence area, and such impacts would be less than significant.

The above-mentioned applicable MMs state the following:

MM N-1 Construction Noise Reduction Measures: To reduce construction noise levels to on-campus and off-campus noise sensitive receivers, UCR shall implement the following measures:

- Hours of exterior construction activities shall be limited to 7:00 a.m. to 9:00 p.m. Monday through Friday and 8:00 a.m. to 6:00 p.m. on Saturday, as feasible, except under circumstances where such time limits are infeasible (e.g., for time sensitive construction work such as concrete pouring, excessive heat warnings/temperatures during the summer, operational emergencies). No exterior construction activities shall occur on federal holidays.
- Construction traffic shall follow routes to minimize the noise impact of this traffic on the surrounding community, to the greatest extent feasible.
- Contract specifications shall require that construction equipment be muffled or otherwise shielded, in accordance with manufacturers' recommendations. Contracts shall specify that engine-driven equipment be fitted with appropriate noise mufflers.
- Where available and feasible, construction equipment with back-up alarms shall be equipped with either audible self-adjusting backup alarms or alarms that only sound when an object is detected. Self-adjusting backup alarms shall automatically adjust to 10 dBA [A-weighted decibels] over the surrounding background levels. All non-self-adjusting backup alarms shall be set to the lowest setting required to be audible above the surrounding noise levels.
- Stationary construction equipment material and vehicle staging shall be placed to direct noise away from sensitive receivers to the greatest extent feasible.
- Meetings shall be conducted, as needed, with on campus constituents to provide advance notice of construction activities to coordinate these activities with the academic calendar, scheduled events, and other situations, as appropriate.
- Communication would be provided, as needed, with constituents that are affected by campus construction to provide advance notice of construction activities and ensure that the mutual needs of the particular construction project and of those impacted by construction noise are met, to the extent feasible.
- A sign shall be provided at the construction site entrance, or other conspicuous location, that includes a 24-hour telephone number for project information, and to report complaints. An inquiry and corrective action will be taken if necessary, in a timely manner.
- Where feasible, installation of temporary sound barriers/blankets of sufficient height to break the line-of-sight between the construction equipment and within proximity to exterior use areas of noise-sensitive receivers shall be required. Temporary sound barriers shall consist of either sound blankets or other sound barriers/techniques such as acoustic padding or acoustic walls placed near adjacent noise-sensitive receivers that have been manufactured to reduce noise by at least 10 dBA at ground level or meets ASTM [American Society for Testing and Materials] E90 & E413 standards/ ASTM C423 (or similar standards with equivalent 10 dBA noise reduction).

MM N-2 HVAC Noise Reduction Measures: The campus shall reduce HVAC equipment noise levels located near noise-sensitive buildings and uses through noise control measures such as, but not limited to:

- Mechanical equipment screening (e.g., parapet walls)
- Equipment setbacks
- Silencers

- Acoustical louvers
- And other sound attenuation devices as made available

If a method other than mechanical equipment screening (e.g., parapet walls) is chosen, a project-specific design plan demonstrating that the noise level from operation of HVAC units does not generate noise levels that exceed 5 dBA above ambient at noise sensitive receivers shall be completed.

MM N-3 Loading Dock Noise Reduction Measures: The campus shall reduce loading dock noise levels through measures such as, but not limited to:

- Noise levels from loading docks at noise-sensitive receivers shall not exceed 5 dBA over ambient noise levels, the effectiveness of which shall be determined on a project-level basis by an acoustical professional.
- As feasible, design and build sound barriers near loading docks and delivery areas that block the line of sight between truck activity areas and noise-sensitive receivers. Sound barriers may consist of a wall, earthen berm, or combination thereof.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a) Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the LRDP in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Significant and Unavoidable Impact (Construction) Less than Significant Impact with Mitigation Incorporated (Operation)	No	No	No	MM N-1 through MM N-3
b) Generate excessive groundborne vibration or groundborne noise levels?	Less than Significant Impact with Mitigation Incorporated	No	No	No	No mitigation required
c) Expose people residing or working in the project area to excessive noise levels where a project is 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?	Less than Significant Impact	No	No	No	No mitigation required

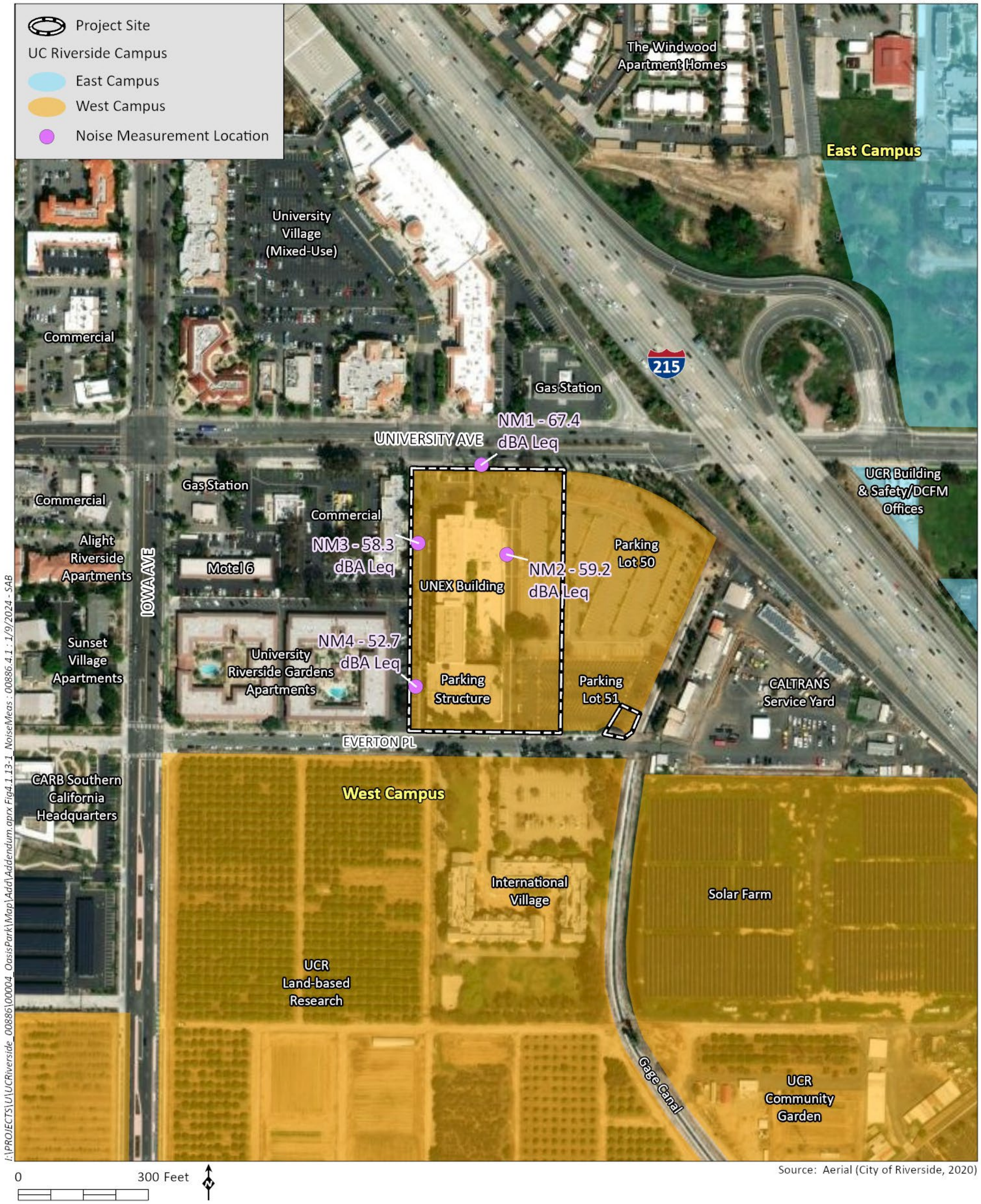
To provide a site-specific analysis of the existing noise environment, a site visit was completed on October 11, 2023. Four 15-minute noise measurements were conducted during the site visit to characterize ambient noise levels at and around the OASIS Park site. Short-Term Noise Measurement (NM) 1 was conducted to capture the existing noise levels at the University Avenue frontage along the site; NM-2 was conducted to capture existing noise levels along the eastern side of the site facing the I-215/SR 60 freeway; NM-3 was conducted to capture existing noise levels at the northwestern edge of the site adjacent to commercial land uses; and NM-4 was conducted to capture existing noise levels at the southwestern edge of the site adjacent to residential land uses. As UNEX and the on-site parking structure were not in operation at the time of this site visit, the noise measurements taken during the site visit represent existing conditions that are likely quieter than those that would have occurred under 2021 LRDP baseline conditions when UNEX was operating and the parking garage was in use. Noise measurement locations are shown in Figure 4.1.13-1, *Noise Measurement Locations*, and Table 4.1.13-1 summarizes the results of the short-term noise measurements. Measured sound levels ranged from 52.7 to 67.4 A-weighted decibels (dBA) equivalent noise level (Leq) at locations around the proposed project boundary.

Table 4.1.13-1
Project Site Sound Level Monitoring Results

Measurement	Location	Sample Times	Approximate Distance to Primary Noise Source Centerline	Leq (dBA)	Primary Noise Sources
NM-1	Along University Avenue project frontage	11:30 a.m. – 11:45 a.m.	45 feet south of University Avenue, 650 feet west of I-215/SR 60	67.4	University Avenue and I-215/SR 60 vehicular traffic
NM-2	East side of existing UNEX building	11:51 a.m. – 12:06 p.m.	260 feet south of University Avenue, 580 feet west of I-215/SR 60	59.2	University Avenue and I-215/SR 60 vehicular traffic
NM-3	Northwestern side of existing UNEX building	12:10 p.m. – 12:25 p.m.	230 feet south of University Avenue, 730 feet west of I-215/SR 60 (obstructed)	58.3	University Avenue and I-215/SR 60 vehicular traffic
NM-4	West of on-site parking structure adjacent to off-site residences	12:32 p.m. – 12:47 p.m.	560 feet south of University Avenue, 940 feet west of I-215/SR 60 (obstructed)	52.7	University Avenue and I-215/SR 60 vehicular traffic

Source: HELIX Environmental Planning, field measurements conducted on October 11, 2023, using Larson Davis LxT sound level meter.
Leq = equivalent noise level; dBA = A-weighted decibels; NM = Noise Measurement

Figure 4.1.13-1 Noise Measurement Locations



a) Construction noise impacts identified in the 2021 LRDP EIR were considered significant if construction would increase ambient noise levels by 10 dBA Leq or more over an 8-hour period at on- or off-campus noise-sensitive land uses. Permanent (operational) increases in noise were considered significant if ambient noise levels would increase by 5 dBA Leq or more at on- or off-campus noise-sensitive land uses. The 2021 LRDP EIR concludes that construction equipment used during construction activities would result in noise level increases that would exceed applicable noise thresholds and with incorporation of MM N-1 would remain significant and unavoidable. The 2021 LRDP EIR concludes incorporation of MM N-2 through MM N-4, which would reduce potentially significant operational noise impacts related to HVAC equipment, loading docks, and Corporation Yard relocation, respectively, to a level below significance. Impacts related to operational noise resulting from emergency generators, parking structures, special events (i.e., graduation, orientation), on-campus gatherings, and off-site traffic noise were determined to be less than significant, and no mitigation was required.

Construction activities associated with the proposed project would temporarily increase noise levels in the vicinity of the project site. Noise impacts associated with construction noise are assessed at the nearest noise-sensitive land uses, which are off-campus residences west of the project site, approximately 45 feet from the limits of construction. However, construction equipment would typically be located at an average distance further than the closest residence due to the nature of construction (i.e., each piece of construction equipment would work in different locations throughout the day). Therefore, it is assumed that over the course of a typical construction day, the construction equipment would operate, on average, approximately 150 feet from the nearest noise-sensitive off-campus residences. Based on the lowest noise measurement at the southwest corner of the project site nearest the residences, ambient noise levels are approximately 52.7 dBA Leq and construction noise impacts would be considered potentially significant if construction noise levels would exceed 62.7 dBA Leq.

Construction equipment required for the proposed project construction activities would result in noise levels between 64.1 dBA Leq and 75.8 dBA Leq at 150 feet depending on the phase of construction (see Supporting Noise Information in Appendix F). Consistent with the findings of the 2021 LRDP EIR, project construction impacts would be potentially significant, as ambient noise levels would be exceeded by more than 10 dBA. This noise level is not anticipated to occur at the residences throughout the duration of construction, as the majority of construction activities would occur further from residences where the buildings are proposed. The proposed project would comply with **MM N-1**, which entails the integration of construction noise mitigation recommendations into the contractor specifications and the implementation of such recommendations during construction activities. With implementation of **MM N-1**, per manufacturer's specifications of construction site sound blankets provided in the 2021 LRDP EIR (Appendix I3 to the 2021 LRDP EIR), construction noise levels would be reduced by at least 10 dBA to 65.8 dBA Leq at the closest exterior use areas of noise-sensitive receivers for the loudest modeled construction phase (demolition). This noise level would exceed ambient noise levels by 13.1 dBA at the residences west of the project site, which would exceed the significance criteria of a 10 dBA increase over ambient. Implementation of the other noise reduction strategies required by **MM N-1** would further reduce noise levels; however, these reductions were not quantified for the purposes of this analysis, as the exact pieces of construction equipment and associated alarm and muffler noise levels are not known at this stage of project design. Therefore, the proposed project would be consistent with the construction noise analyses and determination in the 2021 LRDP EIR; and proposed project impacts from construction noise would **remain significant and unavoidable** with incorporation of **MM N-1**.

The project's operational noise sources would be associated with mechanical equipment (HVAC systems), on-site gatherings, loading docks, and off-site traffic noise. Consistent with the 2021 LRDP EIR analysis, on-campus gatherings occurring at the proposed OASIS Park would utilize small speakers, involve a small number of people, occur intermittently, and follow all UCR policies related to events and noise; therefore, on-campus gatherings would not result in substantial increases in ambient noise levels.

As discussed further in Section 4.1.17, *Transportation*, of this Addendum, off-site traffic associated with the project was anticipated in the 2021 LRDP EIR and growth associated with the project would not generate vehicle trips beyond those anticipated in the 2021 LRDP EIR. Development under the 2021 LRDP was anticipated to add approximately 1,113 trips to University Avenue adjacent the project site. The project would be consistent with the growth projections analyzed in the 2021 LRDP EIR and the project would not increase roadway noise levels beyond the increases in traffic noise anticipated in the 2021 LRDP EIR, which were determined to have a less than significant impact related to noise. While the project would not generate substantial vehicle trips resulting in noise level increases, the removal of the existing parking garage shielding the off-campus residences west of the project site from freeway traffic noise has the potential to increase traffic noise levels at this sensitive receptor. Modeling of peak hour traffic noise from University Avenue and I-215/SR 60 under a scenario with the existing project building and parking structure and a scenario with the proposed OASIS Park development concluded peak hour traffic noise levels at the residences west of the project site would increase by 3.0 dBA Leq with removal of the parking structure. As traffic noise levels at sensitive receptors would increase by less than 5 dBA, project impacts related to transportation noise would remain **less than significant**.

The 2021 LRDP EIR concludes that operational noise from projects implemented under the 2021 LRDP could result in noise level increases associated with mechanical equipment and loading docks that would increase ambient noise levels by more than 5 dBA. Based on the lowest noise measurement at the southwest corner of the project site nearest the residences, ambient noise levels are approximately 52.7 dBA Leq. It is noted that baseline noise levels at the adjacent residences likely exceeded 52.7 dBA Leq during LRDP baseline conditions including operation of UNEX and use of the parking structure. Still, conservatively, operational noise impacts would be considered potentially significant if operational noise levels would exceed 57.7 dBA Leq.

The proposed project would include rooftop HVAC systems that would be located approximately 100 feet from the residences to the west and a loading dock area approximately 120 feet from these residences. In accordance with **MM N-2**, HVAC units would be required to be screened or include other noise reduction measures. As identified in the 2021 LRDP EIR, 130-ton HVAC units would generate 54.4 dBA Leq at 100 feet with mechanical equipment screening; therefore, mechanical equipment (HVAC units) would not result in significant increases in ambient noise levels.

For residences approximately 120 feet from the loading dock, noise levels from the loading dock would exceed 57.7 dBA during some activities, such as truck brakes releasing.[11] Noise from the

[11] The 2021 LRDP EIR states that truck brakes releasing can generate a maximum noise level of up to 86 dBA at 50 feet. At 120 feet, this equates to a maximum noise level of approximately 78.4 dBA for a single noise event (e.g., a truck braking one time).

loading dock would occur intermittently and the majority of noise generated by trucks would occur for only a few seconds, thereby resulting in an hourly noise level that would be much lower than the maximum potential noise level generated by truck activity. For example, truck brakes releasing for one minute of a given hour (i.e., assumes single-event braking noise could occur for a combined total of up to one minute averaged over an hour) would result in an hourly noise level at the residences to the west of 60.6 dBA Leq. Therefore, it is assumed that the loading dock would generate noise exceeding ambient noise levels by more than 5 dBA.

Therefore, **MM N-3** would be required to ensure a sufficient barrier is provided between the loading dock area and the residences to the west. The existing block wall along the western edge of the project site is approximately six feet tall and would decrease noise levels by at least 5 dBA at the residences, thereby providing sufficient attenuation to reduce noise levels below 57.7 dBA Leq. If changes to the site plan occur such that the existing block wall would not block the line of sight between the loading dock and residences, an additional barrier would be required at the western edge of the loading dock area in accordance with **MM N-3**.

Implementation of **MM N-2 and MM N-3** would ensure that project operation-related noise impacts related to mechanical equipment and loading docks would be less than significant. Therefore, the proposed project would be consistent with the operational noise analyses and determination in the 2021 LRDP EIR; and proposed project impacts from operational noise would remain **less than significant** with incorporation of **MM N-2 and MM N-3**.

b) The 2021 LRDP EIR states that groundborne vibration or groundborne noise levels from construction activities for projects under the 2021 LRDP may exceed thresholds for vibration-sensitive receptors from the use of vibratory rollers during paving activities and/or operation of large bulldozers and result in potentially significant impacts that would be reduced to less than significant levels with implementation of MM N-5. No sources of substantial vibration were anticipated to be associated with operation of the 2021 LRDP.

Due to the developed/disturbed nature of the proposed project site, the use of heavy equipment that would generate substantial vibration is not anticipated to be required for project construction. However, to provide a conservative project-specific vibration analysis, it is assumed that a vibratory roller would be the piece of equipment used in project construction with the greatest vibration potential. A vibratory roller would conservatively represent all other heavy-duty construction equipment with lower vibration potential. During project construction, heavy equipment may operate as close as 45 feet from the nearest residences west of the project site. This is further than the screening distances of 25 feet for human annoyance and 20 feet for residential structural damage identified in Table 4.11-13 of the 2021 LRDP EIR. There are no historic sites or laboratory uses within the identified screening distances for these land uses. As such, construction equipment, including a vibratory roller, would not operate within the screening distances identified in Table 4.11-13 of the 2021 LRDP EIR and MM N-5 would not apply to the proposed project. No sources of substantial vibration would be installed and associated with project operation. Therefore, the proposed project would be consistent with the vibration impact analyses and determination in the 2021 LRDP EIR; and proposed project impacts from construction vibration would be **less than significant**.

c) The 2021 LRDP EIR concludes that projects under the 2021 LRDP would not expose people residing or working on the campus to excessive noise levels from an airport or airport influence area, and such impacts would be less than significant. The 2021 LRDP EIR states that are no airstrips within two miles of the campus and the campus is not within the 60 dBA CNEL contour of any airport. Therefore, the 2021 LRDP EIR concludes impacts would be less than significant.

The nearest airports include the Flabob Airport (approximately four miles west of the project site) and March Air Reserve Base (approximately six miles southeast of the project site). The proposed project would not alter flights patterns and their associated noise. Due to the distance of the project site from the Flabob Airport and March Air Reserve Base, the project would not be exposed to excessive aircraft noise. New development on campus, including the proposed project, would comply with CBC Title 24 standards pertaining to noise insulation. Therefore, the proposed project would be consistent with the aircraft noise impact analyses and determination in the 2021 LRDP EIR; and proposed project impacts related to aircraft noise exposure would remain **less than significant**.

4.1.14 POPULATION AND HOUSING

Section 4.12 of the 2021 LRDP EIR addresses the population and housing impacts from implementing the 2021 LRDP and concludes that the campus development program under the 2021 LRDP would accommodate the anticipated regional population forecast. In addition, the 2021 LRDP would not result in indirect inducement of substantial population growth due to the extension of roads or other infrastructure. The 2021 LRDP EIR also states that campus projects under the 2021 LRDP would not displace substantial numbers of existing people or housing. Under the 2021 LRDP, additional student housing would be created to support the growing student population attending UCR. The 2021 LRDP EIR concludes impacts related to population and housing would be less than significant.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a) Induce substantial unplanned 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)?	Less than Significant Impact	No	No	No	No mitigation required
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	Less than Significant Impact	No	No	No	No mitigation required

a) The 2021 LRDP assumes an approximately 46 percent increase in student population (approximately 11,000 students), with an approximately 59 percent increase in additional faculty and staff (approximately 2,800 new faculty and staff) by the 2035/2036 academic year. This increase in population was anticipated in regional and City of Riverside plans related to population growth. Further, approximately 85 percent of the UCR population resides within a one-hour commute radius, which is a trend anticipated to continue with increased campus population. Implementation of the 2021 LRDP entails a variety of projects throughout the campus that fit the needs and allowable uses to accommodate growth in the student, faculty, and staff population. Impacts would be less than significant.

The proposed project would drive regional economic development through solutions-driven applied research, innovation, entrepreneurship, and workforce development around sustainability, clean technology, and social inclusion to meet existing needs and facilitate future enrollment growth. The proposed OASIS Park would add approximately 70,000 gsf of research laboratories, technology incubator, training facilities, hybrid-learning rooms, offices, community spaces, and other supporting uses.

The proposed project would accommodate approximately 180 students and 125 employees. The 180 students to be served by the project at any given time represent fewer or a similar number of students served by UNEX under LRDP baseline conditions, and therefore, would not increase the student population. Of the 125 anticipated employees, 5 would be existing UNEX faculty members, 40 would be existing CE-CERT employees and/or people currently conducting research within similar facilities on or near campus, and 80 would be new people employed by the Office of Technology Partnerships. The employees from CE-CERT and UNEX include those already currently teaching or conducting research within similar facilities on or near campus. The new Office of Technology Partnerships employees would generally be from the local region, similar to that of the existing ExCITE program located in downtown Riverside. The 80 new employees associated with the project represent approximately 2.9 percent of the increase in faculty and staff analyzed in the 2021 LRDP EIR.

Implementation of the proposed OASIS Park project would enable UCR to manage anticipated growth as it would accommodate students, faculty, and staff on campus; allocate space for UNEX classrooms and offer tailored programming options in clean technology through shared resources in collaboration with CE-CERT and ExCITE; and provide incubator and accelerator space for community collaboration through the Office of Technology Partnerships. The population growth attributed to the 80 new employees is minimal and consistent with the overall 2021 LRDP faculty and staff population projections. Furthermore, the campus, including the project site, is within a heavily urbanized area that contains existing infrastructure that includes roadways, electricity, sanitary sewer, potable water, telecommunications, and natural gas. The proposed project would not indirectly result in substantial population growth due to expanding roadways and infrastructure.

Therefore, the proposed project would be consistent with the population growth analysis and determination in the 2021 LRDP EIR; and direct and indirect project impacts from anticipated student, faculty, and staff population growth would remain **less than significant**.

b) The 2021 LRDP EIR anticipated the removal of on-campus housing temporarily when infill housing is proposed under the 2021 LRDP. However, the timing of the removal of housing would be planned to occur when student populations are decreased (during summer) and the new construction would accommodate increased population. Increased campus populations requiring off-campus housing would be accommodated by the existing housing stock and would not result in the displacement of housing. Impacts would be less than significant.

The proposed OASIS Park would be constructed on a site that includes the UNEX building, a parking structure, portions of surface parking lots, and hardscape and landscaped areas. There are no housing units present on the project site and demolition and construction activity proposed by the project would not result in the displacement of people or housing. As such, construction of replacement housing would not be necessary. Therefore, the proposed project would be consistent with the housing displacement analysis and determination in the 2021 LRDP EIR; and the proposed project impacts related to housing displacement would remain **less than significant**.

4.1.15 PUBLIC SERVICES

Section 4.13 of the 2021 LRDP EIR addresses the physical effects of providing public services to meet the needs of the campus growth under the 2021 LRDP. The 2021 LRDP EIR states that the campus growth under the 2021 LRDP would not increase demand to a level that would require new fire protection or school facilities and no substantial alterations to existing fire protection or school facilities would be required. Impacts were considered less than significant.

The IS prepared for the 2021 LRDP concludes that the need for police services and other public facilities (such as libraries) on the campus would increase with the implementation of the 2021 LRDP. However, new facility space required to accommodate additional on-campus police protection services and public programs are expected to be part of the approximately 896,229 asf (1,344,344 gsf) of new administrative and support facility space anticipated in the 2021 LRDP. A project that includes space specifically for on-campus police services or public program uses would undergo its own environmental review and the 2021 LRDP EIR states that no additional environmental impacts beyond those analyzed as part of the 2021 LRDP EIR are anticipated for such a project. Therefore, the impacts of the 2021 LRDP on police protection service and other public facilities were considered less than significant and were not further analyzed in the 2021 LRDP EIR.

Impacts to parks and recreational facilities were addressed in Section 4.14, *Recreation*, of the 2021 LRDP EIR and are addressed in Section 4.1.16, *Recreation*, of this Addendum.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a) 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?	Less than Significant Impact	No	No	No	No mitigation required
ii) Police protection?	Less than Significant Impact	No	No	No	No mitigation required
iii) Schools?	Less than Significant Impact	No	No	No	No mitigation required

Would the proposed project:		2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
iv)	Parks?	Discussion pertaining to project impacts on parks are discussed in Section 4.1.16, *Recreation*, of this Addendum.				
v)	Other public facilities	Less than Significant Impact	No	No	No	No mitigation required

a.i) The 2021 LRDP EIR concludes that implementation of the 2021 LRDP, including construction activities, would not increase demand or response times to a level that would require new fire protection facilities or substantial alterations to existing facilities. Construction would occur in compliance with fire safety regulations and the 2021 LRDP would not substantially alter the amount of construction activity on campus compared to baseline conditions. Operation of projects under the 2021 LRDP would incrementally increase fire protection demands due to the anticipated campus population growth. However, development under the 2021 LRDP would primarily consist of infill development where fire protection services are already required and the increased population anticipated under the 2021 LRDP would not, on its own, require additional fire protection facilities. Therefore, fire service response times are not expected to be notably affected by campus development under the 2021 LRDP. Impacts would be less than significant.

RFD provides fire protection, fire inspection services, community education, and emergency preparedness and training for the City, including UCR. While UCR has a Fire Prevention Program for its campus, the campus also maintains a Memorandum of Understanding with the State Fire Marshal to allow UC personnel to serve as local campus fire marshals, deputy fire marshals, and fire inspectors. As noted in the 2021 LRDP EIR, emergency responders maintain response plans that include use of alternate routes, sirens, and other methods to bypass congestion and minimize response times. Furthermore, California law requires drivers to yield to the right-of-way to emergency vehicles and remain stopped until the emergency vehicle passes.

The project site is already developed and within RFD's service area. Implementation of the proposed project would replace the existing UNEX building and parking structure with a much smaller facility. Development of the OASIS Park would not substantially increase the demand for fire protection services, nor would it require new fire facilities beyond those that exist or are already planned under the 2021 LRDP. The construction and operation of the proposed project would be required to comply with local and State fire safety regulations and no substantial increase in the need for fire protection services beyond those required for the existing site are anticipated. The proposed project would include installation of a fire water connection and fire hydrant. Fire department access would be provided within and around the project area in accordance with the Campus Fire Marshal and RFD standards and requirements. Other fire protection systems such as smoke detectors, fire sprinklers, fire extinguishers, appropriate building access, and emergency response notification systems would be incorporated into the proposed project. Therefore, the proposed project would be consistent with the fire protection services analysis and determination in the 2021 LRDP EIR; and proposed project impacts to fire protection services would remain **less than significant**.

a.ii) As mentioned above, police protection services were not further discussed in the 2021 LRDP EIR based on the analysis completed in the IS prepared for the 2021 LRDP. The campus is served by the University of California Police Department (UCPD), which has sufficient officers and staff to respond to all police related incidents on the campus. UCPD consistently evaluates the need for new officers due to campus population increases and can supplement its staff with officers from other agencies who have arrest authority under mutual aid agreements. Although the need for police facilities would incrementally increase in association with the increase in students, faculty, and staff under the 2021 LRDP, these facilities were anticipated to be part of the 896,229 asf (1,344,344 gsf) of new administrative and support facility space analyzed in the 2021 LRDP EIR. The IS prepared for the 2021 LRDP concluded impacts would be less than significant.

The proposed project would serve existing campus populations and add approximately 80 new faculty and staff to the campus population on a site that is currently developed and within UCPD's service area. This population addition is consistent with that anticipated under the 2021 LRDP and no increase in population would occur such that new police facilities would be required to serve the project. Therefore, the proposed project would be consistent with the police protection services analysis and determination in the IS prepared for the 2021 LRDP; and proposed project impacts to police protection services would remain **less than significant**.

a.iii) The 2021 LRDP EIR estimates that the growth in UCR students and faculty/staff under the 2021 LRDP could result in approximately 2,575 total new school age children that would attend schools in the Inland Southern California area by 2035. The 2021 LRDP EIR also notes that it is likely that some of these students would already attend schools prior to their parent/guardian attending UCR as a student or being employed as a member of faculty or staff. Future campus construction projects would be temporary and not require the relocation of construction workers or need for school facilities for their family members. The increase in school-aged children as a result of development under the 2021 LRDP was anticipated to be accommodated by existing and planned school facilities and impacts were determined to be less than significant.

The proposed project would accommodate approximately 180 students and 125 employees. The 180 students to be served by the project at any given time represent fewer or a similar number of students served by UNEX under LRDP baseline conditions, and therefore, would not increase the student population. Of the 125 anticipated employees, 80 would be new people employed by the Office of Technology Partnerships while the remaining 45 employees are already employed on or near campus. The 80 new employees associated with the project represent approximately 2.9 percent of the 2021 LRDP EIR-analyzed increase in faculty and staff and the increase is well within the overall 2021 LRDP faculty and staff population projections.

The number of school-aged children in the area could increase as a result of the proposed project's growth, but the increase would be minimal and within the increases anticipated in the 2021 LRDP EIR. The addition of school-aged children is anticipated to be accommodated by the school districts in the Inland Southern California area. Therefore, the proposed project would be consistent with the school services analysis and determination in the 2021 LRDP EIR; and proposed project impacts to public school services would remain **less than significant**.

a.iv) The 2021 LRDP impacts to parks and recreational facilities were discussed in Section 4.14, *Recreation*, of the 2021 LRDP EIR. Likewise, proposed project impacts on parks and recreational facilities are analyzed in Section 4.1.16, *Recreation*, of this Addendum.

a.v) The IS prepared for the 2021 LRDP concludes that the increased population anticipated under the 2021 LRDP would not require new or altered library or other public facilities beyond those facilities already proposed as part of the 2021 LRDP. Impacts associated with planned library facilities under the 2021 LRDP were analyzed throughout the 2021 LRDP EIR. Development under the 2021 LRDP was anticipated to have a less than significant impact related to other public facilities and was not further evaluated in the 2021 LRDP EIR.

The proposed project would increase the campus population by adding approximately 80 additional employees upon project completion. The 80 new employees associated with the project represent approximately 2.9 percent of the 2021 LRDP EIR-analyzed increase in faculty and staff and this increase is well within the overall 2021 LRDP faculty and staff population projections. All UCR students, faculty, and staff have access to the libraries on the campus (Tomás Rivera Library, the Orbach Science Library, and the Special Collections and University Archives) in addition to the City Main Library and its seven library branches, as well as the 39 libraries in the County Library System. The project does not propose new library facilities and would not induce unplanned campus population growth such that new library facilities would be required. Therefore, the proposed project would be consistent with the public facilities analysis and determination in the IS prepared for the 2021 LRDP; and proposed project impacts to public facilities, such as on- and off campus libraries, would remain **less than significant**.

4.1.16 RECREATION

Section 4.14 of the 2021 LRDP EIR addresses the environmental effects associated with modifying recreational facilities to meet the needs of campus growth under the 2021 LRDP. The 2021 LRDP EIR concludes that despite the increase in the usage of on- and off-campus recreational facilities anticipated from campus growth, implementation of the 2021 LRDP would not increase the use of neighborhood and regional parks or other recreational facilities such that substantial deterioration of existing facilities would occur or be accelerated. Impacts were determined to be less than significant.

The 2021 LRDP includes approximately 28.7 acres of land within the campus that are specifically designated Recreation & Athletics use, which would be developed to include new on-campus recreational facilities over the LRDP planning horizon to meet the anticipated needs of a larger campus population. Impacts associated with development of such recreational facilities were analyzed throughout the 2021 LRDP EIR and impacts were considered less than significant.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a) 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?	Less than Significant Impact	No	No	No	No mitigation required
b) Require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	Less than Significant Impact with applicable mitigation from other resource sections	No	No	No	No mitigation required

a-b) Population increases that would occur under the 2021 LRDP would result in increased demand for park and recreational facilities. The 2021 LRDP includes a Recreation & Athletics land use category that permits construction or expansion of recreational facilities to accommodate intercollegiate athletics and campus recreation, such as large-scale indoor and outdoor athletic facilities, playfields, and courts. The 2021 LRDP anticipates a net increase of 97,740 gsf of indoor recreation space and four additional outdoor fields. Additionally, the 2021 LRDP includes extensions of key bicycle and pedestrian networks to serve the needs of the campus community. While increased use of recreational facilities would occur given the anticipated population growth, regular maintenance and new facility construction would be funded by campus fee programs and physical deterioration of campus recreational facilities was not anticipated to occur. The maintenance of off campus recreational facilities would be funded by taxes collected by city and county jurisdictions, and the campus populations living off campus are not anticipated to grow such that substantial physical deterioration of recreational facilities would occur. The environmental effects of construction of new recreational facilities proposed under the 2021 LRDP were analyzed throughout the 2021 LRDP EIR and no additional mitigation measures were required to reduce impacts associated specifically with recreation facility construction. The 2021 LRDP EIR concludes impacts related to recreational facility deterioration and new construction would be less than significant.

The proposed OASIS Park would be constructed in an area that currently includes the UNEX building, parking structure, portions of surface parking lots, and associated hardscape and landscaped areas that are proposed to be demolished. No recreational facilities would be removed from the campus as a result of demolition proposed by the project. The project would provide a multimodal path for access between University Avenue to Everton Place by pedestrians, bicycles, and other micro-mobility vehicles, the construction impacts of which are considered as part of the project analyzed throughout this Addendum. Project construction activities would increase the number of construction workers on the campus but would not result in regional population increases since these workers would likely be existing construction employees and residents of the local region and are unlikely to relocate their households as a consequence of working on the site during the temporary construction activities. As such, construction would not result in population growth that would result in accelerated deterioration of or demand for recreational facilities.

The 2021 LRDP EIR states that future increases in UCR student, faculty, and staff population would be accommodated by neighborhood and regional parks in combination with the renovation and expansion of existing recreation facilities on the campus. The proposed project would accommodate approximately 80 new employees who would generally be from the local region, similar to that of the existing ExCITE program at downtown Riverside. Population growth considered and evaluated as part of the 2021 LRDP EIR assumed 35,000 students and 7,545 faculty/staff under the 2021 LRDP in 2035. The 80 new employees associated with the project represent approximately 2.9 percent of the 2021 LRDP EIR analyzed increase in faculty and staff and this increase is well within the overall 2021 LRDP faculty and staff population projections. Therefore, the proposed project would not result in an increase in demand for parks or recreational facilities beyond what was contemplated in the 2021 LRDP EIR. The proposed project would be consistent with the recreational facilities analysis and determination in the 2021 LRDP EIR; and proposed project impacts to recreational facilities would remain **less than significant**.

4.1.17 TRANSPORTATION

Section 4.15 of the 2021 LRDP EIR evaluates transportation impacts of campus growth under the 2021 LRDP. The 2021 LRDP EIR concludes that implementation of future projects under the 2021 LRDP would result in less than significant impacts to conflicts with policies addressing roadway, transit, bicycle, and pedestrian facilities; less than significant impacts to conflicts with CEQA Guidelines Section 15064.3, subdivision (b); and less than significant impacts to adequate emergency access with inclusion of CBP WF-1 and CBP WF-2. The 2021 LRDP EIR includes CBPs WF-1 and CBP WF-2 as conditions of individual project approval that would be implemented as applicable to address access in the event of a wildfire emergency. CBP WF-1 applies to construction of individual projects that require traffic control and/or implementation of alternative travel routes for campus roadways; as the project would not affect campus roadways, CBP WF-1 does not apply.

Implementation of the 2021 LRDP would result in significant and unavoidable impacts due to a substantial increase in hazards related to vehicle queueing at the I-215/SR 60 freeway southbound ramps at Martin Luther King Boulevard. The 2021 LRDP EIR states that an increase in campus population under AM Peak Hour Cumulative Plus Project conditions would result in an exceedance of freeway off-ramp queuing storage length. MM T-1 would be required to reduce the impacts of the 2021 LRDP development program to less than significant. However, UCR does not have jurisdiction over the identified intersection and freeway ramps, and any alteration would require an agreement from Caltrans. Therefore, physical improvements to the ramp queuing storage length could not be guaranteed at the time of 2021 LRDP EIR approval, and the potential impact was determined to remain significant and unavoidable under the 2021 LRDP EIR. Should Caltrans determine that this intersection queuing improvement is required, the University would coordinate with Caltrans.

The above-mentioned applicable CBP and MM state the following:

CBP WF-2 Construction – Alternative Travel Routes: Prior to campus construction activities and/or roadway closures, the Campus Fire Marshal, as delegated by the State Fire Marshal, and in cooperation with the City of Riverside Fire Department shall ensure that adequate access for emergency vehicles is provided or identify alternative travel routes.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a) Conflict with an applicable program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	Less than Significant Impact	No	No	No	No mitigation required
b) Conflict or be inconsistent with CEQA Guidelines Section 15064.3(b)?	Less than Significant Impact	No	No	No	No mitigation required
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	Significant and Unavoidable Impact (Cumulative)	No	No	No	No mitigation required at this time
d) Result in inadequate emergency access?	Less than Significant Impact	No	No	No	No mitigation required; CBP WF-2 as condition of approval

a) The 2021 LRDP EIR states that implementation of the 2021 LRDP would not physically disrupt existing pedestrian or bicycle facilities or interfere with implementation of planned pedestrian or bicycle facilities. Therefore, impacts were determined to be less than significant.

The proposed project could increase bicycle and pedestrian travel with the increase in employment population; however, the additional bicycle and pedestrian traffic would not physically disrupt existing pedestrian or bicycle facilities within and around the project site and the campus, nor interfere with the implementation of planned pedestrian or bicycle facilities under the 2021 LRDP. Pedestrian circulation and access to and from the project site would be provided by existing sidewalks and the project would provide a new north-south multimodal pathway connecting Everton Place to University Avenue.

Bicycle lanes that currently exist on both sides of University Avenue would be maintained. Existing transit service on University Avenue would continue to serve the project site and campus. The maintenance of the existing alternative transportation facilities (for cyclists and pedestrians) within and in the vicinity of the project site would be aligned and consistent with the UCR Transportation Demand Management Program and select objectives and policies of the 2021 LRDP.

Therefore, the proposed project would be consistent with the applicable circulation system programs, plans, ordinances, and policies as analyzed and determined in the 2021 LRDP EIR; and proposed project impacts to transportation and circulation systems would remain **less than significant**.

b) In accordance with CEQA Guidelines Section 15064.3(b), the following thresholds of significance were used in the 2021 LRDP EIR to determine VMT impacts associated with the 2021 LRDP, as well as the proposed project:

> A project would result in a significant project generated VMT impact if either of the following conditions are satisfied:
>
> - The Baseline Plus Project-generated VMT per Service Population exceeds 15 percent below the WRCOG baseline VMT per Service Population.
> - The Cumulative Plus Project-generated VMT per Service Population exceeds 15 percent below the WRCOG baseline VMT per Service Population.
>
> The proposed project's effect on VMT would be considered significant if it resulted in the following condition being satisfied:
>
> - The cumulative link-level boundary WRCOG region VMT per Service Population increases under the Cumulative Plus Project condition compared to Cumulative (2035) conditions.

The VMT analysis completed for the 2021 LRDP EIR reflects the number of vehicle-trips generated by the campus and the expected distance that drivers will travel to/from UCR for their work/school trips as well as other trips generated by campus visitors and students living in on-campus housing. The Riverside Traffic Analysis Model (RivTAM)[12] was used to develop VMT forecasts. UCR campus wide VMT was calculated for the following four scenarios:

- Baseline (2018) – A Fall 2018 baseline was selected for the transportation analysis. Campus population (student enrollment, on-campus residents, and faculty/staff employment) was incorporated in the Base Year RivTAM to establish the Baseline conditions for the transportation assessment.
- Baseline Plus Project – The net new increases in campus population associated with the 2021 LRDP were added to the Baseline conditions to develop Baseline Plus Project conditions.
- Cumulative (2035) Without Project – The Cumulative (2035) Without Project conditions were developed by including the 2018 Baseline campus conditions in combination with future cumulative growth outside of UCR using the Future Year RivTAM model.
- Cumulative Plus Project – The net new increases in campus development and population associated with the 2021 LRDP were added to the Future Year RivTAM to develop Cumulative Plus Project conditions.

The metric identified for the transportation analysis in the 2021 LRDP EIR is Total VMT per Service Population. This represents the daily VMT generated by UCR divided by the total number of employees, residential students, and commuter (nonresidential) students on the campus. The Baseline Plus Project and Cumulative Plus Project VMT per Service Population calculations were determined by measuring the UCR campus wide VMT with the inclusion of the 2021 LRDP population growth. These VMT measurements and associated calculations of VMT per Service Population were used to evaluate the VMT impact of the campus with the addition of the 2021

[12] The RivTAM is consistent with the 2016 SCAG Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) as described in the 2021 LRDP EIR.

LRDP development program conditions. This calculation methodology is reflective of the VMT generation characteristics of the campus with the inclusion of more students, faculty, and staff such as with implementation of the proposed project.

Since the new employees generated by the proposed project are minimal and within the growth projections for the 2021 LRDP, the project specific VMT results are expected to be consistent with those reported in the 2021 LRDP EIR as follows:

- The Baseline 2021 LRDP-generated VMT per Service Population of 17.65 does not exceed the threshold of 15 percent below WRCOG VMT per Service Population of 24.35, resulting in a less than significant impact in the 2021 LRDP EIR; therefore, the proposed project VMT impact is also considered less than significant.
- The Cumulative 2021 LRDP-generated VMT per Service Population of 19.93 does not exceed the threshold of 15 percent below WRCOG VMT per Service Population of 24.35, resulting in a less than significant impact in the 2021 LRDP EIR; therefore, the proposed cumulative project VMT impact is also considered less than significant.
- The 2021 LRDP effect on VMT per Service Population of 18.05 does not cause total VMT for the WRCOG region to exceed the future forecast from the SCAG RTP/SCS of 18.10 VMT per Service Population, resulting in a less than significant impact in the 2021 LRDP EIR; therefore, the proposed project VMT impact is also considered less than significant.

Similar to the 2021 LRDP, operation of the project would result in additional vehicular travel associated with increased population on the campus, but VMT would continue to be below regional thresholds. Therefore, the proposed project would be consistent with the operational VMT analysis and determination in the 2021 LRDP EIR; and proposed project impacts to regional VMT would remain **less than significant**.

c) The 2021 LRDP EIR states that development and circulation improvements would be completed such that changes would remain consistent with surrounding geometric design features and any redesign or construction of on-campus circulation paths would be designed and constructed to meet the Campus Construction and Design Standards. Project-specific construction management plans would be prepared in accordance with the California Manual on Uniform Traffic Control Devices which includes information related to truck routes and construction site access. Impacts were determined to be less than significant.

It is anticipated that construction access would be provided by the I-215/SR 60 freeways, University Avenue, and Everton Place. The proposed project's circulation elements would be designed and constructed to meet the Campus Construction and Design Standards and a construction management plan would be prepared. Therefore, the proposed project would be consistent with the construction roadway analysis and determination in the 2021 LRDP EIR; and proposed project impacts to construction site access management would remain **less than significant**.

The 2021 LRDP EIR states that existing farm equipment movement processes, procedures, and safety measures would remain the same as existing conditions under the 2021 LRDP; and impacts to roadway compatibility between existing and anticipated uses under the 2021 LRDP would be less than significant. The proposed project would not result in incompatible roadway or circulation system use since anticipated modes of project-specific transportation (vehicular, pedestrian, and bicycle) are compatible with and supported by existing roadway and transportation facilities within the project site and campus. Therefore, the proposed project would be consistent with the incompatible uses analysis and determination in the 2021 LRDP

EIR; and proposed project impacts to existing on- and off campus circulation systems would remain **less than significant**.

The proposed project would be constructed in such a way that roadway and accessway changes would remain consistent to the surrounding geometric design features, and would be designed and constructed to meet the Campus Construction and Design Standards in a manner that is consistent with the intent of the 2021 LRDP. The 2021 LRDP EIR also considers transportation impacts resulting from freeway off-ramp queueing. Under *Baseline (2018)* conditions, the I-215/SR 60 freeway southbound ramp queueing with the 2021 LRDP was found not to exceed 85 percent of the storage length for any of the freeway off-ramps. Since the proposed project population growth is consistent with overall campus growth contemplated in the 2021 LRDP analysis, proposed project impacts on the I-215/SR 60 freeway southbound ramp queueing would be consistent with the conclusions in the 2021 LRDP EIR and would also not exceed 85 percent of the storage length for any of the freeway off-ramps under *Baseline (2018)* conditions.

Under *Cumulative (2035)* conditions with the 2021 LRDP, freeway ramp queueing was found to exceed 85 percent of the storage length at the I-215/SR 60 freeway southbound ramps at Martin Luther King Boulevard. Since the proposed project would contribute to an increase in UCR campus-generated traffic under *Cumulative (2035)* conditions, the proposed project would also contribute to the impact related to AM peak hour queueing at the I-215/SR 60 freeway southbound ramps at Martin Luther King Boulevard. However, growth associated with the project would be consistent with that anticipated and analyzed in the 2021 LRDP EIR and no substantial increase in the severity of the cumulative traffic impact would occur under the project. The 2021 LRDP EIR identifies MM T-1, which is intended to improve the intersection of the I-215/SR 60 freeway southbound ramps and reduce the severity of the queuing storage deficiency; however, as the 2021 LRDP EIR states, the implementation of MM T-1 remains uncertain since UCR does not have jurisdictional control over the I-215/SR 60 freeway southbound ramp intersection and any physical improvement would require an agreement with Caltrans. Consistent with the 2021 LRDP EIR, the project would not implement **MM T-1** given UCR's lack of jurisdictional control at this intersection. Should Caltrans determine that this intersection queueing improvement is required, UCR would coordinate with Caltrans.

The proposed project would be consistent with the geometric design features analysis and determination in the 2021 LRDP EIR; however, cumulative transportation impacts related to geometric design features would remain **significant and unavoidable** as identified in the 2021 LRDP EIR.

d) The 2021 LRDP EIR states that the 2021 LRDP would not result in major changes to existing access points or circulation paths. As such, emergency access would remain adequate with implementation of the 2021 LRDP. During construction, adherence to the Campus Construction and Design Standards would be required and would ensure adequate emergency access is maintained. The 2021 LRDP EIR concluded impacts related to emergency access would be less than significant.

Similar to the 2021 LRDP EIR analysis, the proposed project would not include major changes to existing access points or on-campus circulation paths that would result in inadequate emergency access. All proposed circulation and access improvements would adhere to Campus Construction and Design Standards. One of the existing driveways along Everton Place may be shifted to align with the proposed multimodal pathway and a new driveway may be proposed towards the end of the Everton Place cul-de-sac to provide access to Parking Lots 50 and 51. Emergency access to the project site would continue to be provided via ingress/egress routes along University Avenue and Everton Place. Proposed emergency access to and within the project site, as well as fire truck hose pull requirements, as required by the Fire Code, would be reviewed and approved by the Campus Fire Marshal. The Campus Fire Marshal would disclose roadway closures associated with project construction to the City Fire Department and identify alternative travel routes, if necessary, in accordance with **CBP WF-2**. CBP WF-1 applies only to campus roadways and would not apply to the proposed project; however, similar conditions to maintain traffic lanes and provide the necessary traffic controls on off-campus roadways would be applied to the project. Therefore, the proposed project would be consistent with the emergency access analysis and determination in the 2021 LRDP EIR; and proposed project impacts to emergency access roads would remain **less than significant**.

4.1.18 TRIBAL CULTURAL RESOURCES

Section 4.16 of the 2021 LRDP EIR evaluates TCR impacts with development facilitated by the 2021 LRDP. The 2021 LRDP EIR concludes that implementation of future projects under the 2021 LRDP would result in potential impacts to TCR but would be reduced to a level below significance with incorporation of MM CUL-2 through MM CUL-4.

The above-mentioned applicable MMs state the following:

MM CUL-2 Tribal Cultural Resources/Archaeological Monitoring: Prior to commencement of ground disturbing activities into an area with a medium or high potential to encounter undisturbed native soils including Holocene alluvium soils, as determined by UCR, UCR shall hire a qualified archaeological monitor meeting the Secretary of the Interior's Professional Qualification Standards for archaeology (National Park Service 1983) to identify archaeological resources and cultural resources of potential Native American origin. Where development occurs in the southeastern quadrant of campus, and in areas containing Val Verde Pluton geologic features considered highly sensitive to prehistoric archaeological resources, UCR shall hire a qualified archaeologist and a Native American monitor to reduce impacts to potential archaeological and/or tribal cultural resources. The monitor(s) shall be on-site during any construction activities that involve ground disturbance. The on-site monitoring shall end when project-related ground disturbing activities are completed, or, in consultation with the lead agency and tribes as appropriate and based on observed conditions, monitoring may be reduced or eliminated prior to completion of ground-disturbing activities, when the monitor(s) has indicated that the project site has a low potential to encounter tribal cultural resources (TCR)/archaeological resources. Consolidated monitoring efforts (e.g., archaeological monitoring/tribal cultural/paleontological monitoring) may occur if the individual monitor meets the applicable qualifications, except for development in the southeastern quadrant as detailed above.

MM CUL-3 Construction Worker Training: For projects requiring TCR/archaeological monitoring, the monitor shall provide preconstruction training for all earthmoving construction personnel prior to the start of any ground disturbing activities, regarding how to recognize the types of TCRs and/or archaeological resources that may be encountered and to instruct personnel about actions to be taken in the event of a discovery. UCR Planning, Design & Construction Project Manager/contractor shall retain documentation showing when training of personnel was completed.

MM CUL-4 Unanticipated Discovery of Tribal Cultural Resources/Archaeological Resources: If previously undiscovered TCRs and/or archaeological resources are identified during construction, all ground disturbing activities within 100 feet of the resource shall halt, UCR Planning, Design & Construction staff shall be notified, and the find shall be evaluated by a qualified archaeologist meeting the Secretary of the Interior standards to determine whether it is a unique archaeological resource, as defined by CEQA. If the discovery appears to be Native American in origin, a tribal representative will be contacted within 24 hours of discovery to determine whether it is a TCR, as defined by CEQA. If the find is neither a unique archaeological resource nor a TCR, work may resume. If the find is determined to be a unique archaeological resource or TCR, the archaeologist and the tribal representative, as appropriate, shall make recommendations to UCR Planning, Design & Construction staff on the measures that will be implemented, including, but not limited to, preservation in place, excavation, relocation, and further evaluation of the discoveries pursuant to CEQA. Preservation in place (i.e., avoidance) is the preferred method of mitigation for impacts to TCRs/archaeological resources. If UCR determines that preservation in place is not feasible, the archaeologist shall design and implement a treatment plan, prepare a report, and salvage the material, as appropriate. Any important artifacts recovered during monitoring shall be cleaned, catalogued, and analyzed, with the results presented in a report of findings that meets professional standards. Work on-site may commence upon completion of any fieldwork components of the treatment plan.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 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:					
i) 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)?	Discussion pertaining to project impacts on historical resources are discussed in criterion a in Section 4.1.5, *Cultural Resources*, of this Addendum.				

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
ii) 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 Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?	Less than Significant Impact with Mitigation Incorporated	No	No	No	MM CUL-2 through MM CUL-4

a-i) The 2021 LRDP EIR discussed impacts to historical resources in Section 4.5, *Cultural Resources*. Likewise, discussion pertaining to project impacts on historical resources are discussed under criterion a in Section 4.1.5, *Cultural Resources*, of this Addendum.

a-ii) The 2021 LRDP EIR states that the southeastern portion of the LRDP area is considered to have high sensitivity for encountering TCR. The majority of the areas considered to have a high sensitivity for encountering TCR are within the 2021 LRDP land use designation of Open Space Reserve or UCR Botanic Gardens. Areas within the northern portions of East Campus, where a majority of infill development or expansion under the 2021 LRDP is anticipated, have low TCR sensitivity. Areas with potential for new development on West Campus would primarily occur within infill sites that have previously primarily been used for agricultural uses and generally have low tribal cultural sensitivity. No known TCR sites would be disturbed during implementation of the 2021 LRDP. The 2021 LRDP EIR determined that TCR impacts would be less than significant with incorporation of MM CUL-2 through MM CUL-4.

The OASIS Park site is not located adjacent to areas designated as Open Space Reserve or UCR Botanic Gardens under the 2021 LRDP, which are areas with high cultural sensitivity. Rather, the OASIS Park site is an infill project located within the University Avenue Gateway LRDP land use designation, which was generally assessed as a low tribal cultural sensitivity area in the 2021 LRDP EIR. Geotechnical investigations conducted for the proposed project indicated that the site is underlain by 1 to 8 feet of undocumented fill that varies in thickness across the site, with an average depth of approximately 3.5 feet (see Geotechnical Investigation Report in Appendix C). The undocumented fill is underlain by alluvial fan deposits, which have the potential to contain undiscovered TCRs, as cited in the 2021 LRDP EIR. **MM CUL-2 through CUL-4**, as identified in the

2021 LRDP EIR, and measures included in the Campus Construction and Design Standards pertaining to the treatment of previously undiscovered TCRs would apply to the proposed project in the event unanticipated TCRs are discovered, to ensure proper handling, notification, and documentation. Therefore, the proposed project would be consistent with the TCR analyses and determination in the 2021 LRDP EIR; and proposed project impacts to TCR would remain **less than significant** with incorporation of **MM CUL-2 through MM CUL-4**.

4.1.19 UTILITIES AND SERVICE SYSTEMS

Section 4.17 of the 2021 LRDP EIR addresses the impacts of campus growth on water supplies; wastewater conveyance, treatment, and disposal; solid waste disposal; stormwater management; and telecommunications facilities. The 2021 LRDP EIR concludes that any future development under the 2021 LRDP would result in less than significant impacts to utilities, as construction-related impacts resulting from expanded facilities would be temporary and would be consistent with the impacts described throughout the 2021 LRDP EIR. Increased water demand that would result from campus growth are accounted for under the RPU 2015 Urban Water Management Plan (UWMP) and the City's Regional Water Quality Control Plant (RWQCP) has adequate capacity to treat anticipated wastewater generation. Development under the 2021 LRDP would not generate solid waste in excess of State or local standards and associated infrastructure capacity. Impacts were considered less than significant. Potential effects related to water quality, groundwater, and drainage patterns are discussed in Section 4.1.10, *Hydrology and Water Quality*, of this Addendum.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
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, the construction or relocation of which could cause significant environmental effects?	Less than Significant Impact	No	No	No	No mitigation required
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple-dry years?	Less than Significant Impact	No	No	No	No mitigation required
c) Result in a determination by the waste water 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?	Less than Significant Impact	No	No	No	No mitigation required

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	Less than Significant Impact	No	No	No	No mitigation required
e) Comply with federal, State, and local management and reduction statues and regulations related to solid waste?	Less than Significant Impact	No	No	No	No mitigation required

a) The 2021 LRDP EIR states that implementation of the 2021 LRDP may require the relocation or construction of new or expanded utilities infrastructures to support anticipated growth in the number of students, faculty, and staff as well as UCR programs. Impacts were determined to be less than significant.

Development of the proposed project would occur where existing campus development is connected to utility facilities, including for water supply, wastewater treatment, storm water drainage, electric power, and telecommunications. All connections would be implemented during project construction, which would result in temporary impacts, be located within developed/disturbed areas, and implement BMPs and MMs as described throughout this Addendum.

Water and Wastewater Facilities

The campus has a combined fire and domestic water system that is sufficient to serve the proposed project. RPU provides potable water to the campus, which is used both in buildings and for landscape irrigation. In addition, UCR has a private on-campus water system that conveys potable water throughout the campus, as needed. All potable water, fire water, and irrigation water supplies are distributed to the project site through the City's existing domestic water system. The project would not require upgrades to the existing laterals for domestic water service but would require installation of a new fire water line, backflow preventer, and fire hydrant (refer to the Water Capacity Study in Appendix G). Impacts associated with construction of these facilities are described throughout this Addendum.

The irrigation system would meet or exceed the State of California Model Efficient Landscape Ordinance (AB 1881 requirements) and the UCR requirements for a water efficient landscape. Dedicated site irrigation for the proposed project site would be provided from the existing domestic water lateral line, water meter, and backflow preventer at the property line adjacent to University Avenue.

The City's Sewage Systems Services Program and Treatment Services unit collects, treats, and disposes of all wastewater generated by the UCR campus, including the project site. An existing sewer lateral connects the UNEX building to a sewer main in University Avenue. The project would construct branches to this lateral within the project footprint to accommodate proposed wastewater flows (refer to the Sewer Capacity Study in Appendix H). Impacts associated with construction of these facilities are described throughout this Addendum.

Stormwater Drainage Facilities

Please refer to the analysis of drainage provided under Section 4.1.10, *Hydrology and Water Quality*, of this Addendum. In summary, the analysis concluded that operation of the proposed project would not exceed the capacity of the existing storm drain system given the proposed decrease in impervious surface area, and there would be a less than significant impact.

The existing site generally drains to the northwest, where runoff is discharged to University Avenue. The proposed project would generally maintain this drainage pattern and would install new stormwater bioretention basins to capture and treat runoff. All UC campuses are regulated under the Phase II MS4 Permit, and the campus is additionally regulated under the UCR's SWMP. Stormwater management measures (e.g., flow-through planters, bio-swales, bio filtration stormwater planters) would be incorporated into the project design in compliance with permit requirements. Impacts related to stormwater drainage facilities would be less than significant.

Electric Power and Natural Gas Facilities

The proposed project's energy demands would be met through purchased electricity and/or renewable energy sources and would not use natural gas (see Section 4.1.6, *Energy,* of this Addendum). In summary, the proposed project is required to follow energy conservation policies listed in the 2023 SPP, minimize energy use in order for the campus to attain the GHG reduction goals, and comply with future conservation goals or programs enacted by the UC. The proposed project is estimated to require up to 2.5 Mega Volt Amps, representing an increase in electric demand from the existing building. Existing RPU medium voltage switches at the south edge of Parking Lot 51 would be utilized to accommodate the proposed project and would require undergrounding from these switches to the proposed transformer location at the southwestern corner of the proposed building(s) (refer to the Electrical Will Serve Letter in Appendix I). No new public electric facilities would be required to accommodate project electricity demand and the environmental impacts associated with electric connections required for the project have been described throughout this Addendum. Therefore, there would be a less than significant impact related to construction of new or expanded electrical infrastructure or the inefficient use of energy.

Telecommunications Infrastructure

The proposed project would use telecommunications/signals from the existing distribution conduit located within Parking Lots 50 and 51; minor telecommunications improvements may be required to provide connections within the proposed building(s). Impacts associated with these minor improvements have been analyzed throughout this Addendum and would be less than significant.

As described throughout this response, the proposed project would be consistent with the utilities services analyses and determinations in the 2021 LRDP EIR; and proposed project impacts to utility services would remain **less than significant**.

b) The 2021 LRDP EIR states that implementation of the 2021 LRDP would result in a net increase in water demand on the campus of approximately 579 acre feet per year (AFY) based on a per capita water use rate, and that this increase is accounted for in the RPU's 2015 UWMP. Based on the increase in building area, an increase in water consumption of up to 825 AFY could occur with the 2021 LRDP. At the time of the preparation of the 2021 LRDP EIR, RPU was updating its UWMP for 2020 but had not yet released the plan. While the 2015 UWMP estimated 95,221 AFY for the City in 2020, the actual demand in 2020 was 81,338 AFY (RPU 2016; RPU 2021). The 2020 UWMP anticipates a supply average of at least 20,000 AFY greater than demand for normal, one dry year, and multiple dry years until the year 2045 (RPU 2021). Additionally, RPU provided a future water demand letter during the 2021 LRDP EIR efforts (UCR 2021b), which noted that it anticipates RPU will have adequate water supplies to meet UCR's proposed 2021 LRDP increased demand. Therefore, the increased water demand anticipated to occur under the 2021 LRDP is accounted for in the most recent water supply projections for the City. Impacts were determined to be less than significant.

Implementation of the proposed project would decrease total building area and domestic water demand would be decreased from existing conditions (refer to the Water Capacity Study in Appendix G). As such, the project would result in a decrease in water demand projections from the levels anticipated in the 2021 LRDP EIR and 2020 UWMP. Furthermore, the proposed project would comply with the 2023 SPP by including minimum LEED Gold features in project design, including those that enhance water efficiency. Therefore, the proposed project would be consistent with the water demand analysis and determination in the 2021 LRDP EIR; and proposed project impacts to water demand and use would remain **less than significant**.

c) The 2021 LRDP EIR states that wastewater generated by implementation of the 2021 LRDP would be treated at the RWQCP, which has adequate capacity to serve the 2021 LRDP's anticipated wastewater generation in addition to existing treatment commitments. The design capacity of the RWQCP is 46 million gallons per day, which is well above the anticipated 39 million gallons per day wastewater flow by the year 2037. Impacts were determined to be less than significant.

Proposed project implementation would decrease the total building area on the site and wastewater generation would be decreased from existing conditions (Appendix H). As such, the existing sewer system and treatment infrastructure would have sufficient capacity to accommodate project-generated wastewater flows. Therefore, the proposed project would be consistent with the wastewater analysis and determination in the 2021 LRDP EIR; and proposed project impacts to wastewater treatment would remain **less than significant**.

d-e) The 2021 LRDP EIR states that implementation of the 2021 LRDP would not generate solid waste in excess of State or local standards, or in excess of the existing infrastructure capacity. Furthermore, the 2021 LRDP would not impair UCR's attainment of solid waste reduction goals, and projects under the 2021 LRDP would comply with federal, State, and applicable local statutes and regulations pertaining to solid waste. Impacts were determined to be less than significant.

Project implementation would require demolition and grading activities that would produce excavated soils, green waste, asphalt/concrete, and other construction and demolition waste. Project operations would contribute to additional non-recyclable/non-reusable waste that would be deposited at the CR&R Perris Transfer Station and Material Recovery Facility, which has a maximum permitted daily capacity of approximately 3,287 tons per day. Project demolition is expected to produce approximately 16,135 tons of debris, which would result in an estimated 134.5 tons of debris per day over the 120-day demolition phase of construction, well within the daily permitted capacity of the facility. Additionally, the handling of all debris and waste generated during construction would be subject to the latest California Green Building Standards Code requirements and the California Integrated Waste Management Act of 1989.

Project operations would result in an increase of solid waste generation associated with 80 new employees. Based on the per capita waste generation rate of 0.85 tons per year provided in the 2021 LRDP EIR, the proposed project would result in an increase of solid waste generation of 0.2 tons per day. This value is well within the anticipated increase of 9.7 tons per day of solid waste anticipated within the 2021 LRDP, and these values do not account for UCR's waste/source reduction and recycling program which includes sorting and separating wastes and the expansion of composting procedures. UCR implements a waste/source reduction and recycling program that includes sorting and separating wastes to simplify the removal of recyclable materials and the expansion of composting procedures associated with landscaping and agriculture to reduce the solid waste flow. The campus has constructed a transfer station on the West Campus north of Parking Lot 30, where UCR collects the recyclables and waste on campus, including from the project site, and delivers these materials to the transfer station for hauling. A third-party vendor picks up the recyclable material for recycling. UCR delivers waste in UCR haul trucks to the Nelson Transfer Station from which Burrtec Waste Industries then transports 100 percent of the non-recyclable material to waste-to-energy facility. UCR composts all green waste on campus.

The proposed project would implement features of the 2023 SPP, which directs UCR to reduce total per capita municipal solid waste generation by 25 percent and 50 percent from 2015/2016 levels by 2025 and 2030, respectively. The proposed project would comply with all federal, State, and UC statues and regulations related to solid waste. The proposed project would not generate solid waste in excess of State or local standards or negatively impact the provision of solid waste services or impair attainment of solid waste goals, and the proposed project would comply with all federal, State, and local management regulations related to solid waste. Therefore, the proposed project would be consistent with the solid waste management analysis and determination in the 2021 LRDP EIR; and proposed project impacts to solid waste management would remain **less than significant**.

4.1.20 WILDFIRE

Section 4.18 of the 2021 LRDP EIR addresses impacts to wildfire and concludes that impacts to wildfire would be less than significant with implementation of CBP WF-1, CBP WF-2, and MM WF-1. Implementation of the CBPs and MM WF-1 were determined to reduce future impacts of development under the 2021 LRDP related to wildfire to less than significant levels. MM WF-1 applies to UCR's Emergency Operations and Response Plan and does not require action at the project level. CBP WF-1 applies to campus roadways, which would not be affected by project construction.

The above-mentioned applicable CBP states the following:

CBP WF-2 Construction – Alternative Travel Routes: Prior to campus construction activities and/or roadway closures, the Campus Fire Marshal, as delegated by the State Fire Marshal, and in cooperation with the City of Riverside Fire Department shall ensure that adequate access for emergency vehicles is provided or identify alternative travel routes.

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR MMs to Address Project-Specific Impacts
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	Less than Significant Impact	No	No	No	No mitigation required; CBP WF-2 as condition of approval
b) Exacerbate wildfire risks due to slope, prevailing winds, and other factors and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	Less than Significant Impact	No	No	No	No mitigation required
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	Less than Significant Impact	No	No	No	No mitigation required
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	Less than Significant Impact with Mitigation Incorporated	No	No	No	No mitigation required

a) The 2021 LRDP EIR states that implementation of the 2021 LRDP could result in temporary lane or roadway closures on the edges of and within the campus during construction activities. Operation of new facilities developed under the 2021 LRDP would not substantially impair an adopted emergency response or evacuation plan. Impacts were determined to be less than significant.

As shown on Figure 4.18-1 in the 2021 LRDP EIR, the OASIS Park site is not located within a Very High Fire Hazard Severity Zone (VHFHSZ) in a State or Local Responsibility Area (California Department of Forestry and Fire Protection [CAL FIRE] 2009). The proposed project would be developed on a site that has access from University Avenue and Everton Place (off-campus roadways). As stated in the 2021 LRDP EIR, University Avenue is a designated evacuation route in the City's General Plan Public Safety Element (City 2021). As part of the proposed project, the improvements at the University Avenue and University Village intersection would be modified and a crosswalk would be restriped within Everton Place. Consistent with the 2021 LRDP EIR, the proposed project would be required to comply with the UCR Emergency Operations Plan/Emergency Action Plan (UCR 2023b) and to develop and maintain a construction management plan including information related to truck route details, potential road closures/detours, and emergency access. The Campus Fire Marshal would review this plan along with all plans during the plan review process to ensure the project site provides adequate ingress/egress for emergency vehicles, fire lanes, and fire protection (e.g., fire hydrants, sprinklers) with development of the proposed project. In addition, UCR has included CBP WF-1 and CBP WF-2 as conditions of project approval for projects under the 2021 LRDP to ensure traffic controls and alternative travel routes are available during construction activities. CBP WF-1 applies only to campus roadways and would not apply to the project; however, similar conditions to maintain traffic lanes and provide the necessary traffic controls on off-campus roadways would be applied to the project. Therefore, implementation of a construction management plan and **CBP WF-2** would ensure that, although project construction could result in temporary road closures off campus, construction of the project would not substantially alter or otherwise interfere with evacuation routes.

Operation of the proposed project would not alter or interfere with public rights-of-way and would provide access for emergency response vehicles to the OASIS Park site. Development and construction of the proposed project would comply with CBC/California Fire Code and with all existing regulations for on-site vegetation and fuel management to maintain clearance around the proposed building(s) and structures. Therefore, the proposed project would be consistent with the emergency response and evacuation plan analysis and determination in the 2021 LRDP EIR; and proposed project impacts would remain **less than significant**.

b) The 2021 LRDP EIR states that development proposed under the 2021 LRDP could result in exposure of project occupants to pollutants from a wildfire; however, the 2021 LRDP would not result in exacerbation of existing conditions that would result in the uncontrolled spread of wildfire. The majority of campus land within a VHFHSZ are designated for Open Space Reserve or UCR Botanic Gardens and development under the 2021 LRDP within a VHFHSZ would occur on flat or slightly hilly areas rather than steep slopes with greater fire risk. All development under the 2021 LRDP would be required to comply with applicable fire prevention regulations, including the California Fire Code, CBC, and California Health and Safety Code. Impacts were determined to be less than significant.

As shown on Figure 4.18-1 in the 2021 LRDP EIR, the proposed project site is not located within a VHFHSZ in a State or Local Responsibility Area (CAL FIRE 2009). Further, the project site is within West Campus where there are no VHFHSZs. The proposed infill development project would be subject to UCR's wildfire prevention actions, such as fuel clearance and current Fire Codes, thus providing increased fire safety and reducing the potential for wildfire risk. The plant material installed for project landscaping would generally consist of native and adaptive species that require low water use and low maintenance, consistent with the Campus Design and Construction Standards. UCR Facilities Services – Landscape Services would review and approve all tree and plant palettes to ensure the selected species are acceptable tree and plant materials.

The Campus Fire Marshal would ensure that there is proper storage, handling, and use of any hazardous materials during construction activities. Additionally, construction activities would be required to follow fire safety protocols, including but not limited to on-site fire extinguishing equipment and compliance with Fire Code Chapter 33, and all construction equipment would be subject to standard operating procedures that would limit sources of ignition that could generate a wildfire. The proposed project would also have to be designed and constructed in adherence to Campus Construction and Design Standards and building codes, including the UCR Fire Prevention and Life Safety Policy and would be subject to Fire Code review and inspection by UCR's Building and Safety Division, Fire Prevention, EH&S, Office of Emergency Management, the Campus Fire Marshal, and/or other applicable UCR departments and staff. This includes approval of plans and specifications to verify compliance with applicable codes, including updated fire safety standards. The proposed project includes fire protection (e.g., fire hydrants, fire sprinklers) and fire access for emergency vehicles. The proposed project would not exacerbate wildfire risks over existing conditions and the project would not increase the risk of project occupant exposure to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. Therefore, the proposed project would be consistent with the wildfire risk analysis and determination in the 2021 LRDP EIR; and proposed project impacts would remain **less than significant**.

c) The 2021 LRDP EIR states that new or updated infrastructure would be concentrated on developed portions of the campus, and that the installation of underground utilities would decrease fire risks during implementation of the 2021 LRDP. Impacts were considered less than significant.

As shown on Figure 4.18-1 in the 2021 LRDP EIR, the proposed project site is not located within a VHFHSZ in a State or Local Responsibility Area (CAL FIRE 2009). Consistent with the 2021 LRDP EIR, no construction period impacts related to wildfire risk from infrastructure would occur. Development of the proposed project would include new pedestrian pathways, a pick-up/drop-off area, accessible parking, fire and service access, underground utility connections, emergency water sources, fuel breaks, and other associated infrastructure. As anticipated in the 2021 LRDP EIR, these infrastructure improvements would occur within developed portions of campus and electrical connections would be undergrounded. In addition, fire protection infrastructure including a fire water line, backflow preventer, and fire hydrant would be installed and would reduce fire risk by providing increased access to emergency services and fire protection. Infrastructure improvements proposed by the project would not exacerbate fire risk. Access to the project site is provided at existing roadways (University Avenue and Everton Place) under existing conditions and would remain with implementation of the proposed project. Therefore, the proposed project would be consistent with the infrastructure wildfire risk analysis and determination in the 2021 LRDP EIR; and proposed project impacts to infrastructure wildfire risk would remain **less than significant**.

d) The 2021 LRDP EIR concludes that slope stability hazards are considered negligible on the majority of campus due to its very flat to moderately flat topography. Even areas of the East Campus, though adjacent to natural hillsides, have low landslide risks due to the alluvial soils and bedrock that underlie most of the campus. However, burned slopes have a greater risk of landslide and slope instability could occur on East Campus in the event of a wildfire; therefore, the 2021 LRDP EIR incorporated MM WF-1 to minimize landslide risks in the event of wildfire and impacts were reduced to a less than significant level.

As shown on Figure 4.18-1 in the 2021 LRDP EIR, the proposed project site is not located within a VHFHSZ in a State or Local Responsibility Area (CAL FIRE 2009). The project site does not contain and is not adjacent to steep slopes. All project construction activities would comply with NPDES requirements to prepare and implement a SWPPP for site stormwater discharges, which would ensure that the proposed project would not destabilize soils such that there are significant risks related to post-fire landslide or debris flow. The project site would remain relatively flat, as it is under existing conditions, and no slope instability risks are anticipated to occur in the event of wildfire. MM WF-1 applies to policies within the UCR Emergency Operations and Response Plan and does not apply at the project level. Therefore, the proposed project would be consistent with the slope stability and post-fire management analyses and determination in the 2021 LRDP EIR; and proposed project impacts to slope stability and post-fire management would be **less than significant**.

4.1.21 MANDATORY FINDINGS OF SIGNIFICANCE

Would the proposed project:	2021 LRDP EIR Significance Conclusion	Do Proposed Changes Require Major Revisions to the 2021 LRDP EIR?	Do New Circumstances Require Major Revisions to the 2021 LRDP EIR?	Is there Any New Information Resulting in New or Substantially More Severe Significant Impacts?	Applicable 2021 LRDP EIR Mitigation Measures to Address Project-Specific Impacts
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?	Significant and Unavoidable Impact	No	No	No	MM BIO-2 through MM BIO-4; MM CUL-2 through MM CUL-4; MM GEO-1 and MM GEO-2
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)?	Significant and Unavoidable Impact	No	No	No	MM GHG-1; MM N-1
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	Significant and Unavoidable Impact	No	No	No	MM HAZ-1 and MM HAZ-4; MM N-1; CBP WF-2

a) All applicable MMs identified in the 2021 LRDP EIR to avoid and reduce impacts to the environment have been integrated into the proposed project. As described in Section 4.1.4, *Biological Resources*, of this Addendum, the proposed project would not significantly affect fish or wildlife habitat or species. The project site is developed and/or previously disturbed and mostly devoid of sensitive biological resources, except existing trees that serve as potential nesting/roosting locations for birds and bats, impacts to which would be addressed by 2021 LRDP EIR MMs. In accordance with **MM BIO-2 and MM BIO-4**, surveys would occur prior to project construction to identify nesting birds or bats within the project area. If these wildlife species are determined to be present on the project site, subsequent measures, such as avoidance, passive relocation, temporary noise barriers, etc. outlined in **MM BIO-2 and MM BIO-4** would be implemented. **MM BIO-3** requires project design to incorporate bird strike avoidance measures. The proposed project would not 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, or substantially reduce the number or restrict the range of a rare or endangered plant or animal. Impacts to biological resources would be **less than significant with mitigation incorporated** and would be consistent with the biological resources analyses and determinations in the 2021 LRDP EIR.

As described in Section 4.1.5, *Cultural Resources*, and Appendix B of this Addendum, the project site does not contain listed or eligible historical resources or other historically significant features. The existing UNEX building and parking structure would be demolished to construct the proposed OASIS Park facility. The original hotel building was constructed in 1968, which falls outside the periods associated with UCR's postwar growth (1953 through 1967). The building was designed in a common Modernist style that is not representative of the extensive Mid-Century Modern core of campus or distinctive collections of Mid-Century Modern facilities in Riverside County. The building is not associated with a prominent individual who played a significant role in the University's founding, development, or achievements, and does not represent an important example of a major period of UCR campus or Riverside County history. Consistent with the conclusion of the 2021 LRDP EIR and associated UCR Historic Resources Survey, the UNEX building is not deemed eligible for listing on the CRHR or NRHP and is not considered a historical resource. The proposed project would not eliminate important examples of the major periods of California history and associated impacts would be **less than significant**.

Soils underlying the project site have high paleontological sensitivity. UCR's standard contract specifications address the protection and recovery of buried archaeological resources, including human remains, and paleontological resources as noted in **MM CUL-2 through MM CUL-4, MM GEO-1, and MM GEO-2**. These measures identify steps to be taken in the event archaeological resources and/or tribal cultural resources, including human remains, or paleontological resources are discovered during ground disturbing activities. As such, the proposed project would have a **less than significant impact with mitigation incorporated** on archaeological resources, tribal cultural resources, and paleontological resources and would be consistent with the analyses provided in the 2021 LRDP EIR.

b) The 2021 LRDP EIR identifies cumulatively significant impacts to aesthetics (impacts to scenic vistas), agriculture (loss of Farmland), air quality (contribution of ROG and NO_x from construction emissions; contribution of ROG, NO_x and PM_{10} from operational emissions), cultural resources (impacts to historical resources), GHG emissions (contribution to GHG emissions), noise (construction noise), and transportation (hazardous intersection queuing). As part of implementing the 2021 LRDP, the proposed project would contribute to some of these **significant and unavoidable cumulative impacts**, including air quality, GHG emissions, noise, and transportation. However, the proposed project is within the scope of campus development and population evaluated in the 2021 LRDP EIR, as described in Section 3 of this Addendum.

These impacts were also addressed in the Findings and Statement of Overriding Considerations adopted by the Regents with their certification of the 2021 LRDP EIR. No conditions have changed, and no new information has become available since certification of the 2021 LRDP EIR that would alter the previous analysis relative to the proposed project. The project would implement applicable mitigation measures from the 2021 LRDP EIR (**MM GHG-1 and MM N-1**), which would reduce the project's contribution to the cumulative air quality, GHG emissions, and noise impacts previously identified in the 2021 LRDP EIR. The proposed project would not result in new significant cumulative effects and no additional mitigation is required.

c) As described above, the proposed project would incrementally contribute to cumulative air quality (ROG and NO_x from construction emissions and contribution of ROG, NO_x, and PM_{10} during operational emissions) and construction noise impacts, which were identified as significant and unavoidable as well as cumulatively significant in the 2021 LRDP EIR. The proposed project's construction and operation emissions are within the scope of impacts examined in the 2021 LRDP EIR and, as described further in Section 4.1.3, *Air Quality*, would not result in exposure of sensitive receptors to substantial pollutant concentrations. Significant and unavoidable impacts related to construction noise would occur temporarily and be reduced to the extent feasible with incorporation of **MM N-1**.

The project would incorporate **CBP WF-2** to ensure circulation remains adequate in the event of an emergency and **MM HAZ-1 and MM HAZ-4** to ensure hazardous materials are handled, transported, and disposed of in a manner that prevents adverse effects to the public. Compliance with building codes and standards would ensure the project does not result in adverse effects related to geologic hazards. Impacts related to geologic hazards, hazardous materials, and wildfire, which have the potential to affect human beings, would remain **less than significant** with applicable mitigation measures incorporated, as identified in the 2021 LRDP EIR and specified throughout this Addendum.

Project-generated air quality and construction noise impacts would not result in substantial adverse effects on human beings beyond those analyzed in the 2021 LRDP EIR. No conditions have changed, and no new information has become available since certification of the 2021 LRDP EIR that would alter this analysis. These significant impacts were also addressed in the Findings and Statement of Overriding Considerations adopted by the Regents in connection with their approval of the 2021 LRDP EIR. The proposed project would incorporate the relevant 2021 LRDP EIR mitigation measures noted in Section 5 of this Addendum. No additional mitigation is available to reduce the project's contribution to these impacts. Other impacts with the potential to affect human beings were determined to be less than significant with incorporation of applicable MMs.

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5 APPLICABLE MITIGATION MEASURES

The following MMs and CBP from the 2021 LRDP EIR Mitigation Monitoring and Reporting Program would be applicable to the proposed project.

5.1 AESTHETICS

MM AES-1: UCR shall incorporate site-specific consideration of the orientation of the building, use of landscaping materials, lighting design, and choice of primary façade materials to minimize potential off-site spillover of lighting and glare from new development. As part of this measure and prior to project approval, UCR shall require the incorporation of site- and project-specific design considerations (to be included in the lighting plans) to minimize light and glare, including, but not limited to, the following:

- New outdoor lighting adjacent to on-campus residences and adjacent off-campus sensitive uses shall utilize directional lighting methods with full cutoff type light fixtures (and shielding as applicable) to minimize glare and light spillover.
- All elevated light fixtures such as in parking lots, parking structures, and athletic fields shall be shielded to reduce glare.
- Provide landscaped buffers where on-campus student housing, uses identified as Open Space Reserve and UCR Botanic Gardens, and off-campus residential neighborhoods might experience noise or light from UCR activities.
- All lighting shall be consistent with the Illuminating Engineering Society of North America (IESNA) Lighting Handbook.
- The UCR Planning, Design, & Construction staff shall review all exterior lighting design for conformance with the Campus Design and Construction Standards.

Verification of inclusion in project design shall be provided at the time of design review and lighting plans shall be reviewed and approved prior to project-specific design and construction document approval.

MM AES-2: Ingress and egress from new parking areas and parking structures shall be designed and situated to direct vehicular headlights away from adjacent residential uses, as necessary. Walls, landscaping, or other light barriers and shielding shall be provided where appropriate. Site plans shall be reviewed and approved as part of project-specific design and construction document approval.

5.2 AGRICULTURE AND FORESTRY RESOURCES

No mitigation required.

5.3 AIR QUALITY

Please refer to **MM GHG-1** (Measures EN1, FL1, TR2 through TR4, and CR1) in Section 5.8, *Greenhouse Gas Emissions,* below.

5.4 BIOLOGICAL RESOURCES

MM BIO-2 Nesting Bird Avoidance: Prior to issuance of grading permits, the following measures shall be implemented:

- To avoid disturbance of nesting and special-status bird species protected by the Migratory Bird Treaty Act and California Fish and Game Code, activities related to the project, including but not limited to, vegetation removal, ground disturbance, and construction and demolition shall occur outside of the bird breeding season (February 15 through August 31). If construction must be initiated during the peak nesting season, vegetation removal and/or tree removal should be planned to occur outside the nesting season (September 1 to February 14), and a preconstruction nesting bird survey shall be conducted no more than 3 days prior to initiation of construction activities. The nesting bird preconstruction survey shall be conducted on foot inside the project site disturbance areas. If an active avian nest is discovered during the preconstruction clearance survey, construction activities shall stay outside of a 50- to 200-foot buffer for common nesting birds around the active nest, as determined by a biologist. For listed and raptor species, this buffer shall be expanded to 500 feet or as determined by a biologist.
- Inaccessible areas shall be surveyed from afar using binoculars to the extent practical. The survey shall be conducted by a qualified biologist familiar with the identification of avian species known to occur in western Riverside County. If nests are found, an appropriate avoidance buffer shall be determined by a qualified biologist and demarcated by a qualified biologist with bright orange construction fencing, flagging, construction lathe, or other means to mark the boundary. Effective buffer distances are highly variable and based on specific project stage, bird species, stage of nesting cycle, work type, and the tolerance of a particular bird pair. The buffer may be up to 500 feet in diameter, depending on the species of nesting bird found and the biologist's observations.
- If nesting birds are located adjacent to the project site with the potential to be affected by construction activity noise above 60 dBA Leq (see Section 4.11, *Noise*, of the LRDP EIR for definitions and discussion of noise levels), a temporary noise barrier shall be erected consisting of large panels designed specifically to be deployed on construction sites for reducing noise levels at sensitive receptors. If 60 dBA Leq is exceeded, an acoustician would require the construction contractor to make operational and barrier changes to reduce noise levels to 60 dBA during the breeding season (February 15 through August 31). Noise monitoring shall occur during operational changes and installation of barriers to ensure their effectiveness. All construction personnel shall be notified as to the existence of the buffer zone and to avoid entering the buffer zone during the nesting season. No parking, storage of materials, or construction activities shall occur within this buffer until the avian biologist has confirmed that breeding/nesting is completed, and the young have fledged the nest. Encroachment into the buffer shall occur only at the discretion of the qualified biologist, if it is determined such encroachment will not adversely impact the nesting birds.

MM BIO-3 Bird Strike Avoidance: To reduce bird strike mortality and injury of special-status bird species from collisions with clear and reflective sheet glass and plastic, construction of glass-fronted buildings or other structures using exposed glass (e.g., glass-topped walls) shall incorporate measures to minimize the risk of bird strikes. This may include: (1) the use of opaque or uniformly textured/patterned/etched glass, (2) angling of glass downward so that the ground instead of the surrounding habitat or sky is reflected, (3) installation of one-way film that results in opaque or translucent covering when viewed from either side of the glass, (4) installation of a uniformly dense dot pattern created as ceramic frit on both sides of the glass, and/or (5) installation of a striped or grid pattern of clear ultraviolet-reflecting and ultraviolet-absorbing film applied to both sides of the glass. It should be noted that single decals (e.g., falcon silhouettes or large eye patterns) are ineffective and are not recommended unless the entire glass surface is uniformly covered with the objects or patterns.

MM BIO-4 Bat Preconstruction Survey: To avoid disturbance of special-status bat species during maternity season (approximately March through September), a preconstruction roosting bat survey shall be conducted by a qualified bat biologist on potential roost structures identified by the bat biologist and mature vegetation no more than 30 days prior to initiation of construction activities if construction activities must occur during the roosting season. If future projects would impact rocky outcrops, mature vegetation, existing buildings, or other structures that could be used for roosting, a passive acoustic survey shall identify the species using the area for day/night roosting. If special-status roosting bats are present and their roosts would be impacted, a qualified bat biologist should prepare a plan to identify the proper exclusionary methods. Removal of mature trees should be monitored by a qualified bat biologist and occur by pushing down the entire tree (without trimming or limb removal) using heavy equipment and leaving the felled tree on the ground untrimmed and undisturbed for a period of at least 24 hours. To exclude bats from buildings/structures or rocky outcrops, exclusion measures should be installed on crevices by placing one-way exclusionary devices that allow bats to exit but not enter the crevice.

5.5 CULTURAL RESOURCES

MM CUL-2 Tribal Cultural Resources/Archaeological Monitoring: Prior to commencement of ground disturbing activities into an area with a medium or high potential to encounter undisturbed native soils including Holocene alluvium soils, as determined by UCR, UCR shall hire a qualified archaeological monitor meeting the Secretary of the Interior's Professional Qualification Standards for archaeology (National Park Service 1983) to identify archaeological resources and cultural resources of potential Native American origin. Where development occurs in the southeastern quadrant of campus, and in areas containing Val Verde Pluton geologic features considered highly sensitive to prehistoric archaeological resources, UCR shall hire a qualified archaeologist and a Native American monitor to reduce impacts to potential archaeological and/or tribal cultural resources. The monitor(s) shall be on-site during any construction activities that involve ground disturbance. The on-site monitoring shall end when project-related ground disturbing activities are completed, or, in consultation with the lead agency and tribes as appropriate and based on observed conditions, monitoring may be reduced or eliminated prior to completion of ground-disturbing activities, when the monitor(s) has indicated that the project site has a low potential to encounter tribal cultural resources (TCR)/archaeological resources. Consolidated monitoring efforts (e.g., archaeological monitoring/tribal cultural/ paleontological monitoring) may occur if the individual monitor meets the applicable qualifications, except for development in the southeastern quadrant as detailed above.

MM CUL-3 Construction Worker Training: For projects requiring TCR/archaeological monitoring, the monitor shall provide preconstruction training for all earthmoving construction personnel prior to the start of any ground disturbing activities, regarding how to recognize the types of TCRs and/or archaeological resources that may be encountered and to instruct personnel about actions to be taken in the event of a discovery. UCR Planning, Design & Construction Project Manager/contractor shall retain documentation showing when training of personnel was completed.

MM CUL-4 Unanticipated Discovery of Tribal Cultural Resources/Archaeological Resources: If previously undiscovered TCRs and/or archaeological resources are identified during construction, all ground disturbing activities within 100 feet of the resource shall halt, UCR Planning, Design & Construction staff shall be notified, and the find shall be evaluated by a qualified archaeologist meeting the Secretary of the Interior standards to determine whether it is a unique archaeological resource, as defined by CEQA. If the discovery appears to be Native American in origin, a tribal representative will be contacted within 24 hours of discovery to determine whether it is a TCR, as defined by CEQA. If the find is neither a unique archaeological resource nor a TCR, work may resume. If the find is determined to be a unique archaeological resource or TCR, the archaeologist and the tribal representative, as appropriate, shall make recommendations to UCR Planning, Design & Construction staff on the measures that will be implemented, including, but not limited to, preservation in place, excavation, relocation, and further evaluation of the discoveries pursuant to CEQA. Preservation in place (i.e., avoidance) is the preferred method of mitigation for impacts to TCRs/archaeological resources. If UCR determines that preservation in place is not feasible, the archaeologist shall design and implement a treatment plan, prepare a report, and salvage the material, as appropriate. Any important artifacts recovered during monitoring shall be cleaned, catalogued, and analyzed, with the results presented in a report of findings that meets professional standards. Work on-site may commence upon completion of any fieldwork components of the treatment plan.

5.6 ENERGY

Please refer to **MM GHG-1** (Measures EN3 and EN5) in Section 5.8, *Greenhouse Gas Emissions*, below.

5.7 GEOLOGY AND SOILS

MM GEO-1 Inadvertent Discovery of Paleontological Resources: If any paleontological resources are encountered during ground-disturbing activities, the contractor shall ensure that activities in the immediate area of the find are halted and that UCR is informed. UCR shall retain a qualified paleontologist to evaluate the discovery and recommend appropriate treatment options pursuant to guidelines developed by the Society of Vertebrate Paleontology, including development and implementation of a paleontological resource impact mitigation program by a qualified paleontologist for treatment of the particular resource, if applicable. These measures may include, but not limited to, the following:

- Salvage of unearthed fossil remains and/or traces (e.g., tracks, trails, burrows)
- Washing of screen to recover small specimens
- Preparation of salvaged fossils to a point of being ready for curation (e.g., removal of enclosing matrix, stabilization and repair of specimens, and construction of reinforced support cradles)
- Identification, cataloging, curation, and provisions for repository storage of prepared fossil specimens

MM GEO-2 Paleontological Resources Monitoring: UCR shall implement the following measures if projects are proposing earth-moving activities exceeding 5 feet below previously undisturbed alluvial-fan soils within “high paleontological sensitivity” (i.e., Qof and Qvof):

- Retain a qualified professional paleontologist to prepare and implement a Paleontological Resources Impact Mitigation Plan for the project. A qualified paleontologist is an individual who meets the education and professional experience standards as established by the SVP (2010), which recommends the paleontologist shall have at least a master’s degree or equivalent work experience in paleontology, shall have knowledge of the local paleontology, and shall be familiar with paleontological procedures and techniques. The Paleontological Resources Impact Mitigation Plan shall describe mitigation recommendations in detail, including paleontological monitoring procedures; communication protocols to be followed in the event that an unanticipated fossil discovery is made during project development; and preparation, curation, and reporting requirements. Consolidated monitoring efforts (e.g., archaeological monitoring/tribal cultural/ paleontological monitoring) may occur if the individual monitor has the applicable qualifications.

- Prior to the commencement of ground disturbing activities, the qualified paleontologist or their designee, shall conduct training for grading and excavation personnel regarding the appearance of fossils and the procedures for notifying paleontological staff if unanticipated fossils are discovered by construction staff. The Paleontological Worker Environmental Awareness Program shall be fulfilled at the time of a pre-construction meeting. In the event a fossil is discovered by construction personnel anywhere in the project area, all work in the immediate vicinity of the find shall cease and a qualified paleontologist shall be contacted to evaluate the find before re-starting work in the area. If it is determined that the fossil(s) is (are) scientifically significant, the qualified paleontologist shall complete the mitigation outlined below to mitigate impacts to significant fossil resources.
- If paleontological resources are encountered during ground-disturbing activities, MM GEO-1 shall apply.

5.8 GREENHOUSE GAS EMISSIONS

MM GHG-1 Implement On-Campus GHG Emissions Reduction Measures: UCR shall implement the following GHG emissions reduction measures by scope emissions category:

Scope 1 (Stationary Fuel Combustion, Refrigerant Use, Fleet Fossil Fuel Combustion)

- Measure [Energy] EN1: To meet 100 percent electrification of all new campus buildings and structures, UCR shall prioritize construction of all-electric building design for new campus buildings and structures and discourage the construction and connection of new fossil fuel combustion infrastructure on campus. In addition, UCR shall focus on energy optimization through the Central Steam Plant control systems by automating manual processes and initiating an engineering study focused on transitioning away from natural gas use at the Central Plant.
- Measure EN2: To address on-campus natural gas combustion, starting in 2025 and continuing through 2035, UCR shall purchase biogas for at least 40 percent of the total on-campus natural gas usage.
- Measure [Global Warming Potential] GWP1: To reduce emissions from refrigerants used on campus, UCR shall phase out of high global warming potential chemical refrigerants on campus to achieve 100 percent relative carbon neutrality by 2045. This may include the replacement of chemical refrigerants with lower global warming potential in the interim of full phase out while an alternative technology is determined. Furthermore, UCR shall prohibit the use of equipment in new buildings or construction projects that do not utilize low global warming potential or Significant New Alternatives Policy Program accepted refrigerants.
- Measure [Fuel] FL1: To decarbonize the campus vehicle fleet, UCR shall reduce emissions from the campus vehicle fleet by 25 percent by 2025, by 50 percent by 2030, and by 75 percent by 2035 through replacement of fleet vehicles with electric vehicles or low-emission alternative vehicles.

Scope 2 (Electricity Consumption and Generation)

- Measure EN3: UCR shall work to obtain 100 percent clean-sourced electricity through either RPU and/or through the installation of on-site clean-sourced electricity sources for all new buildings by 2025. In addition, UCR shall establish annual budgets that include funding to purchase 100 percent clean-source energy. Furthermore, all newly constructed building projects, other than wet lab research laboratories, shall be designed, constructed, and commissioned to outperform the California Building Code (Title 24 portion of the CCR) energy efficiency standards by at least 20 percent. Finally, UCR shall incorporate solar PV as feasibly possible for newly constructed and majorly-renovated buildings with the maximum system size, highest solar panel efficiency, and greatest system performance.

- Measure EN4: To obtain electricity from 100 percent renewable source(s) for all existing buildings by 2045, UCR shall renegotiate its contractual agreement with RPU to establish a schedule and specific goals for obtaining 100 percent renewable electricity for the campus. In addition, UCR shall conduct an evaluation of existing buildings for structural suitability in terms of accommodating a solar photovoltaic system capacity with highest energy generation yield and for installing energy storage technology on campus and then installing such systems on identified buildings and facilities.
- Measure EN5 (Parts A, B, C): In order to prioritize energy efficiency and green building initiatives for building/facility upgrades and new construction as well as reduced energy use, UCR shall identify aging equipment throughout the campus such as equipment associated with the Central Plant, electrical distribution system, and building HVAC systems and develop a strategy and schedule to upgrade such equipment with high-energy efficiency systems and optimize HVAC systems through heat zoning, high-efficiency filters, and shut-down times expansion. The strategy shall include an evaluation and cost analysis related to upgrading/retrofitting equipment versus retirement of equipment if no longer needed with future initiatives (i.e., Central Plant boiler retirement). The schedule and upgrade strategy must meet a 2 percent energy efficiency improvement annually through 2035. In addition, UCR shall require new buildings to incorporate occupancy sensors and controls such that lighting of shared spaces is on occupancy sensors, building temperature set points are widened and aligned with occupancy schedules, and ventilation systems are converted from constant volume to variable so ventilation rates are occupancy-based. Furthermore, UCR shall develop a plan to identify existing buildings and projects that could undergo upgrades to the control systems and establish a schedule for upgrade incorporation. Finally, UCR shall develop a tracking program to monitor and share campus energy efficiency activities and progress towards increased energy efficiency.

Scope 3 (Waste Generation, Business Air Travel, On-site Transportation, Water Consumption, Carbon Sequestration, and Construction)

- Measure (Waste Generation) WG1: UCR shall implement and enforce SB 1383 organics and recycling requirements to specifically reduce landfilled organics waste to 75 percent by 2025.
- Measure WG2: UCR shall reduce campus waste sent to landfills 90 percent by 2025 and 100 percent by 2035. In addition, UCR shall reduce waste generation at campus events 25 percent by 2025 and 50 percent by 2035, with goals of being zero waste and plastic free events. Furthermore, UCR shall establish purchasing and procurement policies and guidelines prioritizing vendors that limit packaging waste and purchase reusable and compostable goods.
- Measure [Transportation] TR1: To reduce GHG Emissions related to business air travel, UCR shall provide incentives to faculty for emission-reducing behaviors and utilizing travel options that are less carbon intensive, promote the use of virtual meetings, and encourage alternative forms of travel other than air travel.
- Measure TR2: UCR shall update the Transportation Demand Management (TDM) program for the campus to decrease single occupancy vehicle VMT 5 percent by 2025 and 20 percent by 2035. In addition, UCR shall evaluate trends of current programs to expand on existing programs and establish new initiatives that utilize proven successful strategies.
- Measure TR3: UCR shall develop and implement a Campus Active Transportation Plan to shift 2 percent of baseline (2018) passenger vehicle VMT to active transportation by 2025 and 8 percent

by 2035. In addition, UCR shall update the Campus Bicycle and Pedestrian Network Map every five years, including routes from off campus to on campus.

- Measure TR4: UCR shall reduce GHG emissions associated with campus commuting 10 percent by 2025 and 25 percent by 2035.
- Measure [Water Consumption] WC1: UCR shall reduce per-capita water consumption 20 percent by 2025 and 35 percent by 2035 compared to academic year 2018/2019 per capita consumption.
- Measure [Carbon Sequestration] CS1: UCR shall increase carbon sequestration through increasing tree planting and green space 5 percent by 2025 and 15 percent by 2035.
- Measure [Construction] CR1: UCR shall reduce construction-related GHG emissions on campus 10 percent by 2025 and 25 percent by 2035 through emission reduction controls and/or electric equipment requirements in line with contract obligations. Specifically, UCR shall require off-road diesel-powered construction equipment greater than 50 horsepower to meet the Tier 4 emission standards as well as construction equipment to be outfitted with BACT devices certified by CARB and emissions control devices that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similar-sized engine. In addition, UCR shall develop zero waste procurement guidelines and processes for campus construction projects and integrate into purchasing RFP language as part of campus procurement.

The UCR Office of Sustainability, Facilities Services, EH&S, TAPS, and/or PD&C shall annually monitor, track, and verify implementation of these GHG emissions reduction measures.

5.9 HAZARDS AND HAZARDOUS MATERIALS

MM HAZ-1 Property Assessment – Phase I and II ESAs: During the pre-planning stage of campus projects on previously developed sites or on agricultural lands (current or historic), and in coordination with EH&S, UCR shall obtain documentation from EH&S or prepare a Phase I Environmental Site Assessment (ESA) assessing the land use history of the proposed project site and identify potential hazardous materials concerns, including, but not limited to, fuel tanks, chemical storage, presence of elemental mercury, elevator pistons and associated hydraulic oil reservoirs and piping, heating-oil USTs, or agricultural uses. If the Phase I ESAs, or similar documentation, identify recognized environmental conditions or potential concern areas, a Phase II ESA would be conducted in coordination with EH&S to determine whether the soil, groundwater, and/or soil vapor has been impacted at concentrations exceeding regulatory screening levels for residential or commercial/industrial type land uses (as applicable). If the Phase II ESA concludes that the site is or may be impacted and could affect the planned development, assessment, remediation, or corrective action (e.g., removal of contaminated soil, in-situ treatment, capping, engineering controls) would be conducted prior to or during construction under the oversight of federal, State, and/or local agencies (e.g., USEPA, DTSC, RWQCB, RFD, RCDEH) and in full compliance with current and applicable federal and State laws and regulations, including but are not limited to the California Environmental Quality Act (CEQA). Assessment, remediation, or corrective action must be evaluated under CEQA prior to commencing the assessment, remediation, or correction action. Additionally, Voluntary Cleanup Agreements may be used for parcels where remediation or long-term monitoring is necessary.

MM HAZ-4 Construction Site Management Plan: If impacted soils are identified pursuant to activities conducted through Mitigation Measures MM HAZ-1, MM HAZ-2, or MM HAZ-3; or encountered during construction (soil disturbance), UCR shall prepare a Construction Site Management Plan (SMP) for the proposed redevelopment project area to address potential issues that may be encountered during redevelopment activities involving subsurface work. The Construction SMP objectives shall include:

- Communicating information to proposed project construction workers about environmental conditions
- Presenting measures to mitigate potential risks to the environment, construction workers, and other nearby receptors from potential exposure to hazardous substances that may be associated with unknown conditions or unexpected underground structures
- Presenting protocols for management of known contaminated soil or groundwater encountered during construction activities

The Construction SMP shall identify the proposed project contacts, responsibilities, and notification requirements and outline the procedures for health and safety, soil management, contingency measures for discovery of unexpected underground structures, erosion, dust, and odor management, groundwater management, waste management, stormwater management, and written records and reporting. The Construction SMP shall be reviewed and approved by UCR prior to issuance of grading permits.

5.10 HYDROLOGY AND WATER QUALITY

No mitigation required.

5.11 LAND USE AND PLANNING

No mitigation required.

5.12 MINERAL RESOURCES

No mitigation required.

5.13 NOISE

MM N-1 Construction Noise Reduction Measures: To reduce construction noise levels to on-campus and off-campus noise sensitive receivers, UCR shall implement the following measures:

- Hours of exterior construction activities shall be limited to 7:00 a.m. to 9:00 p.m. Monday through Friday and 8:00 a.m. to 6:00 p.m. on Saturday, as feasible, except under circumstances where such time limits are infeasible (e.g., for time sensitive construction work such as concrete pouring, excessive heat warnings/temperatures during the summer, operational emergencies). No exterior construction activities shall occur on federal holidays.
- Construction traffic shall follow routes to minimize the noise impact of this traffic on the surrounding community, to the greatest extent feasible.
- Contract specifications shall require that construction equipment be muffled or otherwise shielded, in accordance with manufacturers' recommendations. Contracts shall specify that engine-driven equipment be fitted with appropriate noise mufflers.
- Where available and feasible, construction equipment with back-up alarms shall be equipped with either audible self-adjusting backup alarms or alarms that only sound when an object is detected. Self-adjusting backup alarms shall automatically adjust to 10 dBA over the surrounding background levels. All non-self-adjusting backup alarms shall be set to the lowest setting required to be audible above the surrounding noise levels.
- Stationary construction equipment material and vehicle staging shall be placed to direct noise away from sensitive receivers to the greatest extent feasible.

- Meetings shall be conducted, as needed, with on-campus constituents to provide advance notice of construction activities to coordinate these activities with the academic calendar, scheduled events, and other situations, as appropriate.
- Communication would be provided, as needed, with constituents that are affected by campus construction to provide advance notice of construction activities and ensure that the mutual needs of the particular construction project and of those impacted by construction noise are met, to the extent feasible.
- A sign shall be provided at the construction site entrance, or other conspicuous location, that includes a 24-hour telephone number for project information, and to report complaints. An inquiry and corrective action will be taken if necessary, in a timely manner.
- Where feasible, installation of temporary sound barriers/blankets of sufficient height to break the line-of-sight between the construction equipment and within proximity to exterior use areas of noise-sensitive receivers shall be required. Temporary sound barriers shall consist of either sound blankets or other sound barriers/techniques such as acoustic padding or acoustic walls placed near adjacent noise-sensitive receivers that have been manufactured to reduce noise by at least 10 dBA at ground level or meets ASTM E90 & E413 standards/ASTM C423 (or similar standards with equivalent 10 DBA noise reduction).

MM N-2 HVAC Noise Reduction Measures: The campus shall reduce HVAC equipment noise levels located in close proximity to noise-sensitive buildings and uses through noise control measures such as, but not limited to:

- Mechanical equipment screening (e.g., parapet walls)
- Equipment setbacks
- Silencers
- Acoustical louvers
- And other sound attenuation devices as made available

If a method other than mechanical equipment screening (e.g., parapet walls) is chosen, a project specific design plan demonstrating that the noise level from operation of HVAC units does not generate noise levels that exceed 5 dBA above ambient at noise sensitive receivers shall be completed.

MM N-3 Loading Dock Noise Reduction Measures: The campus shall reduce loading dock noise levels through measures such as, but not limited to:

- Noise levels from loading docks at noise-sensitive receivers shall not exceed 5 dBA over ambient noise levels, the effectiveness of which shall be determined on a project-level basis by an acoustical professional.
- As feasible, design and build sound barriers near loading docks and delivery areas that block the line of sight between truck activity areas and noise-sensitive receivers. Sound barriers may consist of a wall, earthen berm, or combination thereof.

5.14 POPULATION AND HOUSING

No mitigation required.

5.15 PUBLIC SERVICES

No mitigation required.

5.16 RECREATION

No mitigation required.

5.17 TRANSPORTATION

Refer to **CBP WF-2** in Section 5.20, *Wildfire*, below.

5.18 TRIBAL CULTURAL RESOURCES

Refer to **MM CUL-2 through MM CUL-4** in Section 5.5, *Cultural Resources*, above.

5.19 UTILITIES AND SERVICE SYSTEMS

No mitigation required.

5.20 WILDFIRE

CBP WF-2 Construction – Alternative Travel Routes: Prior to campus construction activities and/or roadway closures, the Campus Fire Marshal, as delegated by the State Fire Marshal, and in cooperation with the City of Riverside Fire Department shall ensure that adequate access for emergency vehicles is provided or identify alternative travel routes.

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Appendix A

CalEEMod Reports

UCR OASIS Park - Clean Power Mix Detailed Report

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1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	UCR OASIS Park - Clean Power Mix
Construction Start Date	4/1/2024
Operational Year	2027
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.20
Precipitation (days)	14.2
Location	33.97475953331494, -117.33758367490393
County	Riverside-South Coast
City	Riverside
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	5490
EDFZ	11
Electric Utility	City of Riverside
Gas Utility	Southern California Gas
App Version	2022.1.1.21

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description

Office Park	28.0	1000sqft	0.64	28,000	53,578	—	—	—
Research & Development	42.0	1000sqft	0.96	42,000	—	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-5	Use Advanced Engine Tiers
Energy	E-1	Buildings Exceed 2019 Title 24 Building Envelope Energy Efficiency Standards

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	38.5	37.5	35.2	84.1	0.07	2.04	3.14	4.85	1.78	1.43	2.31	—	8,048	8,048	0.27	0.44	6.55	8,191
Mit.	35.4	35.0	10.0	82.0	0.07	0.85	3.14	3.66	0.70	1.43	1.52	—	8,048	8,048	0.27	0.44	6.55	8,191
% Reduced	8%	7%	72%	3%	—	58%	—	24%	61%	—	34%	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.18	1.82	17.8	17.4	0.03	0.79	3.14	3.93	0.73	1.43	2.16	—	3,595	3,595	0.13	0.16	0.06	3,646
Mit.	0.66	0.58	3.59	16.3	0.03	0.12	3.14	3.23	0.11	1.43	1.52	—	3,595	3,595	0.13	0.16	0.06	3,646
% Reduced	70%	68%	80%	7%	—	85%	—	18%	85%	—	30%	—	—	—	—	—	—	—

Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	13.1	12.8	15.4	31.9	0.03	0.83	1.18	2.01	0.74	0.27	1.01	—	3,521	3,521	0.12	0.17	1.20	3,576
Mit.	11.8	11.7	4.32	31.4	0.03	0.31	1.18	1.49	0.26	0.27	0.54	—	3,521	3,521	0.12	0.17	1.20	3,576
% Reduced	10%	9%	72%	2%	—	62%	—	26%	65%	—	47%	—	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.40	2.33	2.81	5.82	0.01	0.15	0.22	0.37	0.13	0.05	0.18	—	583	583	0.02	0.03	0.20	592
Mit.	2.16	2.13	0.79	5.74	0.01	0.06	0.22	0.27	0.05	0.05	0.10	—	583	583	0.02	0.03	0.20	592
% Reduced	10%	9%	72%	2%	—	62%	—	26%	65%	—	47%	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	38.5	37.5	35.2	84.1	0.07	2.04	3.14	4.85	1.78	1.43	2.31	—	8,048	8,048	0.27	0.44	6.55	8,191
2025	1.31	1.09	9.50	13.0	0.02	0.37	0.39	0.76	0.34	0.10	0.44	—	2,717	2,717	0.10	0.08	2.16	2,746
2026	1.24	31.0	8.98	12.8	0.02	0.33	0.39	0.72	0.30	0.10	0.40	—	2,705	2,705	0.10	0.08	1.99	2,733
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	2.18	1.82	17.8	17.4	0.03	0.79	3.14	3.93	0.73	1.43	2.16	—	3,595	3,595	0.13	0.16	0.06	3,646
2025	1.29	1.08	9.53	12.6	0.02	0.37	0.39	0.76	0.34	0.10	0.44	—	2,692	2,692	0.10	0.08	0.06	2,719
2026	1.23	1.03	9.01	12.4	0.02	0.33	0.39	0.72	0.30	0.10	0.40	—	2,680	2,680	0.10	0.08	0.05	2,707
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

2024	13.1	12.8	15.4	31.9	0.03	0.83	1.18	2.01	0.74	0.27	1.01	—	3,521	3,521	0.12	0.17	1.20	3,576
2025	1.11	0.93	8.18	10.8	0.02	0.32	0.33	0.65	0.29	0.08	0.38	—	2,311	2,311	0.09	0.07	0.80	2,334
2026	0.56	2.26	4.03	5.63	0.01	0.15	0.17	0.32	0.14	0.04	0.18	—	1,182	1,182	0.04	0.03	0.38	1,194
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	2.40	2.33	2.81	5.82	0.01	0.15	0.22	0.37	0.13	0.05	0.18	—	583	583	0.02	0.03	0.20	592
2025	0.20	0.17	1.49	1.98	< 0.005	0.06	0.06	0.12	0.05	0.01	0.07	—	383	383	0.01	0.01	0.13	386
2026	0.10	0.41	0.74	1.03	< 0.005	0.03	0.03	0.06	0.02	0.01	0.03	—	196	196	0.01	0.01	0.06	198

2.3. Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	35.4	35.0	10.0	82.0	0.07	0.85	3.14	3.66	0.70	1.43	1.52	—	8,048	8,048	0.27	0.44	6.55	8,191
2025	0.64	0.55	3.48	14.7	0.02	0.11	0.39	0.50	0.11	0.10	0.20	—	2,717	2,717	0.10	0.08	2.16	2,746
2026	0.61	31.0	3.41	14.5	0.02	0.10	0.39	0.50	0.10	0.10	0.20	—	2,705	2,705	0.10	0.08	1.99	2,733
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.66	0.58	3.59	16.3	0.03	0.12	3.14	3.23	0.11	1.43	1.52	—	3,595	3,595	0.13	0.16	0.06	3,646
2025	0.63	0.55	3.50	14.2	0.02	0.11	0.39	0.50	0.11	0.10	0.20	—	2,692	2,692	0.10	0.08	0.06	2,719
2026	0.60	0.53	3.43	14.1	0.02	0.10	0.39	0.50	0.10	0.10	0.20	—	2,680	2,680	0.10	0.08	0.05	2,707
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	11.8	11.7	4.32	31.4	0.03	0.31	1.18	1.49	0.26	0.27	0.54	—	3,521	3,521	0.12	0.17	1.20	3,576
2025	0.54	0.47	3.01	12.3	0.02	0.10	0.33	0.43	0.09	0.08	0.17	—	2,311	2,311	0.09	0.07	0.80	2,334
2026	0.28	2.04	1.60	6.35	0.01	0.05	0.17	0.22	0.05	0.04	0.09	—	1,182	1,182	0.04	0.03	0.38	1,194
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

2024	2.16	2.13	0.79	5.74	0.01	0.06	0.22	0.27	0.05	0.05	0.10	—	583	583	0.02	0.03	0.20	592
2025	0.10	0.09	0.55	2.24	< 0.005	0.02	0.06	0.08	0.02	0.01	0.03	—	383	383	0.01	0.01	0.13	386
2026	0.05	0.37	0.29	1.16	< 0.005	0.01	0.03	0.04	0.01	0.01	0.02	—	196	196	0.01	0.01	0.06	198

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.54	3.12	0.64	8.59	0.01	0.01	1.13	1.14	0.01	0.29	0.30	45.5	1,520	1,565	4.64	0.09	5.25	1,712
Mit.	1.54	3.12	0.64	8.59	0.01	0.01	1.13	1.14	0.01	0.29	0.30	45.5	1,496	1,541	4.64	0.09	5.25	1,688
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	2%	2%	—	—	—	1%
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.94	2.55	0.66	4.87	0.01	0.01	1.13	1.14	0.01	0.29	0.30	45.5	1,429	1,474	4.64	0.09	1.25	1,618
Mit.	0.94	2.55	0.66	4.87	0.01	0.01	1.13	1.14	0.01	0.29	0.30	45.5	1,405	1,450	4.64	0.09	1.25	1,594
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	2%	2%	—	—	—	1%
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.03	2.64	0.50	5.67	0.01	0.01	0.80	0.81	0.01	0.20	0.21	45.5	1,090	1,135	4.62	0.07	2.41	1,274
Mit.	1.03	2.64	0.50	5.67	0.01	0.01	0.80	0.81	0.01	0.20	0.21	45.5	1,066	1,112	4.62	0.07	2.41	1,250
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	2%	2%	—	—	—	2%
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.19	0.48	0.09	1.03	< 0.005	< 0.005	0.15	0.15	< 0.005	0.04	0.04	7.53	180	188	0.76	0.01	0.40	211

Mit.	0.19	0.48	0.09	1.03	< 0.005	< 0.005	0.15	0.15	< 0.005	0.04	0.04	7.53	177	184	0.76	0.01	0.40	207
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	2%	2%	—	—	—	2%

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.00	0.94	0.62	5.55	0.01	0.01	1.13	1.14	0.01	0.29	0.30	—	1,323	1,323	0.06	0.06	4.11	1,348
Area	0.54	2.18	0.03	3.04	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	12.5	12.5	< 0.005	< 0.005	—	12.6
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	182	182	0.00	0.00	—	182
Water	—	—	—	—	—	—	—	—	—	—	—	8.90	2.77	11.7	0.91	0.02	—	40.9
Waste	—	—	—	—	—	—	—	—	—	—	—	36.6	0.00	36.6	3.66	0.00	—	128
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.14	1.14
Total	1.54	3.12	0.64	8.59	0.01	0.01	1.13	1.14	0.01	0.29	0.30	45.5	1,520	1,565	4.64	0.09	5.25	1,712
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.94	0.88	0.66	4.87	0.01	0.01	1.13	1.14	0.01	0.29	0.30	—	1,244	1,244	0.07	0.07	0.11	1,266
Area	—	1.68	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	182	182	0.00	0.00	—	182
Water	—	—	—	—	—	—	—	—	—	—	—	8.90	2.77	11.7	0.91	0.02	—	40.9
Waste	—	—	—	—	—	—	—	—	—	—	—	36.6	0.00	36.6	3.66	0.00	—	128
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.14	1.14
Total	0.94	2.55	0.66	4.87	0.01	0.01	1.13	1.14	0.01	0.29	0.30	45.5	1,429	1,474	4.64	0.09	1.25	1,618
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Mobile	0.66	0.62	0.48	3.59	0.01	0.01	0.80	0.81	0.01	0.20	0.21	—	897	897	0.05	0.05	1.27	914
Area	0.37	2.02	0.02	2.09	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	8.57	8.57	< 0.005	< 0.005	—	8.61
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	182	182	0.00	0.00	—	182
Water	—	—	—	—	—	—	—	—	—	—	—	8.90	2.77	11.7	0.91	0.02	—	40.9
Waste	—	—	—	—	—	—	—	—	—	—	—	36.6	0.00	36.6	3.66	0.00	—	128
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.14	1.14
Total	1.03	2.64	0.50	5.67	0.01	0.01	0.80	0.81	0.01	0.20	0.21	45.5	1,090	1,135	4.62	0.07	2.41	1,274
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.12	0.11	0.09	0.65	< 0.005	< 0.005	0.15	0.15	< 0.005	0.04	0.04	—	148	148	0.01	0.01	0.21	151
Area	0.07	0.37	< 0.005	0.38	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.42	1.42	< 0.005	< 0.005	—	1.42
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	30.1	30.1	0.00	0.00	—	30.1
Water	—	—	—	—	—	—	—	—	—	—	—	1.47	0.46	1.93	0.15	< 0.005	—	6.78
Waste	—	—	—	—	—	—	—	—	—	—	—	6.06	0.00	6.06	0.61	0.00	—	21.2
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.19	0.19
Total	0.19	0.48	0.09	1.03	< 0.005	< 0.005	0.15	0.15	< 0.005	0.04	0.04	7.53	180	188	0.76	0.01	0.40	211

2.6. Operations Emissions by Sector, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	1.00	0.94	0.62	5.55	0.01	0.01	1.13	1.14	0.01	0.29	0.30	—	1,323	1,323	0.06	0.06	4.11	1,348
Area	0.54	2.18	0.03	3.04	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	12.5	12.5	< 0.005	< 0.005	—	12.6
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	158	158	0.00	0.00	—	158
Water	—	—	—	—	—	—	—	—	—	—	—	8.90	2.77	11.7	0.91	0.02	—	40.9
Waste	—	—	—	—	—	—	—	—	—	—	—	36.6	0.00	36.6	3.66	0.00	—	128
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.14	1.14

Total	1.54	3.12	0.64	8.59	0.01	0.01	1.13	1.14	0.01	0.29	0.30	45.5	1,496	1,541	4.64	0.09	5.25	1,688
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.94	0.88	0.66	4.87	0.01	0.01	1.13	1.14	0.01	0.29	0.30	—	1,244	1,244	0.07	0.07	0.11	1,266
Area	—	1.68	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	158	158	0.00	0.00	—	158
Water	—	—	—	—	—	—	—	—	—	—	—	8.90	2.77	11.7	0.91	0.02	—	40.9
Waste	—	—	—	—	—	—	—	—	—	—	—	36.6	0.00	36.6	3.66	0.00	—	128
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.14	1.14
Total	0.94	2.55	0.66	4.87	0.01	0.01	1.13	1.14	0.01	0.29	0.30	45.5	1,405	1,450	4.64	0.09	1.25	1,594
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.66	0.62	0.48	3.59	0.01	0.01	0.80	0.81	0.01	0.20	0.21	—	897	897	0.05	0.05	1.27	914
Area	0.37	2.02	0.02	2.09	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	8.57	8.57	< 0.005	< 0.005	—	8.61
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	158	158	0.00	0.00	—	158
Water	—	—	—	—	—	—	—	—	—	—	—	8.90	2.77	11.7	0.91	0.02	—	40.9
Waste	—	—	—	—	—	—	—	—	—	—	—	36.6	0.00	36.6	3.66	0.00	—	128
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.14	1.14
Total	1.03	2.64	0.50	5.67	0.01	0.01	0.80	0.81	0.01	0.20	0.21	45.5	1,066	1,112	4.62	0.07	2.41	1,250
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.12	0.11	0.09	0.65	< 0.005	< 0.005	0.15	0.15	< 0.005	0.04	0.04	—	148	148	0.01	0.01	0.21	151
Area	0.07	0.37	< 0.005	0.38	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.42	1.42	< 0.005	< 0.005	—	1.42
Energy	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	26.2	26.2	0.00	0.00	—	26.2
Water	—	—	—	—	—	—	—	—	—	—	—	1.47	0.46	1.93	0.15	< 0.005	—	6.78
Waste	—	—	—	—	—	—	—	—	—	—	—	6.06	0.00	6.06	0.61	0.00	—	21.2
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.19	0.19
Total	0.19	0.48	0.09	1.03	< 0.005	< 0.005	0.15	0.15	< 0.005	0.04	0.04	7.53	177	184	0.76	0.01	0.40	207

3. Construction Emissions Details

3.1. Demolition (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	38.2	37.4	32.4	81.2	0.05	1.99	—	1.99	1.74	—	1.74	—	5,297	5,297	0.22	0.04	—	5,316
Demolition	—	—	—	—	—	—	1.84	1.84	—	0.28	0.28	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	12.6	12.3	10.6	26.7	0.02	0.66	—	0.66	0.57	—	0.57	—	1,742	1,742	0.07	0.01	—	1,748
Demolition	—	—	—	—	—	—	0.61	0.61	—	0.09	0.09	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.29	2.24	1.94	4.87	< 0.005	0.12	—	0.12	0.10	—	0.10	—	288	288	0.01	< 0.005	—	289
Demolition	—	—	—	—	—	—	0.11	0.11	—	0.02	0.02	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.15	0.14	0.13	2.30	0.00	0.00	0.36	0.36	0.00	0.08	0.08	—	396	396	0.02	0.01	1.57	402
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.10	0.04	2.66	0.64	0.02	0.04	0.61	0.65	0.04	0.17	0.22	—	2,354	2,354	0.04	0.38	4.98	2,474
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.05	0.60	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	121	121	0.01	< 0.005	0.22	123
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.03	0.01	0.92	0.21	0.01	0.01	0.20	0.21	0.01	0.06	0.07	—	774	774	0.01	0.12	0.70	812
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.11	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	20.1	20.1	< 0.005	< 0.005	0.04	20.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	< 0.005	0.17	0.04	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	128	128	< 0.005	0.02	0.12	135

3.2. Demolition (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	35.1	34.8	7.21	79.1	0.05	0.81	—	0.81	0.66	—	0.66	—	5,297	5,297	0.22	0.04	—	5,316
Demolition	—	—	—	—	—	—	1.84	1.84	—	0.28	0.28	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	11.6	11.5	2.37	26.0	0.02	0.27	—	0.27	0.22	—	0.22	—	1,742	1,742	0.07	0.01	—	1,748
Demolition	—	—	—	—	—	—	0.61	0.61	—	0.09	0.09	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.11	2.09	0.43	4.75	< 0.005	0.05	—	0.05	0.04	—	0.04	—	288	288	0.01	< 0.005	—	289
Demolition	—	—	—	—	—	—	0.11	0.11	—	0.02	0.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.15	0.14	0.13	2.30	0.00	0.00	0.36	0.36	0.00	0.08	0.08	—	396	396	0.02	0.01	1.57	402
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.10	0.04	2.66	0.64	0.02	0.04	0.61	0.65	0.04	0.17	0.22	—	2,354	2,354	0.04	0.38	4.98	2,474

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.05	0.60	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	121	121	0.01	< 0.005	0.22	123
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.03	0.01	0.92	0.21	0.01	0.01	0.20	0.21	0.01	0.06	0.07	—	774	774	0.01	0.12	0.70	812
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.11	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	20.1	20.1	< 0.005	< 0.005	0.04	20.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	< 0.005	0.17	0.04	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	128	128	< 0.005	0.02	0.12	135

3.3. Site Preparation (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.52	1.28	12.7	13.1	0.02	0.56	—	0.56	0.52	—	0.52	—	2,077	2,077	0.08	0.02	—	2,084
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.07	0.70	0.72	< 0.005	0.03	—	0.03	0.03	—	0.03	—	114	114	< 0.005	< 0.005	—	114

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.01	0.13	0.13	< 0.005	0.01	—	0.01	0.01	—	0.01	—	18.8	18.8	< 0.005	< 0.005	—	18.9
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.05	0.83	0.00	0.00	0.13	0.13	0.00	0.03	0.03	—	144	144	0.01	< 0.005	0.57	146
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.34	7.34	< 0.005	< 0.005	0.01	7.44
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.22	1.22	< 0.005	< 0.005	< 0.005	1.23
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.4. Site Preparation (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.20	0.20	1.02	12.0	0.02	0.04	—	0.04	0.04	—	0.04	—	2,077	2,077	0.08	0.02	—	2,084
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.06	0.66	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	114	114	< 0.005	< 0.005	—	114
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.12	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	18.8	18.8	< 0.005	< 0.005	—	18.9
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.05	0.83	0.00	0.00	0.13	0.13	0.00	0.03	0.03	—	144	144	0.01	< 0.005	0.57	146
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.34	7.34	< 0.005	< 0.005	0.01	7.44
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.22	1.22	< 0.005	< 0.005	< 0.005	1.23
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.5. Grading (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.08	1.75	16.7	16.4	0.02	0.77	—	0.77	0.71	—	0.71	—	2,595	2,595	0.11	0.02	—	2,604
Dust From Material Movement	—	—	—	—	—	—	2.76	2.76	—	1.34	1.34	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.08	1.75	16.7	16.4	0.02	0.77	—	0.77	0.71	—	0.71	—	2,595	2,595	0.11	0.02	—	2,604

Dust From Material Movement	—	—	—	—	—	—	2.76	2.76	—	1.34	1.34	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.11	0.10	0.92	0.90	< 0.005	0.04	—	0.04	0.04	—	0.04	—	142	142	0.01	< 0.005	—	143
Dust From Material Movement	—	—	—	—	—	—	0.15	0.15	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.17	0.16	< 0.005	0.01	—	0.01	0.01	—	0.01	—	23.5	23.5	< 0.005	< 0.005	—	23.6
Dust From Material Movement	—	—	—	—	—	—	0.03	0.03	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	1.04	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	180	180	0.01	0.01	0.71	183
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.03	0.01	0.94	0.23	0.01	0.02	0.22	0.23	0.02	0.06	0.08	—	833	833	0.02	0.13	1.76	876
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.07	0.06	0.07	0.79	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	165	165	0.01	0.01	0.02	167
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.03	0.01	0.98	0.23	0.01	0.02	0.22	0.23	0.02	0.06	0.08	—	834	834	0.01	0.13	0.05	874
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.18	9.18	< 0.005	< 0.005	0.02	9.30
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.05	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	45.7	45.7	< 0.005	0.01	0.04	47.9
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.52	1.52	< 0.005	< 0.005	< 0.005	1.54
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	7.56	7.56	< 0.005	< 0.005	0.01	7.94

3.6. Grading (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.33	2.05	15.3	0.02	0.07	—	0.07	0.07	—	0.07	—	2,595	2,595	0.11	0.02	—	2,604
Dust From Material Movement	—	—	—	—	—	—	2.76	2.76	—	1.34	1.34	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.35	0.33	2.05	15.3	0.02	0.07	—	0.07	0.07	—	0.07	—	2,595	2,595	0.11	0.02	—	2,604
Dust From Material Movement	—	—	—	—	—	—	2.76	2.76	—	1.34	1.34	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.11	0.84	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	142	142	0.01	< 0.005	—	143
Dust From Material Movement	—	—	—	—	—	—	0.15	0.15	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.15	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	23.5	23.5	< 0.005	< 0.005	—	23.6
Dust From Material Movement	—	—	—	—	—	—	0.03	0.03	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	1.04	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	180	180	0.01	0.01	0.71	183
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.03	0.01	0.94	0.23	0.01	0.02	0.22	0.23	0.02	0.06	0.08	—	833	833	0.02	0.13	1.76	876

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.07	0.79	0.00	0.00	0.16	0.16	0.00	0.04	0.04	—	165	165	0.01	0.01	0.02	167
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.03	0.01	0.98	0.23	0.01	0.02	0.22	0.23	0.02	0.06	0.08	—	834	834	0.01	0.13	0.05	874
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.18	9.18	< 0.005	< 0.005	0.02	9.30
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.05	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	45.7	45.7	< 0.005	0.01	0.04	47.9
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.52	1.52	< 0.005	< 0.005	< 0.005	1.54
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	7.56	7.56	< 0.005	< 0.005	0.01	7.94

3.7. Building Construction (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.25	1.05	9.67	11.2	0.02	0.42	—	0.42	0.39	—	0.39	—	2,051	2,051	0.08	0.02	—	2,058
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.26	0.22	2.02	2.34	< 0.005	0.09	—	0.09	0.08	—	0.08	—	429	429	0.02	< 0.005	—	430
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.04	0.37	0.43	< 0.005	0.02	—	0.02	0.01	—	0.01	—	71.0	71.0	< 0.005	< 0.005	—	71.2
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.11	0.13	1.41	0.00	0.00	0.29	0.29	0.00	0.07	0.07	—	296	296	0.01	0.01	0.03	300
Vendor	0.02	0.01	0.42	0.13	< 0.005	0.01	0.10	0.10	0.01	0.03	0.03	—	356	356	0.01	0.05	0.03	373
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.03	0.31	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	62.7	62.7	< 0.005	< 0.005	0.12	63.6
Vendor	< 0.005	< 0.005	0.09	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	74.5	74.5	< 0.005	0.01	0.09	77.9
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.4	10.4	< 0.005	< 0.005	0.02	10.5
Vendor	< 0.005	< 0.005	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	12.3	12.3	< 0.005	< 0.005	0.01	12.9
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.8. Building Construction (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.52	0.46	3.04	12.8	0.02	0.11	—	0.11	0.11	—	0.11	—	2,051	2,051	0.08	0.02	—	2,058
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.11	0.10	0.63	2.68	< 0.005	0.02	—	0.02	0.02	—	0.02	—	429	429	0.02	< 0.005	—	430
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.12	0.49	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	71.0	71.0	< 0.005	< 0.005	—	71.2
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.12	0.11	0.13	1.41	0.00	0.00	0.29	0.29	0.00	0.07	0.07	—	296	296	0.01	0.01	0.03	300
Vendor	0.02	0.01	0.42	0.13	< 0.005	0.01	0.10	0.10	0.01	0.03	0.03	—	356	356	0.01	0.05	0.03	373
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.03	0.31	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	62.7	62.7	< 0.005	< 0.005	0.12	63.6
Vendor	< 0.005	< 0.005	0.09	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	74.5	74.5	< 0.005	0.01	0.09	77.9
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.06	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.4	10.4	< 0.005	< 0.005	0.02	10.5
Vendor	< 0.005	< 0.005	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	12.3	12.3	< 0.005	< 0.005	0.01	12.9
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Building Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.17	0.98	9.02	11.2	0.02	0.37	—	0.37	0.34	—	0.34	—	2,051	2,051	0.08	0.02	—	2,058
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.17	0.98	9.02	11.2	0.02	0.37	—	0.37	0.34	—	0.34	—	2,051	2,051	0.08	0.02	—	2,058

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.01	0.84	7.73	9.56	0.02	0.32	—	0.32	0.29	—	0.29	—	1,758	1,758	0.07	0.01	—	1,764
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.18	0.15	1.41	1.74	< 0.005	0.06	—	0.06	0.05	—	0.05	—	291	291	0.01	< 0.005	—	292
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.10	0.10	1.73	0.00	0.00	0.29	0.29	0.00	0.07	0.07	—	316	316	0.01	0.01	1.16	320
Vendor	0.02	0.01	0.39	0.12	< 0.005	0.01	0.10	0.10	0.01	0.03	0.03	—	351	351	0.01	0.05	1.00	368
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.09	0.11	1.31	0.00	0.00	0.29	0.29	0.00	0.07	0.07	—	290	290	0.01	0.01	0.03	294
Vendor	0.02	0.01	0.40	0.12	< 0.005	0.01	0.10	0.10	0.01	0.03	0.03	—	351	351	0.01	0.05	0.03	367
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.10	1.18	0.00	0.00	0.25	0.25	0.00	0.06	0.06	—	252	252	0.01	0.01	0.43	255
Vendor	0.01	0.01	0.35	0.10	< 0.005	< 0.005	0.08	0.09	< 0.005	0.02	0.03	—	301	301	0.01	0.05	0.37	315
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.02	0.01	0.02	0.22	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	41.7	41.7	< 0.005	< 0.005	0.07	42.3
Vendor	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	49.8	49.8	< 0.005	0.01	0.06	52.2
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.10. Building Construction (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.50	0.45	2.99	12.8	0.02	0.11	—	0.11	0.10	—	0.10	—	2,051	2,051	0.08	0.02	—	2,058
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.50	0.45	2.99	12.8	0.02	0.11	—	0.11	0.10	—	0.10	—	2,051	2,051	0.08	0.02	—	2,058
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.43	0.38	2.56	11.0	0.02	0.09	—	0.09	0.09	—	0.09	—	1,758	1,758	0.07	0.01	—	1,764
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.07	0.47	2.00	< 0.005	0.02	—	0.02	0.02	—	0.02	—	291	291	0.01	< 0.005	—	292

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.10	0.10	1.73	0.00	0.00	0.29	0.29	0.00	0.07	0.07	—	316	316	0.01	0.01	1.16	320
Vendor	0.02	0.01	0.39	0.12	< 0.005	0.01	0.10	0.10	0.01	0.03	0.03	—	351	351	0.01	0.05	1.00	368
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.09	0.11	1.31	0.00	0.00	0.29	0.29	0.00	0.07	0.07	—	290	290	0.01	0.01	0.03	294
Vendor	0.02	0.01	0.40	0.12	< 0.005	0.01	0.10	0.10	0.01	0.03	0.03	—	351	351	0.01	0.05	0.03	367
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.10	1.18	0.00	0.00	0.25	0.25	0.00	0.06	0.06	—	252	252	0.01	0.01	0.43	255
Vendor	0.01	0.01	0.35	0.10	< 0.005	< 0.005	0.08	0.09	< 0.005	0.02	0.03	—	301	301	0.01	0.05	0.37	315
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.02	0.22	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	41.7	41.7	< 0.005	< 0.005	0.07	42.3
Vendor	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	49.8	49.8	< 0.005	0.01	0.06	52.2
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Building Construction (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.12	0.93	8.53	11.1	0.02	0.32	—	0.32	0.30	—	0.30	—	2,050	2,050	0.08	0.02	—	2,057
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.12	0.93	8.53	11.1	0.02	0.32	—	0.32	0.30	—	0.30	—	2,050	2,050	0.08	0.02	—	2,057
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.46	0.38	3.50	4.56	0.01	0.13	—	0.13	0.12	—	0.12	—	843	843	0.03	0.01	—	845
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.08	0.07	0.64	0.83	< 0.005	0.02	—	0.02	0.02	—	0.02	—	139	139	0.01	< 0.005	—	140
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.09	0.09	1.61	0.00	0.00	0.29	0.29	0.00	0.07	0.07	—	309	309	0.01	0.01	1.05	313
Vendor	0.02	0.01	0.37	0.11	< 0.005	0.01	0.10	0.10	0.01	0.03	0.03	—	345	345	0.01	0.05	0.94	362
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.10	1.22	0.00	0.00	0.29	0.29	0.00	0.07	0.07	—	284	284	< 0.005	0.01	0.03	288
Vendor	0.02	0.01	0.38	0.12	< 0.005	0.01	0.10	0.10	0.01	0.03	0.03	—	346	346	0.01	0.05	0.02	362
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.04	0.52	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	118	118	< 0.005	< 0.005	0.19	120
Vendor	0.01	< 0.005	0.16	0.05	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	142	142	< 0.005	0.02	0.17	149
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.10	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	19.6	19.6	< 0.005	< 0.005	0.03	19.8
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	23.5	23.5	< 0.005	< 0.005	0.03	24.6
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.12. Building Construction (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.49	0.43	2.95	12.8	0.02	0.10	—	0.10	0.09	—	0.09	—	2,050	2,050	0.08	0.02	—	2,057
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.49	0.43	2.95	12.8	0.02	0.10	—	0.10	0.09	—	0.09	—	2,050	2,050	0.08	0.02	—	2,057
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.20	0.18	1.21	5.26	0.01	0.04	—	0.04	0.04	—	0.04	—	843	843	0.03	0.01	—	845
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.03	0.22	0.96	< 0.005	0.01	—	0.01	0.01	—	0.01	—	139	139	0.01	< 0.005	—	140
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.09	0.09	1.61	0.00	0.00	0.29	0.29	0.00	0.07	0.07	—	309	309	0.01	0.01	1.05	313
Vendor	0.02	0.01	0.37	0.11	< 0.005	0.01	0.10	0.10	0.01	0.03	0.03	—	345	345	0.01	0.05	0.94	362
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.09	0.10	1.22	0.00	0.00	0.29	0.29	0.00	0.07	0.07	—	284	284	< 0.005	0.01	0.03	288
Vendor	0.02	0.01	0.38	0.12	< 0.005	0.01	0.10	0.10	0.01	0.03	0.03	—	346	346	0.01	0.05	0.02	362
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.04	0.52	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	118	118	< 0.005	< 0.005	0.19	120
Vendor	0.01	< 0.005	0.16	0.05	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	142	142	< 0.005	0.02	0.17	149

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.10	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	19.6	19.6	< 0.005	< 0.005	0.03	19.8
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	23.5	23.5	< 0.005	< 0.005	0.03	24.6
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Paving (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.75	0.63	5.49	7.59	0.01	0.23	—	0.23	0.21	—	0.21	—	1,157	1,157	0.05	0.01	—	1,161
Paving	—	0.30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.03	0.27	0.37	< 0.005	0.01	—	0.01	0.01	—	0.01	—	57.1	57.1	< 0.005	< 0.005	—	57.3
Paving	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.05	0.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	9.45	9.45	< 0.005	< 0.005	—	9.48

Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.26	0.00	0.00	0.23	0.23	0.00	0.05	0.05	—	241	241	0.01	0.01	0.82	245
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.1	11.1	< 0.005	< 0.005	0.02	11.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.83	1.83	< 0.005	< 0.005	< 0.005	1.86
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.14. Paving (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.45	0.39	2.55	7.99	0.01	0.10	—	0.10	0.10	—	0.10	—	1,157	1,157	0.05	0.01	—	1,161
Paving	—	0.30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.13	0.39	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	57.1	57.1	< 0.005	< 0.005	—	57.3
Paving	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	9.45	9.45	< 0.005	< 0.005	—	9.48
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.26	0.00	0.00	0.23	0.23	0.00	0.05	0.05	—	241	241	0.01	0.01	0.82	245
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	< 0.005	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.1	11.1	< 0.005	< 0.005	0.02	11.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.83	1.83	< 0.005	< 0.005	< 0.005	1.86
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.15. Architectural Coating (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.12	0.86	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	30.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.05	0.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.68	7.68	< 0.005	< 0.005	—	7.71
Architectural Coatings	—	1.78	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.27	1.27	< 0.005	< 0.005	—	1.28
Architectural Coatings	—	0.32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.32	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	61.8	61.8	< 0.005	< 0.005	0.21	62.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.31	3.31	< 0.005	< 0.005	0.01	3.35
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.55	0.55	< 0.005	< 0.005	< 0.005	0.56
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.16. Architectural Coating (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.12	0.86	1.13	< 0.005	0.02	—	0.02	0.02	—	0.02	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	30.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.05	0.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.68	7.68	< 0.005	< 0.005	—	7.71
Architectural Coatings	—	1.78	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.27	1.27	< 0.005	< 0.005	—	1.28
Architectural Coatings	—	0.32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.32	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	61.8	61.8	< 0.005	< 0.005	0.21	62.7
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.31	3.31	< 0.005	< 0.005	0.01	3.35
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.55	0.55	< 0.005	< 0.005	< 0.005	0.56
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Mobile source emissions results are presented in Sections 2.6. No further detailed breakdown of emissions is available.

4.1.2. Mitigated

Mobile source emissions results are presented in Sections 2.5. No further detailed breakdown of emissions is available.

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	40.9	40.9	0.00	0.00	—	40.9
Research & Development	—	—	—	—	—	—	—	—	—	—	—	—	141	141	0.00	0.00	—	141
Total	—	—	—	—	—	—	—	—	—	—	—	—	182	182	0.00	0.00	—	182
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	40.9	40.9	0.00	0.00	—	40.9
Research & Development	—	—	—	—	—	—	—	—	—	—	—	—	141	141	0.00	0.00	—	141
Total	—	—	—	—	—	—	—	—	—	—	—	—	182	182	0.00	0.00	—	182
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	6.77	6.77	0.00	0.00	—	6.77
Research & Development	—	—	—	—	—	—	—	—	—	—	—	—	23.3	23.3	0.00	0.00	—	23.3
Total	—	—	—	—	—	—	—	—	—	—	—	—	30.1	30.1	0.00	0.00	—	30.1

4.2.2. Electricity Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	35.6	35.6	0.00	0.00	—	35.6
Research & Development	—	—	—	—	—	—	—	—	—	—	—	—	122	122	0.00	0.00	—	122
Total	—	—	—	—	—	—	—	—	—	—	—	—	158	158	0.00	0.00	—	158
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	35.6	35.6	0.00	0.00	—	35.6
Research & Development	—	—	—	—	—	—	—	—	—	—	—	—	122	122	0.00	0.00	—	122
Total	—	—	—	—	—	—	—	—	—	—	—	—	158	158	0.00	0.00	—	158
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	5.89	5.89	0.00	0.00	—	5.89
Research & Development	—	—	—	—	—	—	—	—	—	—	—	—	20.3	20.3	0.00	0.00	—	20.3
Total	—	—	—	—	—	—	—	—	—	—	—	—	26.2	26.2	0.00	0.00	—	26.2

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Research & Development	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Research & Development	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Research & Development	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

4.2.4. Natural Gas Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Research & Development	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Research & Development	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Research & Development	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	1.50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.54	0.50	0.03	3.04	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	12.5	12.5	< 0.005	< 0.005	—	12.6
Total	0.54	2.18	0.03	3.04	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	12.5	12.5	< 0.005	< 0.005	—	12.6
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	1.50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	1.68	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Architectural	—	0.03	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.07	0.06	< 0.005	0.38	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.42	1.42	< 0.005	< 0.005	—	1.42
Total	0.07	0.37	< 0.005	0.38	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.42	1.42	< 0.005	< 0.005	—	1.42

4.3.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	1.50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.54	0.50	0.03	3.04	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	12.5	12.5	< 0.005	< 0.005	—	12.6
Total	0.54	2.18	0.03	3.04	< 0.005	0.01	—	0.01	< 0.005	—	< 0.005	—	12.5	12.5	< 0.005	< 0.005	—	12.6
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	1.50	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	1.68	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.03	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.07	0.06	< 0.005	0.38	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.42	1.42	< 0.005	< 0.005	—	1.42
Total	0.07	0.37	< 0.005	0.38	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.42	1.42	< 0.005	< 0.005	—	1.42

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	3.56	1.32	4.88	0.37	0.01	—	16.6
Research & Development	—	—	—	—	—	—	—	—	—	—	—	5.34	1.46	6.80	0.55	0.01	—	24.4
Total	—	—	—	—	—	—	—	—	—	—	—	8.90	2.77	11.7	0.91	0.02	—	40.9
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Office Park	—	—	—	—	—	—	—	—	—	—	—	3.56	1.32	4.88	0.37	0.01	—	16.6
Research & Development	—	—	—	—	—	—	—	—	—	—	—	5.34	1.46	6.80	0.55	0.01	—	24.4
Total	—	—	—	—	—	—	—	—	—	—	—	8.90	2.77	11.7	0.91	0.02	—	40.9
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	0.59	0.22	0.81	0.06	< 0.005	—	2.75
Research & Development	—	—	—	—	—	—	—	—	—	—	—	0.88	0.24	1.13	0.09	< 0.005	—	4.03
Total	—	—	—	—	—	—	—	—	—	—	—	1.47	0.46	1.93	0.15	< 0.005	—	6.78

4.4.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	3.56	1.32	4.88	0.37	0.01	—	16.6
Research & Development	—	—	—	—	—	—	—	—	—	—	—	5.34	1.46	6.80	0.55	0.01	—	24.4
Total	—	—	—	—	—	—	—	—	—	—	—	8.90	2.77	11.7	0.91	0.02	—	40.9
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Office Park	—	—	—	—	—	—	—	—	—	—	—	3.56	1.32	4.88	0.37	0.01	—	16.6
Research & Development	—	—	—	—	—	—	—	—	—	—	—	5.34	1.46	6.80	0.55	0.01	—	24.4
Total	—	—	—	—	—	—	—	—	—	—	—	8.90	2.77	11.7	0.91	0.02	—	40.9
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	0.59	0.22	0.81	0.06	< 0.005	—	2.75
Research & Development	—	—	—	—	—	—	—	—	—	—	—	0.88	0.24	1.13	0.09	< 0.005	—	4.03
Total	—	—	—	—	—	—	—	—	—	—	—	1.47	0.46	1.93	0.15	< 0.005	—	6.78

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	14.6	0.00	14.6	1.46	0.00	—	51.2
Research & Development	—	—	—	—	—	—	—	—	—	—	—	22.0	0.00	22.0	2.19	0.00	—	76.8
Total	—	—	—	—	—	—	—	—	—	—	—	36.6	0.00	36.6	3.66	0.00	—	128

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	14.6	0.00	14.6	1.46	0.00	—	51.2
Research & Development	—	—	—	—	—	—	—	—	—	—	—	22.0	0.00	22.0	2.19	0.00	—	76.8
Total	—	—	—	—	—	—	—	—	—	—	—	36.6	0.00	36.6	3.66	0.00	—	128
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	2.42	0.00	2.42	0.24	0.00	—	8.48
Research & Development	—	—	—	—	—	—	—	—	—	—	—	3.64	0.00	3.64	0.36	0.00	—	12.7
Total	—	—	—	—	—	—	—	—	—	—	—	6.06	0.00	6.06	0.61	0.00	—	21.2

4.5.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	14.6	0.00	14.6	1.46	0.00	—	51.2
Research & Development	—	—	—	—	—	—	—	—	—	—	—	22.0	0.00	22.0	2.19	0.00	—	76.8
Total	—	—	—	—	—	—	—	—	—	—	—	36.6	0.00	36.6	3.66	0.00	—	128

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	14.6	0.00	14.6	1.46	0.00	—	51.2
Research & Development	—	—	—	—	—	—	—	—	—	—	—	22.0	0.00	22.0	2.19	0.00	—	76.8
Total	—	—	—	—	—	—	—	—	—	—	—	36.6	0.00	36.6	3.66	0.00	—	128
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	2.42	0.00	2.42	0.24	0.00	—	8.48
Research & Development	—	—	—	—	—	—	—	—	—	—	—	3.64	0.00	3.64	0.36	0.00	—	12.7
Total	—	—	—	—	—	—	—	—	—	—	—	6.06	0.00	6.06	0.61	0.00	—	21.2

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.07	0.07
Research & Development	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.07	1.07

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.14	1.14
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.07	0.07
Research & Development	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.07	1.07
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.14	1.14
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
Research & Development	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.18	0.18
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.19	0.19

4.6.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.07	0.07
Research & Development	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.07	1.07
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.14	1.14

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.07	0.07
Research & Development	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.07	1.07
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.14	1.14
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Office Park	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.01	0.01
Research & Development	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.18	0.18
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.19	0.19

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetatio	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	4/1/2024	8/17/2024	6.00	120	—
Site Preparation	Site Preparation	8/18/2024	9/10/2024	6.00	20.0	—
Grading	Grading	9/11/2024	10/3/2024	6.00	20.0	—
Building Construction	Building Construction	10/4/2024	6/24/2026	6.00	539	—
Paving	Paving	7/19/2026	8/8/2026	6.00	18.0	—
Architectural Coating	Architectural Coating	6/25/2026	7/18/2026	6.00	21.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

Demolition	Tractors/Loaders/Backh	Diesel	Average	1.00	8.00	84.0	0.37
Demolition	Rubber Tired Dozers	Diesel	Average	2.00	8.00	367	0.40
Demolition	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Demolition	Crushing/Proc. Equipment	Gasoline	Average	1.00	8.00	12.0	0.85
Demolition	Rubber Tired Loaders	Diesel	Average	3.00	8.00	150	0.36
Demolition	Excavators	Diesel	Average	3.00	8.00	36.0	0.38
Site Preparation	Rubber Tired Dozers	Diesel	Average	1.00	7.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	7.00	84.0	0.37
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Grading	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Building Construction	Cranes	Diesel	Average	1.00	6.00	367	0.29
Building Construction	Forklifts	Diesel	Average	3.00	6.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	6.00	84.0	0.37
Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Paving	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Paving	Pavers	Diesel	Average	1.00	6.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	1.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	7.00	36.0	0.38
Paving	Cement and Mortar Mixers	Diesel	Average	2.00	6.00	10.0	0.56
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	1.00	8.00	84.0	0.37
Demolition	Rubber Tired Dozers	Diesel	Tier 4 Final	2.00	8.00	367	0.40
Demolition	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Demolition	Crushing/Proc. Equipment	Gasoline	Average	1.00	8.00	12.0	0.85
Demolition	Rubber Tired Loaders	Diesel	Tier 4 Final	3.00	8.00	150	0.36
Demolition	Excavators	Diesel	Average	3.00	8.00	36.0	0.38
Site Preparation	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	7.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	3.00	8.00	84.0	0.37
Grading	Graders	Diesel	Tier 4 Final	1.00	8.00	148	0.41
Grading	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	2.00	7.00	84.0	0.37
Grading	Rubber Tired Dozers	Diesel	Tier 4 Final	1.00	8.00	367	0.40
Grading	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Building Construction	Cranes	Diesel	Tier 4 Final	1.00	6.00	367	0.29
Building Construction	Forklifts	Diesel	Tier 4 Final	3.00	6.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	3.00	6.00	84.0	0.37
Building Construction	Welders	Diesel	Average	1.00	8.00	46.0	0.45
Paving	Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	1.00	8.00	84.0	0.37
Paving	Pavers	Diesel	Tier 4 Final	1.00	6.00	81.0	0.42
Paving	Paving Equipment	Diesel	Tier 4 Final	1.00	8.00	89.0	0.36

Paving	Rollers	Diesel	Average	2.00	7.00	36.0	0.38
Paving	Cement and Mortar Mixers	Diesel	Average	2.00	6.00	10.0	0.56
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	27.5	18.5	LDA,LDT1,LDT2
Demolition	Vendor	—	10.2	HHDT,MHDT
Demolition	Hauling	33.6	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	10.0	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	—	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	12.5	18.5	LDA,LDT1,LDT2
Grading	Vendor	—	10.2	HHDT,MHDT
Grading	Hauling	11.9	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	22.4	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	11.5	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT

Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	17.5	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	4.48	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	27.5	18.5	LDA,LDT1,LDT2
Demolition	Vendor	—	10.2	HHDT,MHDT
Demolition	Hauling	33.6	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	10.0	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	—	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	12.5	18.5	LDA,LDT1,LDT2
Grading	Vendor	—	10.2	HHDT,MHDT

Grading	Hauling	11.9	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	22.4	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	11.5	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	17.5	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	4.48	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00	0.00	105,000	35,000	—

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (Building Square Footage)	Acres Paved (acres)
Demolition	0.00	0.00	0.00	350,766	—
Grading	1,900	—	20.0	0.00	—
Paving	0.00	0.00	0.00	0.00	2.06

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%
Water Demolished Area	2	36%	36%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Office Park	2.06	100%
Research & Development	0.00	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2024	0.00	787	0.03	< 0.005
2025	0.00	600	0.03	< 0.005
2026	0.00	449	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Total all Land Uses	266	0.00	0.00	69,350	1,594	0.00	0.00	415,683

5.9.2. Mitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Total all Land Uses	266	0.00	0.00	69,350	1,594	0.00	0.00	415,683

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.1.2. Mitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	105,000	35,000	—

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.10.4. Landscape Equipment - Mitigated

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Office Park	533,389	28.0	0.0000	0.0000	0.00
Research & Development	1,834,039	28.0	0.0000	0.0000	0.00

5.11.2. Mitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
Office Park	464,053	28.0	0.0000	0.0000	0.00
Research & Development	1,595,629	28.0	0.0000	0.0000	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Office Park	1,857,800	849,517
Research & Development	2,786,700	0.00

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
Office Park	1,857,800	849,517
Research & Development	2,786,700	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Office Park	27.2	—
Research & Development	40.7	—

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
Office Park	27.2	—
Research & Development	40.7	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Office Park	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
Office Park	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Research & Development	Household refrigerators and/or freezers	R-134a	1,430	0.45	0.60	0.00	1.00

Research & Development	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0

5.14.2. Mitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
Office Park	Household refrigerators and/or freezers	R-134a	1,430	0.02	0.60	0.00	1.00
Office Park	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0
Research & Development	Household refrigerators and/or freezers	R-134a	1,430	0.45	0.60	0.00	1.00
Research & Development	Other commercial A/C and heat pumps	R-410A	2,088	< 0.005	4.00	4.00	18.0

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.15.2. Mitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

5.18.2.2. Mitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	26.3	annual days of extreme heat
Extreme Precipitation	2.65	annual days with precipitation above 20 mm
Sea Level Rise	0.00	meters of inundation depth
Wildfire	1.71	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	3	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A

Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	3	1	1	3
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	1	1	2
Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	97.6
AQ-PM	79.4
AQ-DPM	88.9
Drinking Water	77.4
Lead Risk Housing	43.1
Pesticides	0.00
Toxic Releases	54.7
Traffic	85.6
Effect Indicators	—
CleanUp Sites	47.0
Groundwater	0.00
Haz Waste Facilities/Generators	76.0
Impaired Water Bodies	0.00
Solid Waste	52.9
Sensitive Population	—
Asthma	23.8
Cardio-vascular	16.9
Low Birth Weights	88.0
Socioeconomic Factor Indicators	—
Education	53.4
Housing	98.5

Linguistic	76.1
Poverty	96.7
Unemployment	99.0

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	—
Employed	—
Median HI	—
Education	—
Bachelor's or higher	—
High school enrollment	—
Preschool enrollment	—
Transportation	—
Auto Access	—
Active commuting	—
Social	—
2-parent households	—
Voting	—
Neighborhood	—
Alcohol availability	—
Park access	—
Retail density	—
Supermarket access	—
Tree canopy	—

Housing	—
Homeownership	—
Housing habitability	—
Low-inc homeowner severe housing cost burden	—
Low-inc renter severe housing cost burden	—
Uncrowded housing	—
Health Outcomes	—
Insured adults	—
Arthritis	99.7
Asthma ER Admissions	57.0
High Blood Pressure	99.4
Cancer (excluding skin)	99.8
Asthma	12.1
Coronary Heart Disease	99.7
Chronic Obstructive Pulmonary Disease	96.5
Diagnosed Diabetes	99.6
Life Expectancy at Birth	0.0
Cognitively Disabled	66.4
Physically Disabled	96.9
Heart Attack ER Admissions	76.0
Mental Health Not Good	18.5
Chronic Kidney Disease	99.6
Obesity	86.4
Pedestrian Injuries	0.0
Physical Health Not Good	82.3
Stroke	99.7
Health Risk Behaviors	—

Binge Drinking	63.5
Current Smoker	26.1
No Leisure Time for Physical Activity	36.0
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	87.9
Elderly	99.5
English Speaking	0.0
Foreign-born	0.0
Outdoor Workers	86.7
Climate Change Adaptive Capacity	—
Impervious Surface Cover	74.8
Traffic Density	0.0
Traffic Access	55.8
Other Indices	—
Hardship	0.0
Other Decision Support	—
2016 Voting	0.0

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	82.0
Healthy Places Index Score for Project Location (b)	—
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Construction: Construction Phases	Construction schedule provided by UCR and project design teams.
Construction: Paving	Estimated hardscape area provided by Miller Hull, conservatively assumed to be 100% asphalt for modeling purposes.
Construction: Off-Road Equipment	Construction equipment list provided by UCR and project design teams.
Construction: Dust From Material Movement	Import estimates plus 20 percent for use in modeling provided by Miller Hull.
Characteristics: Utility Information	UCR policy to purchase 100% renewable energy mix from RPU by 2025 when project would be operational. Emissions factors in CO2e for RPU 100% renewable energy mix from 2022 Power Content Label applied to project electricity.
Operations: Energy Use	Energy use intensity based on 2021 LRDP EIR assumptions for academic/administrative uses (65 kBtu/sf/year) and lab/complex uses (149kBtu/sf/year). No natural gas connections will be made for the project.
Construction: Electricity	—
Operations: Water and Waste Water	Indoor water use based on 2021 LRDP EIR projections of 66.35 gallons per gsf building area. Outdoor water use per CalEEMod default.
Operations: Solid Waste	Waste generation based on rate of 0.85 ton of waste per capita from 2021 LRDP EIR and employment generation of 80 individuals.

Existing UNEX Building Operation Detailed Report

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1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Existing UNEX Building Operation
Operational Year	2027
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.20
Precipitation (days)	14.2
Location	33.974991387904964, -117.33756759618979
County	Riverside-South Coast
City	Riverside
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	5490
EDFZ	11
Electric Utility	City of Riverside
Gas Utility	Southern California Gas
App Version	2022.1.1.21

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
User Defined Educational	1.00	User Defined Unit	4.10	196,641	17,859	—	—	—

Unenclosed Parking with Elevator	54.0	1000sqft	1.24	54,000	—	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.30	6.69	3.38	13.7	0.02	0.27	0.00	0.27	0.26	0.00	0.26	25.0	4,181	4,206	2.92	0.07	0.00	4,299
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.36	4.90	3.28	2.76	0.02	0.25	0.00	0.25	0.25	0.00	0.25	25.0	4,136	4,161	2.91	0.07	0.00	4,254
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.69	6.13	3.35	10.2	0.02	0.26	0.00	0.26	0.26	0.00	0.26	25.0	4,167	4,192	2.92	0.07	0.00	4,285
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.31	1.12	0.61	1.87	< 0.005	0.05	0.00	0.05	0.05	0.00	0.05	4.15	690	694	0.48	0.01	0.00	709

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	1.94	6.51	0.09	10.9	< 0.005	0.02	—	0.02	0.01	—	0.01	—	44.8	44.8	< 0.005	< 0.005	—	45.0
Energy	0.36	0.18	3.28	2.76	0.02	0.25	—	0.25	0.25	—	0.25	—	4,129	4,129	0.35	0.01	—	4,140
Water	—	—	—	—	—	—	—	—	—	—	—	25.0	6.94	32.0	2.57	0.06	—	114
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	2.30	6.69	3.38	13.7	0.02	0.27	0.00	0.27	0.26	0.00	0.26	25.0	4,181	4,206	2.92	0.07	0.00	4,299
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	—	4.72	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.36	0.18	3.28	2.76	0.02	0.25	—	0.25	0.25	—	0.25	—	4,129	4,129	0.35	0.01	—	4,140
Water	—	—	—	—	—	—	—	—	—	—	—	25.0	6.94	32.0	2.57	0.06	—	114
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.36	4.90	3.28	2.76	0.02	0.25	0.00	0.25	0.25	0.00	0.25	25.0	4,136	4,161	2.91	0.07	0.00	4,254
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	1.33	5.95	0.06	7.47	< 0.005	0.01	—	0.01	0.01	—	0.01	—	30.7	30.7	< 0.005	< 0.005	—	30.8
Energy	0.36	0.18	3.28	2.76	0.02	0.25	—	0.25	0.25	—	0.25	—	4,129	4,129	0.35	0.01	—	4,140
Water	—	—	—	—	—	—	—	—	—	—	—	25.0	6.94	32.0	2.57	0.06	—	114
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	1.69	6.13	3.35	10.2	0.02	0.26	0.00	0.26	0.26	0.00	0.26	25.0	4,167	4,192	2.92	0.07	0.00	4,285
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	0.24	1.09	0.01	1.36	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.08	5.08	< 0.005	< 0.005	—	5.10

Energy	0.07	0.03	0.60	0.50	< 0.005	0.05	—	0.05	0.05	—	0.05	—	684	684	0.06	< 0.005	—	685
Water	—	—	—	—	—	—	—	—	—	—	—	4.15	1.15	5.29	0.43	0.01	—	18.9
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.31	1.12	0.61	1.87	< 0.005	0.05	0.00	0.05	0.05	0.00	0.05	4.15	690	694	0.48	0.01	0.00	709

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Educational	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Unenclosed Parking with Elevator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Educational	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Unenclosed Parking with Elevator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Educational	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Unenclosed Parking with Elevator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Educational	—	—	—	—	—	—	—	—	—	—	—	—	198	198	0.00	0.00	—	198
Unenclosed Parking with Elevator	—	—	—	—	—	—	—	—	—	—	—	—	11.7	11.7	0.00	0.00	—	11.7
Total	—	—	—	—	—	—	—	—	—	—	—	—	210	210	0.00	0.00	—	210

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Educational	—	—	—	—	—	—	—	—	—	—	—	—	198	198	0.00	0.00	—	198
Unenclosed Parking with Elevator	—	—	—	—	—	—	—	—	—	—	—	—	11.7	11.7	0.00	0.00	—	11.7
Total	—	—	—	—	—	—	—	—	—	—	—	—	210	210	0.00	0.00	—	210
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Educational	—	—	—	—	—	—	—	—	—	—	—	—	32.8	32.8	0.00	0.00	—	32.8
Unenclosed Parking with Elevator	—	—	—	—	—	—	—	—	—	—	—	—	1.93	1.93	0.00	0.00	—	1.93
Total	—	—	—	—	—	—	—	—	—	—	—	—	34.7	34.7	0.00	0.00	—	34.7

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Educational	0.36	0.18	3.28	2.76	0.02	0.25	—	0.25	0.25	—	0.25	—	3,919	3,919	0.35	0.01	—	3,930

Unenclosed Parking with Elevator	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.36	0.18	3.28	2.76	0.02	0.25	—	0.25	0.25	—	0.25	—	3,919	3,919	0.35	0.01	—	3,930
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Educational	0.36	0.18	3.28	2.76	0.02	0.25	—	0.25	0.25	—	0.25	—	3,919	3,919	0.35	0.01	—	3,930
Unenclosed Parking with Elevator	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.36	0.18	3.28	2.76	0.02	0.25	—	0.25	0.25	—	0.25	—	3,919	3,919	0.35	0.01	—	3,930
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Educational	0.07	0.03	0.60	0.50	< 0.005	0.05	—	0.05	0.05	—	0.05	—	649	649	0.06	< 0.005	—	651
Unenclosed Parking with Elevator	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.07	0.03	0.60	0.50	< 0.005	0.05	—	0.05	0.05	—	0.05	—	649	649	0.06	< 0.005	—	651

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	4.21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.51	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	1.94	1.79	0.09	10.9	< 0.005	0.02	—	0.02	0.01	—	0.01	—	44.8	44.8	< 0.005	< 0.005	—	45.0
Total	1.94	6.51	0.09	10.9	< 0.005	0.02	—	0.02	0.01	—	0.01	—	44.8	44.8	< 0.005	< 0.005	—	45.0
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	4.21	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.51	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	4.72	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.77	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.09	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.24	0.22	0.01	1.36	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.08	5.08	< 0.005	< 0.005	—	5.10
Total	0.24	1.09	0.01	1.36	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.08	5.08	< 0.005	< 0.005	—	5.10

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Educational	—	—	—	—	—	—	—	—	—	—	—	25.0	6.94	32.0	2.57	0.06	—	114
Unenclosed Parking with Elevator	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	25.0	6.94	32.0	2.57	0.06	—	114
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Educational	—	—	—	—	—	—	—	—	—	—	—	25.0	6.94	32.0	2.57	0.06	—	114
Unenclosed Parking with Elevator	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	25.0	6.94	32.0	2.57	0.06	—	114
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Educational	—	—	—	—	—	—	—	—	—	—	—	4.15	1.15	5.29	0.43	0.01	—	18.9

Unenclos Parking with Elevator	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	4.15	1.15	5.29	0.43	0.01	—	18.9

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Educational	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Unenclosed Parking with Elevator	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Educational	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Unenclosed Parking with Elevator	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
User Defined Educational	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Unenclosed Parking with Elevator	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Sequest	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
User Defined Educational	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Unenclosed Parking with Elevator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	297,391	98,590	3,240

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	250

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
User Defined Educational	2,582,239	28.0	0.0000	0.0000	12,229,621
Unenclosed Parking with Elevator	152,172	28.0	0.0000	0.0000	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
User Defined Educational	13,065,946	283,167
Unenclosed Parking with Elevator	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
User Defined Educational	0.00	—
Unenclosed Parking with Elevator	0.00	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	26.3	annual days of extreme heat
Extreme Precipitation	2.65	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	1.71	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score

Temperature and Extreme Heat	3	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	3	1	1	3
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	1	1	2
Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	97.6
AQ-PM	79.4
AQ-DPM	88.9
Drinking Water	77.4
Lead Risk Housing	43.1
Pesticides	0.00
Toxic Releases	54.7
Traffic	85.6
Effect Indicators	—
CleanUp Sites	47.0
Groundwater	0.00
Haz Waste Facilities/Generators	76.0
Impaired Water Bodies	0.00
Solid Waste	52.9
Sensitive Population	—
Asthma	23.8
Cardio-vascular	16.9
Low Birth Weights	88.0
Socioeconomic Factor Indicators	—

Education	53.4
Housing	98.5
Linguistic	76.1
Poverty	96.7
Unemployment	99.0

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	—
Employed	—
Median HI	—
Education	—
Bachelor's or higher	—
High school enrollment	—
Preschool enrollment	—
Transportation	—
Auto Access	—
Active commuting	—
Social	—
2-parent households	—
Voting	—
Neighborhood	—
Alcohol availability	—
Park access	—
Retail density	—

Supermarket access	—
Tree canopy	—
Housing	—
Homeownership	—
Housing habitability	—
Low-inc homeowner severe housing cost burden	—
Low-inc renter severe housing cost burden	—
Uncrowded housing	—
Health Outcomes	—
Insured adults	—
Arthritis	99.7
Asthma ER Admissions	57.0
High Blood Pressure	99.4
Cancer (excluding skin)	99.8
Asthma	12.1
Coronary Heart Disease	99.7
Chronic Obstructive Pulmonary Disease	96.5
Diagnosed Diabetes	99.6
Life Expectancy at Birth	0.0
Cognitively Disabled	66.4
Physically Disabled	96.9
Heart Attack ER Admissions	76.0
Mental Health Not Good	18.5
Chronic Kidney Disease	99.6
Obesity	86.4
Pedestrian Injuries	0.0
Physical Health Not Good	82.3

Stroke	99.7
Health Risk Behaviors	—
Binge Drinking	63.5
Current Smoker	26.1
No Leisure Time for Physical Activity	36.0
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	87.9
Elderly	99.5
English Speaking	0.0
Foreign-born	0.0
Outdoor Workers	86.7
Climate Change Adaptive Capacity	—
Impervious Surface Cover	74.8
Traffic Density	0.0
Traffic Access	55.8
Other Indices	—
Hardship	0.0
Other Decision Support	—
2016 Voting	0.0

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	82.0
Healthy Places Index Score for Project Location (b)	—
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes

Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Characteristics: Utility Information	UCR policy to purchase 100% renewable energy mix from RPU by 2025 when operational emissions are calculated. Emissions factors in CO2e for RPU 100% renewable energy mix from 2022 Power Content Label applied to project electricity.
Land Use	Assumed landscape area is up to 10 percent of existing site.
Operations: Energy Use	Based on 2021 LRDP EIR existing energy use intensity for academic buildings, split between electricity and natural gas consumption at default CalEEMod rate for University/College land use. Default parking garage energy use maintained.
Operations: Water and Waste Water	Indoor water use based on 2021 LRDP EIR baseline of 66.44 gallons per gsf building area. Outdoor water use per CalEEMod default.
Operations: Solid Waste	Waste generation based on rate of 0.85 ton of waste per capita from 2021 LRDP EIR.

Appendix B

Historic Resource Evaluation

State of California The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code ____________ Reviewer ____________________ Date __________________

Page 1 **of** 13 ***Resource Name or #:** (Assigned by recorder) UC Riverside University Extension Center (UNEX)

P1. Other Identifier: # P5722 ("Appendix B. 2021 Long Range Development Plan -Project No. 958098- Campus-wide Results, 2020 Historic Resources Survey" by Rincon Consultants, Inc.)

***P2. Location:** **Not for Publication** **Unrestricted**

***a. County** Riverside **and** (P2c, P2e, and P2b or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Riverside East, Calif. **Date** 1967 (Rev 1980) **T** 2S; **R** 4W **Sec** 30

c. Address 1200 University Avenue City Riverside Zip 92507

d. UTM: (Give more than one for large and/or linear resources) Zone 11S, 468827 mE/ 3759434 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, decimal degrees, etc., as appropriate)

APN: 000151965

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

See Continuation Sheet

***P3b. Resource Attributes:** (List attributes and codes) HP5. Hotel/motel (1974-1992); HP15. Educational building (1992-present)

***P4. Resources Present:** Building Structure Object Site District Element of District Other (Isolates, etc.)

P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects.)

P5b. Description of Photo: (view, date, accession #)
North (primary) façade, view southeast (Google Earth)

***P6. Date Constructed/Age and Source:** Historic Prehistoric Both 1968, 1984 (Architectural plans and original building permit)

***P7. Owner and Address:**
University of California, Riverside
900 University Avenue
Riverside, CA 92521

***P8. Recorded by:**
Nelson White, M.S.H.P.
HELIX Environmental Planning, Inc.
7578 El Cajon Blvd.
La Mesa, CA 91942

***P9. Date Recorded:**
January 22, 2024

***P10. Survey Type:** (Describe)
Intensive Survey

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")
None

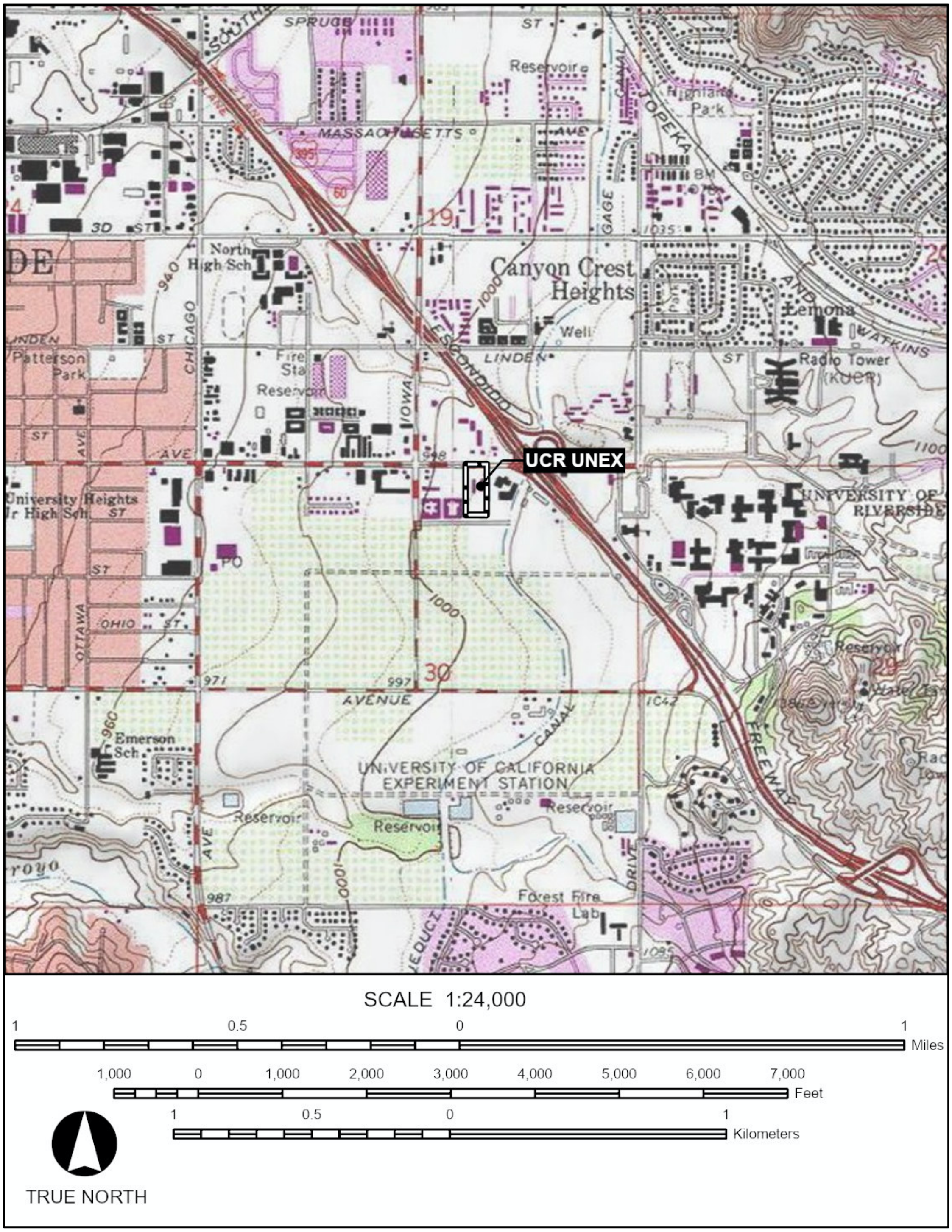
***Attachments:** NONE Location Map Continuation Sheet Building, Structure, and Object Record Archaeological Record District Record Linear Feature Record Milling Station Record Rock Art Record Artifact Record Photograph Record Other (List):

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI#
Trinomial

Page 2 **of** 13 ***Resource Name or #** (Assigned by recorder) UC Riverside University Extension Center (UNEX)

***Map Name:** Riverside East, Calif. ***Scale:** 1:24,000 ***Date of map:** 1967 (PR 1980)



BUILDING, STRUCTURE, AND OBJECT RECORD

***Resource Name or #** (Assigned by recorder) UC Riverside University Extension Center (UNEX) ***NRHP Status Code** 6Z

B1. Historic Name: Holiday Inn of America
B2. Common Name: UNEX
B3. Original Use: Hotel B4. Present Use: Unoccupied educational building
***B5. Architectural Style:** Mid-Century Modern
***B6. Construction History:** (Construction date, alterations, and date of alterations)

See Continuation Sheet

***B7. Moved?** ■**No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:**
Parking garage, swimming pool.

B9a. Architect: Rissman and Rissman Associates; Homer A. Rissman building, designer; Marshall W. Rissman, architect
b. Builder: Unknown
***B10. Significance: Theme** N/A **Area** N/A
Period of Significance N/A **Property Type** N/A **Applicable Criteria** N/A (Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

See Continuation Sheet

B11. Additional Resource Attributes: (List attributes and codes) None
***B12. References:**

City of Riverside, California. Various dates. Building Permits.

County of Riverside Assessor's Office records, various dates.

"Guide to the Homer Rissman Architectural Records." University of Nevada Las Vegas Special Collections and Archives. 2019

"Holiday Inn Slated for Shopping Center." *Los Angeles Times*, October 4, 1964, H21.

Manning, Mary and Koch, Ed. "Obituary of Homer Rissman." *Los Vegas Sun*. October 4, 2001.

Rincon Consultants, Inc. *2021 Long Range Development Plan. Historic Resources Survey Report. Project No. 958098*. Prepared for University of California, Riverside. May 2021.

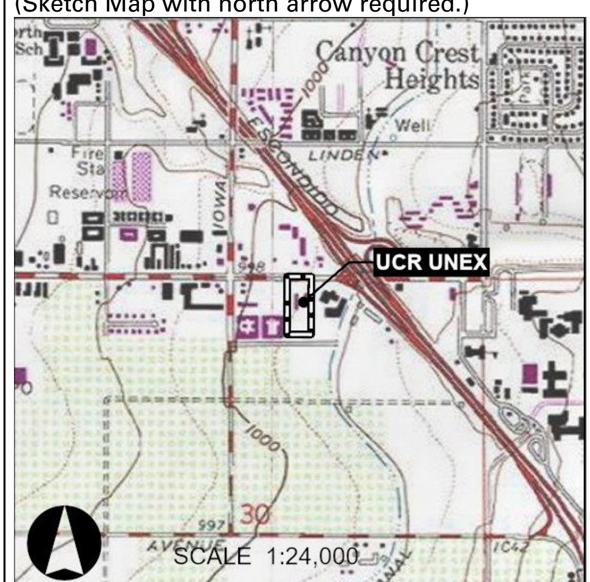
Rissman and Rissman Associates. Architectural plans for 1200 University Avenue. 1967.

Rissman and Rissman Associates. Architectural plans for 1200 University Avenue. 1984.

B13. Remarks: N/A
***B14. Evaluator:** Nelson White, M.S.H.P.
***Date of Evaluation:** January 22, 2024

(This space reserved for official comments.)

(Sketch Map with north arrow required.)



***P3a. Description**

Located west of the central UCR campus (west of I-215), the UC Riverside University Extension Building (UNEX), is situated on the south side of University Avenue. The UNEX building was designed by architects Rissman & Rissman Associates in two phases: 1968 and 1984. Its present U-shape plan consists of three components: 1) one-story east wing, 2) five-story west wing, and 3) a three-deck parking garage. The exterior walls consist primarily of reinforced poured concrete clad in cement plaster. Fenestration consists of metal-framed fixed and sliding windows. It is capped by flat roofs. The architectural description begins with the north (primary) façade and continues counterclockwise to the west, south, and east elevations.

The north (primary) façade is asymmetrical. The one-story east wing (1968) has seven evenly spaced large windows divided into nine lites each. It is capped by a decorative mansard parapet finished with metal standing seam panels. At center is a replacement pair of metal-framed glass doors surrounded by fixed glass panels (date unknown). A replacement entry portico projects north from the entrance (date unknown). It has a barrel shaped roof, with metal bracing, supported at the north end by two metal posts. The west wing of the façade (1968) is five stories. This section is blind. It is accentuated by recessed horizontal scores at each floor. The far west corner is recessed and features non-original decorative metal I-beam bracing (date unknown).

The west elevation is divided into three parts: the five-story north section of the west wing (1968), the five-story central section of the west wing (1984), and the three-deck parking garage (1984). The north section is divided into 10 bays that are visually divided vertically and horizontally by the projecting structural elements. The bays of the ground story vary in arrangement of windows and doors, while those of the upper four stories are consistent with three windows per bay and floor. The metal bracing of the northwest corner wraps around to this section, extending four bays on ground and second stories before receding a bay with each story from the third to the fifth story. The elevation has a deep, but narrow, recess between the original north and added central sections. The central section is divided into 10 bays that are visually divided vertically and horizontally by recessed scores. Each bay and floor exhibit a window centered within a chamfered recess. The ground story and fifth story appear to be visually taller than the rest with more blank walls above the windows than on the other three stories. The south bay is blind. The south parking garage section projects from the rest of the elevation by approximately 20 feet. The garage is largely open with pre-cast concrete railings on each deck.

The south elevation is symmetrical. Consisting entirely of the parking garage, the elevation is largely blind with only the southwest and southeast corners open to the parking decks.

The east elevation is divided into four parts: parking garage (1984), a walled courtyard, the one-story addition (1984), and the original one-story section (1968). From south to north the parking garage on this elevation is three decks with the same openness as on the west elevation. Vehicular entrances and exits are located at the south and north ends of the east elevation of the garage. The next section exhibits a wall and open pedestrian entry into the enclosed courtyard. The entry exhibits a decorative metal arch with diagonal bracing (date unknown) mimicking that of the entry portico of the north façade. The central and north one-story wings are blind. A narrow span of decorative mansard parapet, matching that of the north façade, acts as a visual demarcation between the 1984 addition and the original 1968 north section. An enclosed passageway, that projects from the lower half of the elevation, spans across most of the east wing (1984). The east elevation of the west wing is visible above and behind the east wing. It is largely identical to its east elevation with the most noticeable difference being the decorative metal bracing applied to the south end of the north section (as opposed to the north end).

The UNEX building is largely surrounded by pavement for vehicular passage and parking. Mature trees and lawn accentuate the north and south ends of the property.

P5a. Photo – continued

Figure 1. Overview of north (primary) façade, view south (Google Earth)

Figure 2. West elevation, view southeast (Google Earth)

Figure 3. West and south elevations, view northeast (Google Earth)

Figure 4. South end of east elevation, view west (Google Earth)

Figure 5. Central section of east elevation, view southwest (Google Earth)

Figure 6. North end of east elevation, view southeast (Google Earth)

***B6. Construction History:**

The “UC Riverside University Extension Center” (UNEX) was designed and built in two phases: 1968 and 1984 for Holiday Inn of America. Rissman & Rissman Associates were the architects for both phases (a brief biography of the firm follows this construction history). Designed in the Mid-Century Modern style, the building was U-shaped in plan. The original north section is comprised of the east and west wings and housed public spaces on the ground floor: reception, a coffee shop, dining room, cocktail lounge, and kitchen. The south end of the one-story east wing housed a banquet room. A rectangular pool was situated south of the east wing. The five-story west wing housed 118 hotel rooms.

In 1984 the hotel was expanded with two additions. A one-story addition was added to the east wing to house more banquet rooms. The previous pool was removed and a new smaller one and spa were installed south of the new east wing (no longer extant). To the west wing a new five-story addition was added with 19 hotel rooms per floor for a total of 95. A three-deck parking garage was added to the south of the east and west wings.

In 1992 the University purchased the property. The first floor was converted into classrooms and gathering space and the upper floors largely retained their configuration as hotel rooms, housing offices and visiting researchers.

Since its original construction in 1968, known alterations to the exterior include the three additions (1984), removal of the Holiday Inn branding (presumably in 1992), possible alteration of the entry canopy (date unknown), removal of the 1984 pool and spa, and the addition of the metal bracing to parts of the original hotel wing (date unknown).

Rissman & Rissman

The 1968 and 1984 architectural plans for the UNEX building indicate that Rissman & Rissman Associates were the architects for both phases of construction. The firm was founded in 1960 by brothers Homer A. Rissman (1927-2001) and Marshall W. Rissman (1923-1981), who had previously practiced separately. Rissman & Rissman were prolific designers and renovators of hotels, casinos, and country clubs, often in the Mid-Century Modern style, in Southern California and Las Vegas. As the “in-house” architects for Holiday Inn, Marshall created prototypical franchise designs that were used throughout Southern California. An early example of this was the 1964 Holiday Inn in West Covina, which was five stories tall and featured poured concrete and window walls. In Southern California the firm designed such hotels as Palm Springs Riviera Hotel (1956 and 1975), Pen & Quill (1962), Holiday Inn (West Covina, 1964), and the Holiday Inn (Westwood, 1971). In Las Vegas the firm designed expansions to the Hacienda, Tropicana (1964), Dunes, Tally Ho (1961), Castaways, and the Silver Slipper. Arguably the firm’s most recognizable commission is the tent-shaped Circus Circus (1968) in Las Vegas. In 1974 the Woodwork Institute of California gave the Award of Excellence to the firm for their design of the Holiday Casino (Las Vegas). In 2001 the American Institute of Architects posthumously awarded Homer with the Lifetime Achievement award.

***B6. Construction History:**

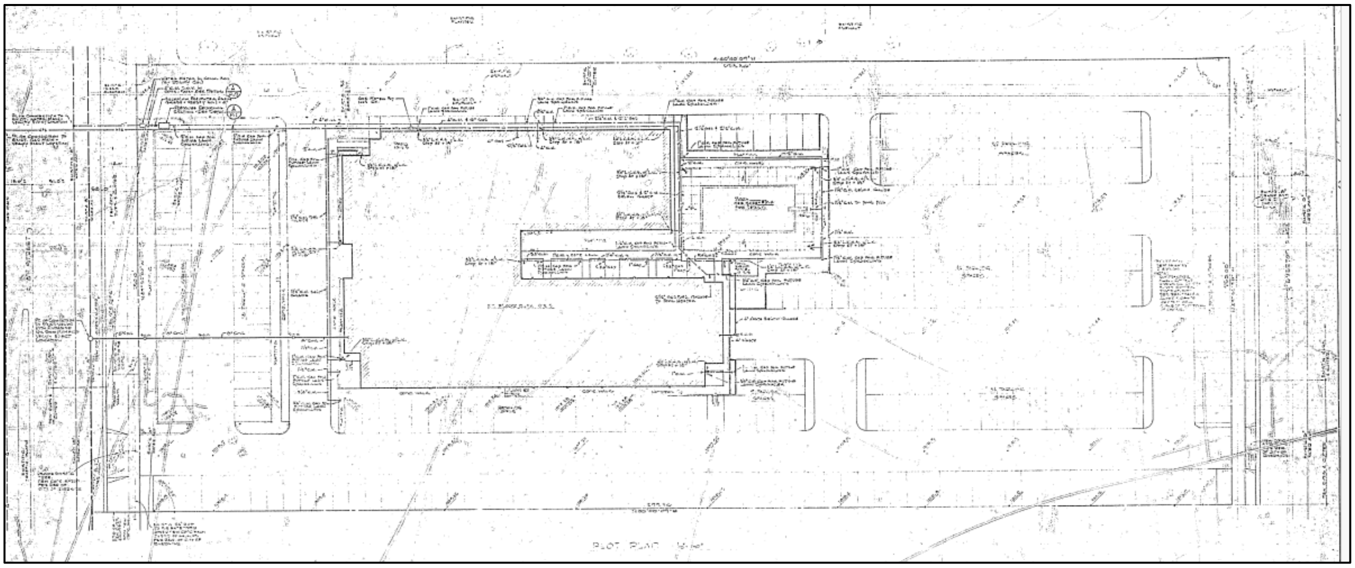


Figure 1. Site Plan of 1200 University Avenue, 1968 (Rissman & Rissman Associates)

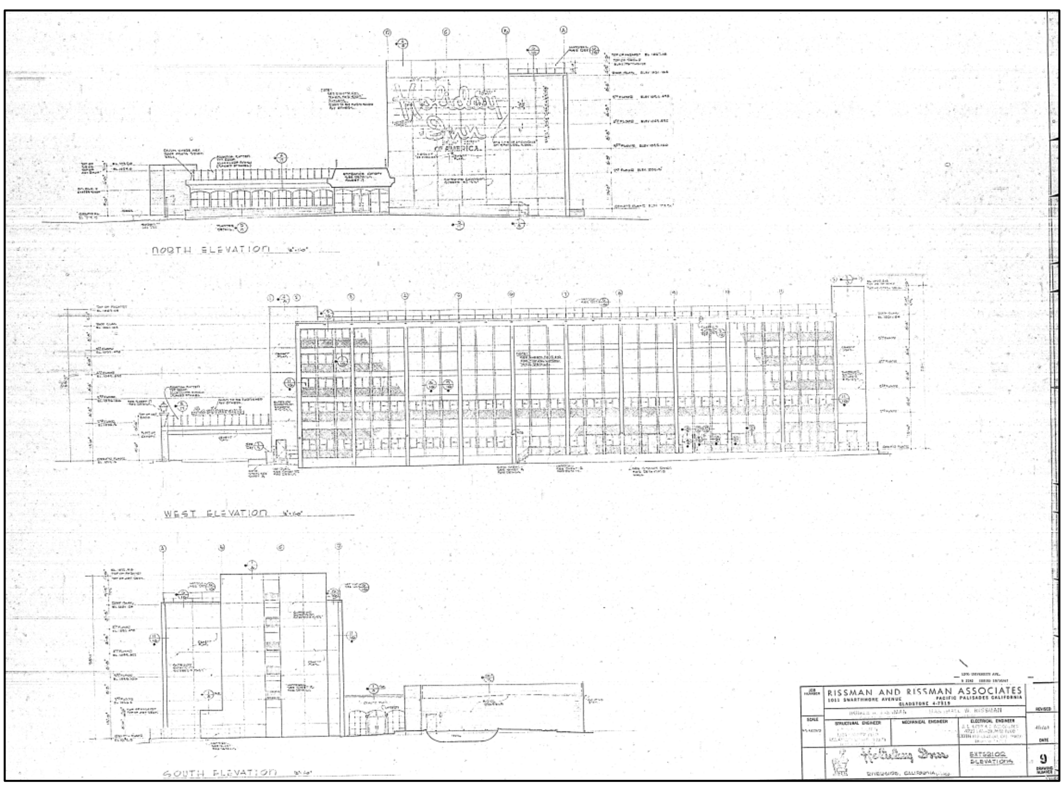


Figure 2. North, west, and south elevations, 1968 (Rissman & Rissman Associates)

CONTINUATION SHEET

 ***Resource Name or #** (Assigned by recorder) UC Riverside University Extension Center (UNEX)

***Recorded by:** Nelson White, M.S.H.P. ***Date** January 22, 2024 ■ Continuation ☐ Update

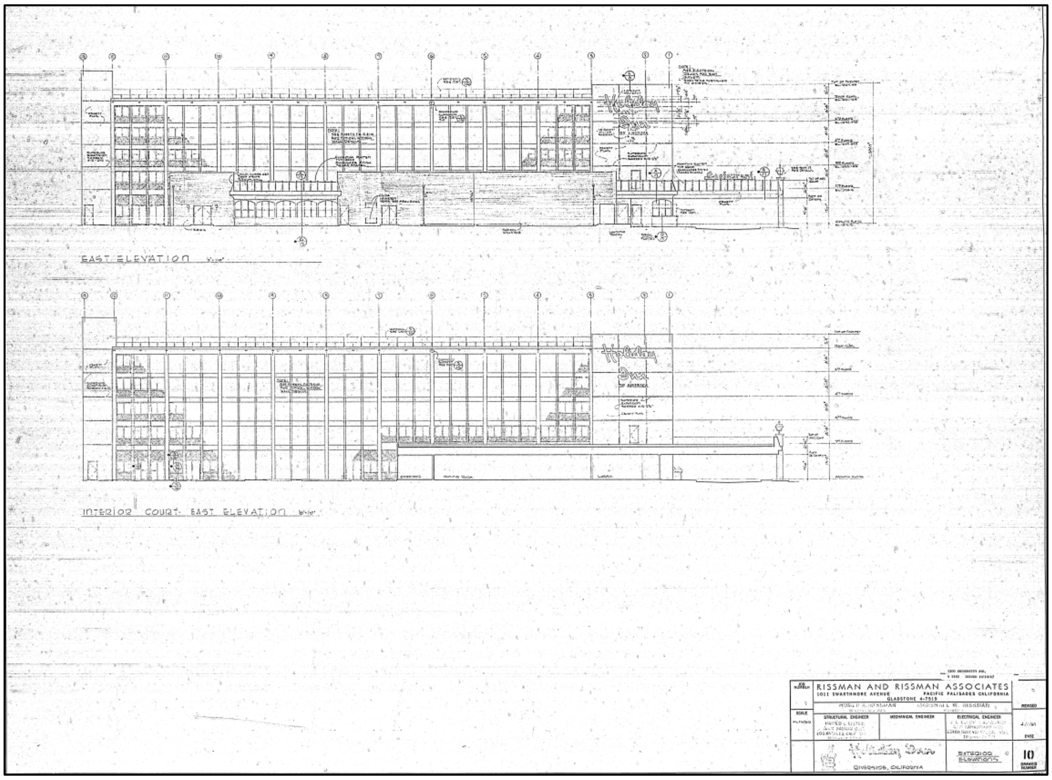


Figure 1. East elevations, 1968 (Rissman & Rissman Associates)

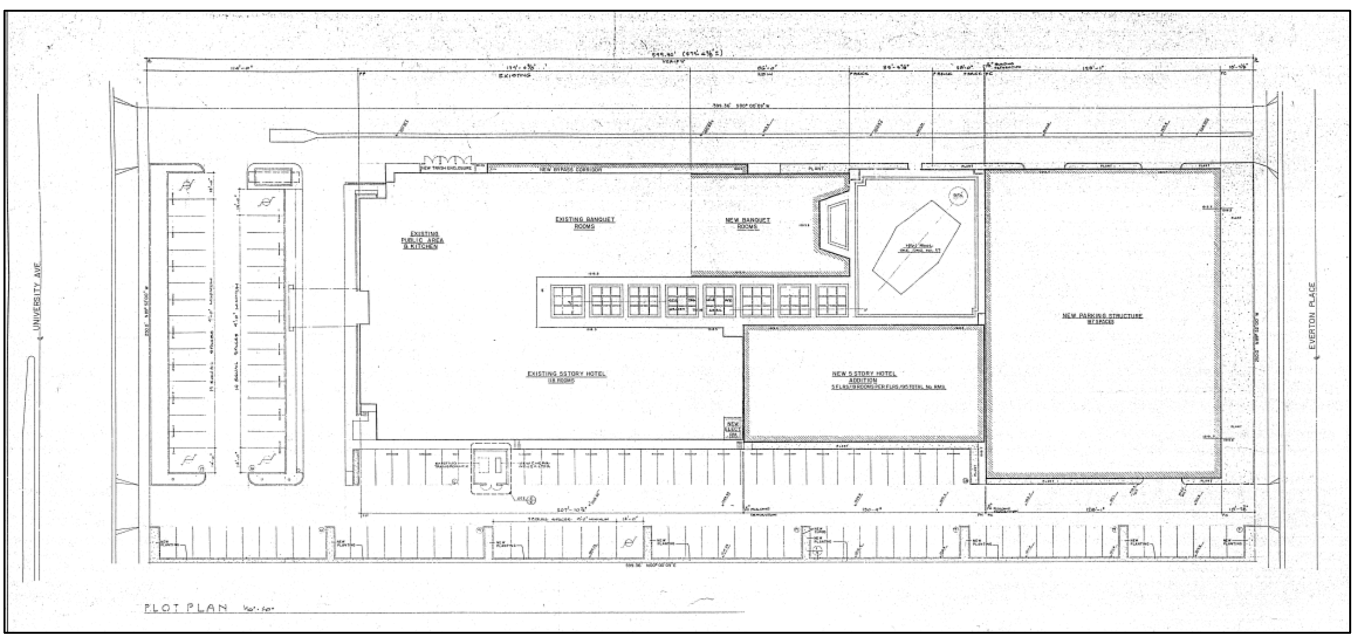


Figure 2. Altered site plan of 1200 University Avenue, 1984 (Rissman & Rissman Associates)

CONTINUATION SHEET

Page 11 **of** 13 ***Resource Name or #** (Assigned by recorder) UC Riverside University Extension Center (UNEX)

***Recorded by:** Nelson White, M.S.H.P. ***Date** January 22, 2024 ■ Continuation ☐ Update

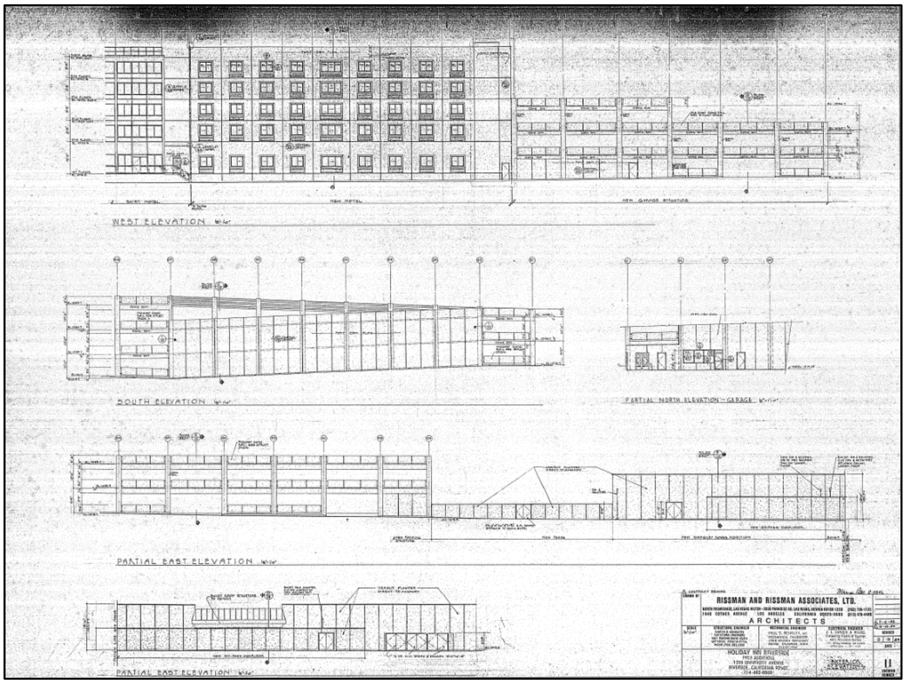


Figure 5. West, south, and east elevations, 1984 (Rissman & Rissman Associates)

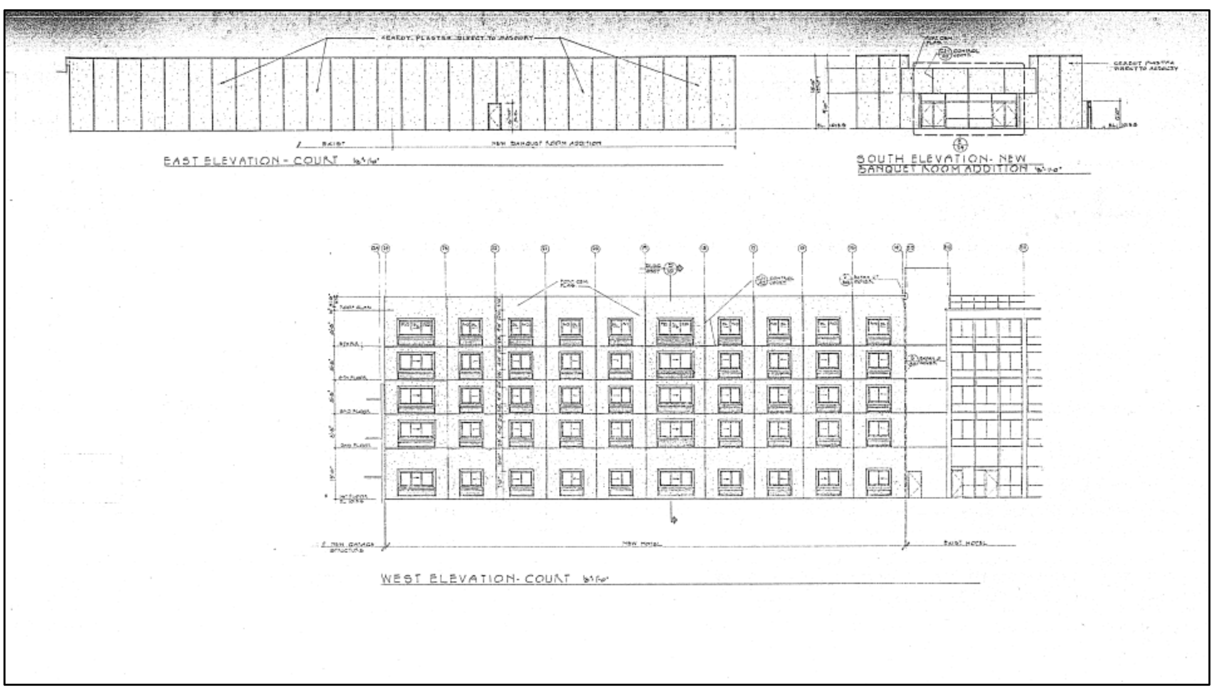


Figure 6. East, south, and west elevations, 1984 (Rissman & Rissman Associates)

***B10. Significance:**

The Mid-Century Modern-style UNEX building, constructed in 1968 and 1984, is presently owned by the University of Riverside. Therefore, this evaluation utilized the 2020 *Historic Resources Survey Report's* historic contexts and eligibility standards, specifically: **a)** Context #2: Riverside's Postwar Boom, 1945-1975; Theme: Postwar Institutional Expansion in Riverside; Subtheme: Founding of the University of California, Riverside, 1953-1975; **b)** Context #3: Social and Cultural Development, 1953-1975; Theme: Civil Rights Movement and Student Activism at UCR and Theme: Initiatives in Cultural Diversity, Ethnic Studies, and Student Support; and **c)** Context #4: Architecture and Design, 1916-1975; Theme: Modernism in Riverside.

With its original 1968 construction date, the UNEX building falls outside two periods associated with UCR's construction chronology: 1) UCR College of Letters and Sciences, 1953-1958 and 2) Creation of UCR "General Campus," 1959-1967.

Previous Evaluation

As part of the *Campus-Wide Results* of the *2020 Historic Resources Survey*, Rincon Environmental Consultants recommended the UNEX building is not a historical resource.

NRHP and CRHR Evaluation

Criteria A/1

Two of the *Historic Resources Survey's* contexts were utilized to evaluate the UNEX building under Criteria A/1.

- Context #2: Riverside's Postwar Boom, 1945-1975;
    - Theme: Postwar Institutional Expansion in Riverside;
        - Subtheme: Founding of the University of California, Riverside, 1953-1975
- Context #3: Social and Cultural Development, 1935-1975,
    - Theme: Civil Rights Movement and Student Activism at UCR and
    - Theme: Initiatives in Cultural Diversity, Ethnic Studies, and Student Support.

The UNEX building does not meet eligibility standards for the *Historic Resources Survey's* Contexts #2 and #3. Although the UNEX building was originally constructed (1968) during the period of significance for the historic context and themes, it was built as and functioned as a Holiday Inn from 1968 to 1992. It was not a part of UCR until the University acquired the property in 1992. Research to date does not indicate a strong "association with the postwar institutional expansion of Riverside and the opening decades of UCR" (Context #2), a strong "association with the Civil Rights Movement and era of student activism" (Context #3), nor a strong association with Cultural Diversity, Ethnic Studies, and Student Support (Context #3).

In addition, research to date does not indicate the UNEX building to have a strong association with any event, pattern of events, or trend that made a significant contribution to local, state, or national history.

Although the UNEX building was constructed during the Era of Transition, 1968-1975 of UCR's construction chronology, which was characterized by enrollment decline, it was built as and functioned as a Holiday Inn from 1968 to 1992. It was not a part of UCR until the University acquired the property in 1992. Research to date does not indicate a strong association with this period of UCR's history.

Therefore, the UNEX building is not eligible under Criteria A/1 for listing in the NRHP and the CRHR.

Criteria B/2

Two of the *Historic Resources Survey's* contexts were utilized to evaluate the UNEX building under Criteria B/2.

- Context #2: Riverside's Postwar Boom, 1945-1975;
  - Theme: Postwar Institutional Expansion in Riverside;
    - Subtheme: Founding of the University of California, Riverside, 1953-1975
- Context #3: Social and Cultural Development, 1935-1975,
  - Theme: Civil Rights Movement and Student Activism at UCR and
  - Theme: Initiatives in Cultural Diversity, Ethnic Studies, and Student Support.

The UNEX building does not meet eligibility standards for the *Historic Resources Survey's* Contexts #2 and #3. Although the UNEX building was originally constructed (1968) during the period of significance for the historic context and themes, research to date does not indicate a strong "association with a prominent individual who played a significant role in the university's founding, development, or achievements" (Context #2), a strong "association with an individual who played in significant role in the Civil Rights Movement and era of student activism" (Context #3), nor a strong association with an individual who played a significant role in UCR's Cultural Diversity, Ethnic Studies, and Student Support (Context #3).

In addition, although hundreds of Holiday Inn employees and UCR employees and students were associated with the UNEX building over nearly six decades since its construction, research to date does not indicate a strong or direct association between any of them and any demonstrably important contributions to local, state, or national history.

Therefore, the UNEX building is not eligible under Criteria B/2 for listing in the NRHP and the CRHR.

Criteria C/3

One of the *Historic Resources Survey's* contexts were utilized to evaluate the UNEX building under Criteria C/3.

- *Context #4:* Architecture and Design, 1916-1975;
  - Theme: Modernism in Riverside.

The UNEX building exhibits some characteristics and construction methods of Mid-Century Modern commercial architecture in its simple geometric volumes, horizontal massing, lack of ornamentation, flat roofs, poured concrete and glass. However, as its form, design, and materials are common for the period and style, it is an unexceptional example of Mid-Century Modern commercial architecture. Nor is there any indication that innovative or experimental construction methods were used.

Likewise, the UNEX building does not meet eligibility standards for the *Historic Resources Survey's* Context #4: Architecture and Design: Associated Architectural Styles, Architects, and Design Professionals, Theme: Modernism in Riverside. The UNEX building was designed by Rissman & Rissman Associates, who are not listed in the Architects section of the *Historic Resources Survey's* Context #4. Compared to examples recommended eligible by the *Survey* (Social Sciences-Humanities Building (Watkins Hall) and Costo Hall) that better exemplify the style's character-defining features, the UNEX building does not "exhibit quality of design through distinctive features and/or represent an excellent, intact example of the style at UCR." Moreover, although designed by Rissman & Rissman Associates, the 1984 additions to the UNEX building are less than 50 years old and have not achieved historic significance in their own right.

While Rissman & Rissman Associates were a prolific Southern California firm that contributed to the built environment of the region, the UNEX building is not recognized as a notable example of their work generally or within the region. The building was one of several Southern California prototypical designs by the firm for Holiday Inn. It was neither the first of these nor the last. The firm is not listed in the Architects of Modernism section of the City of Riverside's *Modernism Context Statement*. The firm was arguably best known for its hotels in Las Vegas. The UNEX (former Holiday Inn) building was not widely published upon its construction, nor did it receive any local or peer awards.

Because it does not embody distinctive characteristics of a type, period or method of construction, does not possess high artistic value, nor is it a notable example of a master architect, it is not eligible under Criteria C/3 for listing in the NRHP and the CRHR.

Summary

Based on the preceding investigation and analysis, the UNEX building is not individually eligible for listing in the NRHP and the CRHR. Therefore, the UNEX building is not a historical resource for the purposes of the California Environmental Quality Act (CEQA) nor a historic property for the purposes of Section 106 of the National Historic Preservation Act of 1966.

Appendix C

Geotechnical Investigation Report

Geotechnical Investigation Report

Proposed OASIS Park
University of California, Riverside
Riverside, California

Prepared for:

University of California, Riverside
1223 University Avenue, Suite 240
Riverside, CA 92507

June 29, 2023
Project No.: 220759.3

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June 29, 2023
Project No.: 220759.3

Ms. Daneca Stevens
Project Manager
Planning, Design, and Construction
University of California, Riverside
1223 University Avenue, Suite 240
Riverside, CA 92507

Subject: **Geotechnical Investigation Report**
Proposed OASIS Park
University of California, Riverside
Riverside, California

Dear Ms. Stevens,

In accordance with your request and authorization, we are presenting the results of our geotechnical investigation for the proposed OASIS Park project located at the University of California, Riverside in Riverside, California. The purpose of our investigation is to characterize subsurface conditions of the site and evaluate seismic and geologic hazards at the site.

This report was prepared in accordance with the requirements of the 2022 California Building Code (2022 CBC) and ASCE 7-16 (ASCE, 2017). The geotechnical engineer of record from the Design/Build team shall utilize this report and provide geotechnical recommendations for the construction and design of the proposed project.

We appreciate the opportunity to be of service on this project. Should you have any questions regarding this report or if we can be of further service, please do not hesitate to contact the undersigned.

Respectfully submitted,
TWINING, INC.

REGISTERED PROFESSIONAL ENGINEER
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G-2606
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1. INTRODUCTION

This report presents the results of the geotechnical investigation performed by Twining, Inc. (Twining) for the proposed OASIS Park project located at University of California, Riverside in Riverside, California. A description of the site and the proposed improvements is provided in the following section. The objectives of this investigation have been to characterize subsurface conditions of the site and evaluate seismic and geologic hazards at the site. Our investigation was performed in conformance with the 2022 California Building Code (2022 CBC) and ASCE 7-16 (ASCE, 2017).

2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The overall OASIS site is located at the existing Parking Lot 50 and 1200 University Avenue on University of California, Riverside campus in Riverside, California, as shown on Figure 1 – Site Location Map. The approximate site coordinates are latitude 33.974715°N and longitude 117.336899°W, on the Riverside East, California 7½-Minute Quadrangle, according to the United States Geological Survey (USGS) topographic maps (USGS 2022). The overall OASIS site is bound by University Avenue on the north, the Gage Canal on the east, Everton Place on the south, and commercial properties on the west. The western third of the site is currently occupied by the University Extension building, a four-story parking garage, and surface parking lots. The eastern portion of the site is covered by Parking Lots 50 and 51. Three buildings previously occupied the site of Lot 50 and were demolished around 2017. The site covers approximately 8.25 acres. The site is relatively flat with a surface elevation that varies from approximately 1011 feet mean sea level (msl) in the northwest corner, to 1024 feet msl in the northeast corner, to 1022 feet msl in the southeast corner, to 1013 feet msl in the southwest corner. Twining previously conducted borings in September of 2017 for an abandoned Outpatient Pavilion project that was planned for Parking Lot 50. The borings from that investigation and this current investigation are used in the preparation of this report.

The proposed project will consist of the construction of a new technology park consisting of research laboratories, technology incubator, training facilities, hybrid-learning room, offices, community spaces, other supporting uses, and parking on the western portion of the OASIS Site. Associated improvements such as new flatwork, landscape areas, and utilities are also expected. We note that a conceptual plan layout of the proposed development is not available at the time of preparation of this report. The scope of our report is to provide a comprehensive evaluation of the site; we note that additional borings/investigation may be required depending on the actual locations of the new structures relative to completed boring locations. A site plan and the locations of our borings are depicted on Figure 2 – Site Plan and Boring Location Map.

3. SCOPE OF WORK

Our scope of work included review of background information, pre-field activities and field exploration, laboratory testing, and report preparation. These tasks are described in the following subsections.

3.1. Literature Review

We reviewed readily available background data including published geologic maps, topographic maps, aerial photographs, seismic hazard maps and literature, and flood hazard maps relevant to the subject site. Relevant information has been incorporated into this report. A partial list of literature reviewed is presented in the "Selected References" section of this report.

3.2. Pre-Field Activities

Before starting our exploration program, we performed a geotechnical site reconnaissance to observe the general surficial conditions at the site and to select field exploration locations. After exploration locations were delineated, Underground Service Alert was notified of the planned locations a minimum of 72 hours prior to excavation. Additionally, existing as-built utility plans were reviewed by Twining and the University to determine if the proposed boring locations conflicted with existing underground utilities.

3.3. Field Exploration

The field exploration consisted of drilling, testing, sampling, and logging of 8 exploratory borings (B-9 through B-14, P-1, and P-2) and percolation testing in 2 of the borings (P-1 and P-2) conducted at the site on December 1 and 2, 2022. The approximate exploration locations are shown on Figure 2 – Site Plan and Boring Location Map. Additionally, Twining previously conducted 8 borings at the site in September and October of 2017. The locations of those borings are also shown on Figure 2.

The borings were advanced to approximate depths of 5 to 51.5 feet below ground surface (bgs) using a CME-75 truck-mounted drill rig equipped with 8-inch-diameter hollow-stem-auger (HSA). All borings were first excavated to 5 feet bgs using a hand-auger to clear potential underground utilities.

Drive samples of the soils were obtained from the borings using a Standard Penetration Test (SPT) sampler without room for liner and a modified California split-spoon sampler. The samplers were driven using a 140-pound automatic hammer falling approximately 30 inches. The blow counts to drive the samplers were recorded, and subsurface conditions encountered in the borings were logged by a Twining field engineer under the supervision of a California Registered Geotechnical Engineer. Bulk samples were collected from the upper 5-foot soil cuttings. The samples were transported to Twining's geotechnical engineering laboratory in Long Beach, California for examination and testing.

In-situ percolation testing was performed in borings P-1 and P-2, which were advanced to 5 feet bgs, to provide estimates of infiltration rate of the site soils. In 2017 Twining conducted percolation tests at borings B-7 and B-8 at depths of 30 feet and 10 feet, respectively. The results of the infiltration testing are discussed in Appendix A – Field Exploration.

Upon completion of exploration, the borings deeper than 5 feet were backfilled with lean concrete grout. The 5-foot-deep borings were backfilled with soil cuttings. The surface was repaired to match existing conditions.

Detailed descriptions of the field exploration and the soils encountered during the current and previous drilling are presented in Appendix A – Field Exploration.

3.4. Geotechnical Laboratory Testing

Laboratory tests were performed on selected samples obtained from the borings to aid in the soil classification and to evaluate the engineering properties of site soils. The following tests were performed in general accordance with ASTM and Caltrans standards:

- In-situ moisture and density (ASTM D2937),
- #200 Wash (ASTM D1140),
- Atterberg Limits (ASTM D4318),
- Expansion Index (ASTM D4829),

- Consolidation (ASTM D2435),
- Direct shear (ASTM D3080),
- Maximum dry density and optimum moisture content (ASTM D1557),
- Resistance value (R-value) (ASTM D2844), and
- Corrosivity (Caltrans test methods CT417, CT422, and CT 643).

Detailed laboratory test procedures and results are presented in Appendix B – Laboratory Testing.

3.5. Report Preparation

We compiled and analyzed the data collected from our field exploration and laboratory testing. We performed engineering analyses based on our literature review and data from field exploration and laboratory testing programs. Our analyses included the following:

- Site geology, and subsurface conditions,
- Groundwater conditions,
- Geologic hazards and seismic design parameters, and
- Liquefaction potential and seismic settlement.

We prepared this report to present our conclusions from this investigation.

4. GEOLOGY AND SUBSURFACE CONDITIONS

The regional and site geology and subsurface conditions are described in this section, based on our data review and field investigation. A portion of the geologic map is reproduced as Figure 3 – Geologic Map. Detailed subsurface conditions are presented in Appendix A – Field Exploration.

4.1. Regional Geology

The project site is located within the central portion of the Perris Block, a relatively stable terrain which is bounded on the north by the Cucamonga fault zone, on the east by the San Jacinto fault zone, on the south by the San Felipe fault zone, and on the west by the Elsinore fault zone. The Perris Block, in turn, is situated within the northern portion of the Peninsular Ranges geomorphic province. The Peninsular Range province occupies the southwestern portion of the state, south of the Transverse Ranges and west of the Colorado geomorphic provinces.

The Peninsular Ranges province is characterized generally by northwest-trending mountains and valleys, traversed by northwest-trending faults. Within the Perris Block, the predominant rock exposures comprise a multitude of Cretaceous-age plutonic emplacements known collectively as the southern California batholith. Locally these plutons intruded Jurassic-age metavolcanic and metasedimentary rocks and Paleozoic-age limestone, schist, and gneiss. Valleys are mantled by Quaternary-age alluvial fan deposits and recent alluvium derived from erosion of the adjacent mountains.

According to geologic mapping published by the Dibblee Geological Foundation (Dibblee, 2003), the project site is underlain by Pleistocene alluvial fan deposits (map symbol: Qoa). These deposits are described as "deposits of sand, minor gravel, tan to light reddish brown." A portion of this geologic map is reproduced as Figure 3, Regional Geologic Map.

4.2. Surface and Subsurface Conditions

Earth materials encountered during our subsurface investigation generally consist of a thin layer of undocumented fill underlain by alluvial fan deposits which extend to the total depth of exploration. Based on our field observations, the undocumented fill consists of silty sand on the order of 1 to 8 feet in thickness, with the average depth of approximately 3.5 feet. It should be noted that the undocumented fill thickness may vary across the site. The alluvial deposits consist predominantly of medium dense to very dense sand with varying amounts of fines.

Detailed information regarding the exploratory excavations is presented in Appendix A - Field Exploration.

4.3. Groundwater

Groundwater was not encountered within our exploratory borings drilled to a maximum depth of approximately 51½ feet below the existing grade. Based on our review of the California Water Resource website, the groundwater level is reportedly situated at a depth greater than 150 feet below the ground surface. Groundwater conditions may vary across the site due to stratigraphic and hydrologic conditions and may change over time because of seasonal and meteorological fluctuations, or of activities by humans at this and nearby site.

5. GEOLOGIC HAZARDS AND SEISMIC DESIGN CONSIDERATIONS

The site is in a seismically active area, as is the majority of southern California, and the potential for strong ground motion in the project area is considered high during the design life of the proposed development. The hazards associated with seismic activity in the vicinity of the site area discussed in the following sections.

5.1. Active Faulting and Surface Fault Rupture

The subject site is not located within a State of California Alquist-Priolo Earthquake Fault Zone (Alquist-Priolo EFZ, formerly known as a Special Studies Zone) (Hart and Bryant, 1997). The closest know active fault to the site is the San Jacinto fault, located approximately 6.21 miles to the northeast from the project site. It is our opinion that the likelihood of fault rupture occurring at the site during the design life of the proposed improvements is low.

5.2. Liquefaction Potential

Liquefaction is the phenomenon in which loosely deposited granular soils with silt and clay contents of less than approximately 35 percent, and non-plastic silts located below the water table undergo rapid loss of shear strength when subjected to strong earthquake-induced ground shaking. Ground shaking of sufficient duration results in the loss of grain-to-grain contact due to a rapid rise in pore water pressure and causes the soil to behave as a fluid for a short period of time.

Liquefaction is generally known to occur in loose, saturated, relatively clean, fine-grained cohesionless soils at depths shallower than approximately 50 feet. Factors to consider in the evaluation of soil liquefaction potential include groundwater conditions, soil type, grain size distribution, relative density, degree of saturation, and both the intensity and duration of ground motion. Other phenomena associated with soil liquefaction include sand boils, ground oscillation, and loss of foundation bearing capacity.

The California Geological Survey (CGS) has not published literature or maps within the project site that would indicate a state-designated Zone of Required Investigation for Liquefaction. However, Riverside County has mapped the site in an area of "Low" concern for liquefaction. Based on the depth of groundwater approximately 150 feet bgs, and site subsurface conditions, it is our opinion that liquefaction potential at the site is low.

5.3. Seismic Settlement Potential

Seismic settlement can occur when loose to medium dense granular materials densify during seismic shaking and liquefaction. Seismic settlement may occur in dry, unsaturated, as well as saturated soils. Based on the results of our field exploration, we believe that seismic settlement is possible at the site. The geotechnical engineer of record for the Design/Build team should evaluate the possibility of seismic settlement at the site.

5.4. Landslides

The area of the project site is not within an area with the potential for earthquake-induced landslides. Considering the site is flat and not close to significant slopes, the potential for earthquake-induced landslides to occur at the site is considered negligible.

5.5. Tsunamis and Seiches

Tsunamis are waves generated by massive landslides near or under sea water. Based on California Official Tsunami Inundation Maps, the site is not located on any State of California Tsunami Inundation Map for Emergency Planning. The potential for the site to be adversely impacted by earthquake-induced tsunamis is negligible.

Seiches are standing wave oscillations of an enclosed water body after the original driving force has dissipated. The potential for the site to be adversely impacted by earthquake-induced seiches is considered negligible due to the lack of any significant enclosed bodies of water located in the vicinity of the site.

5.6. Flooding

The Federal Emergency Management Agency (FEMA) has prepared flood insurance rate maps (FIRMs) for use in administering the National Flood Insurance Program, effective September 26, 2008. Based on our review of online FEMA flood mapping, the site is located within Zone X with minimal flood hazard.

5.7. Deaggregated Seismic Source Parameters

We performed a seismic hazard de-aggregation analysis for the peak ground acceleration with a probability of exceedance of 2% in 50 years. The analysis used the USGS Unified Hazard Tool based on the 2014 USGS seismic source model. The results of the analysis indicate the controlling modal moment magnitude and fault distance are 8.1 Mw and 6.3 miles (10.1 km), respectively.

5.8. Site Class for Seismic Design

Based on the SPT resistance, it is our opinion that Site Class D may be used for the project seismic design according to Chapter 20 of ASCE 7-16.

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5.9. Seismic Design Parameters

Seismic design for new buildings should be based on the 2022 CBC and ASCE 7-16. As the site is classified as seismic Site Class D and the mapped spectral acceleration parameter at period 1-second, S_1, is greater than 0.2 g, the 2022 CBC requires a site-specific ground motion hazard analysis following Section 11.4.7 of ASCE 7-16 for new buildings.

Alternatively, Exception 2 in Section 11.4.8 of ASCE 7-16 may be used for the project new buildings in lieu of the site-specific ground motion hazard analysis. For seismic design of new buildings based on this exception, seismic design parameters in Table 1 may be used, based on site coordinates of latitude 33.974715°N and longitude 117.336899°W.

Table 1 – Seismic Design Parameters Based on 2022 CBC and ASCE 7-16 for Design Based on Exception 2 in Section 11.4.8 of ASCE 7-16

Design Parameters	Value
Site Class	D
Mapped Spectral Acceleration Parameter at Period of 0.2-Second, S_s (g)	1.5
Mapped Spectral Acceleration Parameter at Period 1-Second, S_1 (g)	0.6
Site Coefficient, F_a	1
Site Coefficient, F_v	1.7
Adjusted MCE_R[1] Spectral Response Acceleration Parameter, S_{MS} (g)	1.5
Adjusted MCE_R[1] Spectral Response Acceleration Parameter, S_{M1} (g)	1.02
Design Spectral Response Acceleration Parameter, S_{DS} (g)	1
Design Spectral Response Acceleration Parameter, S_{D1} (g)	0.68
Risk Coefficient, C_{RS}	0.934
Risk Coefficient, C_{R1}	0.909
Peak Ground Acceleration, PGA_M[2] (g)	0.656
Seismic Design Category[3]	D
Long-Period Transition Period, T_L (seconds)	8
$T_S = S_{D1} / S_{DS}$	0.68

When using the above parameters for seismic design, the seismic design coefficient C_s should be calculated as follows:
For $T \le 1.5T_S$, $C_S = S_{DS}/(R/I_e)$
For $T_L \ge T > 1.5T_S$, $C_S = 1.5\ S_{D1}/(T\ R/I_e)$
For $T > T_L$, $C_S = 1.5\ (S_{D1}\ T_L)/(T^2\ R/I_e)$
where
T = the fundamental period of the structure(s) determined in Section 12.8.2 of ASCE 7-16;
R = the response modification factor determined in Table 12.2-1 of ASCE 7-16; and
I_e = the importance factor determined in accordance with Section 11.5.1 of ASCE 7-16.

Notes: [1] Risk-Targeted Maximum Considered Earthquake.
[2] Peak Ground Acceleration adjusted for site effects.
[3] For S_1 greater than or equal to 0.75g, the Seismic Design Category is E for risk category I, II, and III structures and F for risk category IV structures.

6. LIMITATIONS

This report presents geotechnical data and seismic design criteria for the proposed project site. The information may be used by the project design team to develop recommendations based on the information provided. The designer should supplement this data with additional data as the deem necessary to provide thorough geotechnical design recommendations.

Due to the limited nature of our field explorations, conditions not observed and described in this report may be present on the site. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. It should be understood that conditions different from those anticipated in this report may be encountered during grading operations.

Site conditions, including groundwater elevation, can change with time as a result of natural processes or the activities of man at the subject site or at nearby sites. Changes to the applicable laws, regulations, codes, and standards of practice may occur as a result of government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Twining, Inc. has no control.

Twining performed its evaluation using the degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical professionals with experience in this area in similar soil conditions. No other warranty, either express or implied, is made as to the conclusions and recommendations contained in this report.

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7. SELECTED REFERENCES

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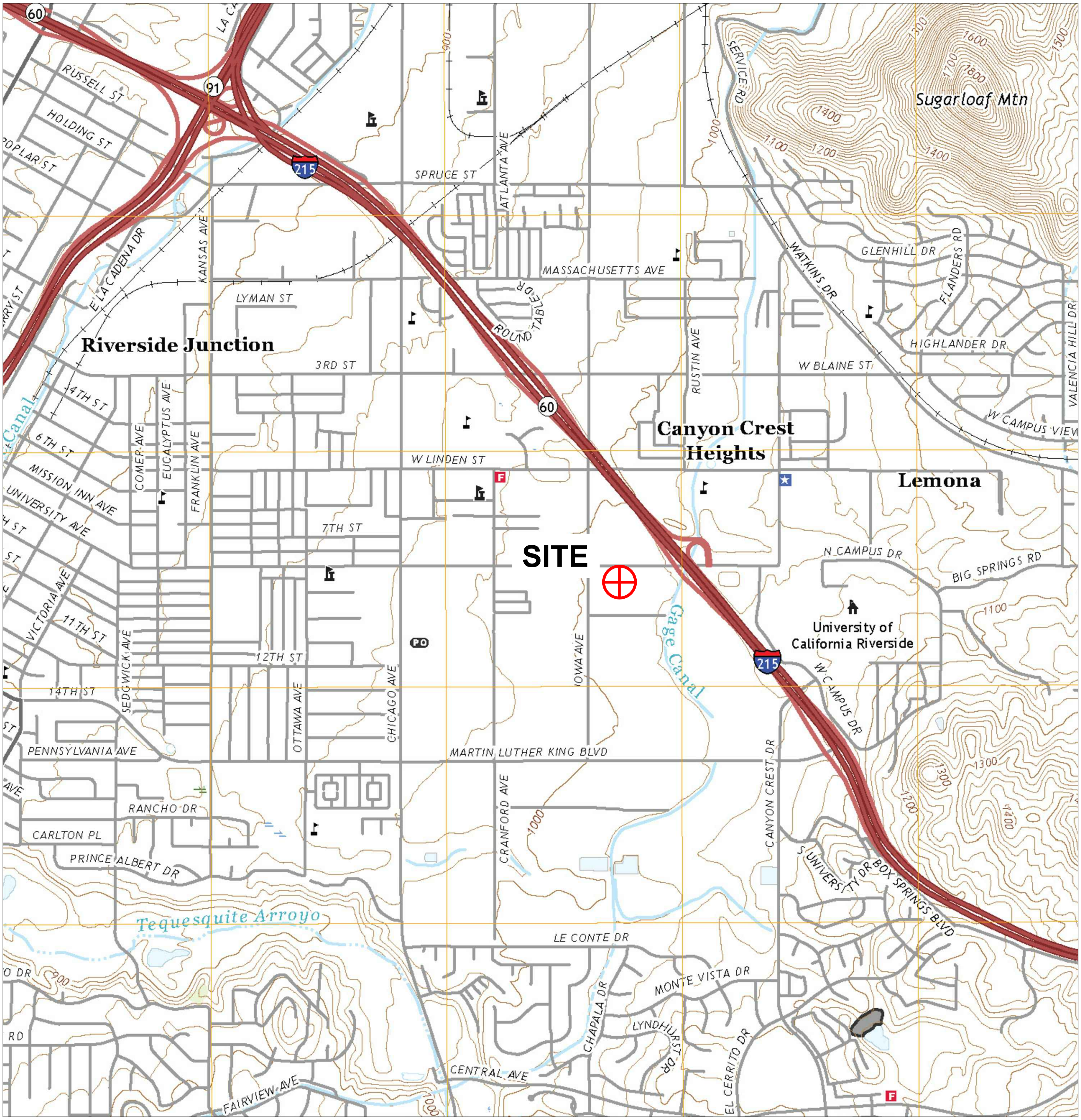
FIGURES



APPROXIMATE LOCATION OF PROJECT

SCALE IN FEET

0 2000 4000

REFERENCE: USGS (2022)

TWINING

SITE LOCATION MAP

OASIS PARK
UNIVERSITY OF CALIFORNIA
RIVERSIDE, CA

PROJECT NO.	REPORT DATE	FIGURE 1
220759.3	June 2023	

SCALE IN FEET

0 100 200

NOTE: ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE

LEGEND

B-1 TD=51.5' — APPROXIMATE LOCATION OF BORING BY TWINING (2022) TOTAL DEPTH IN FEET

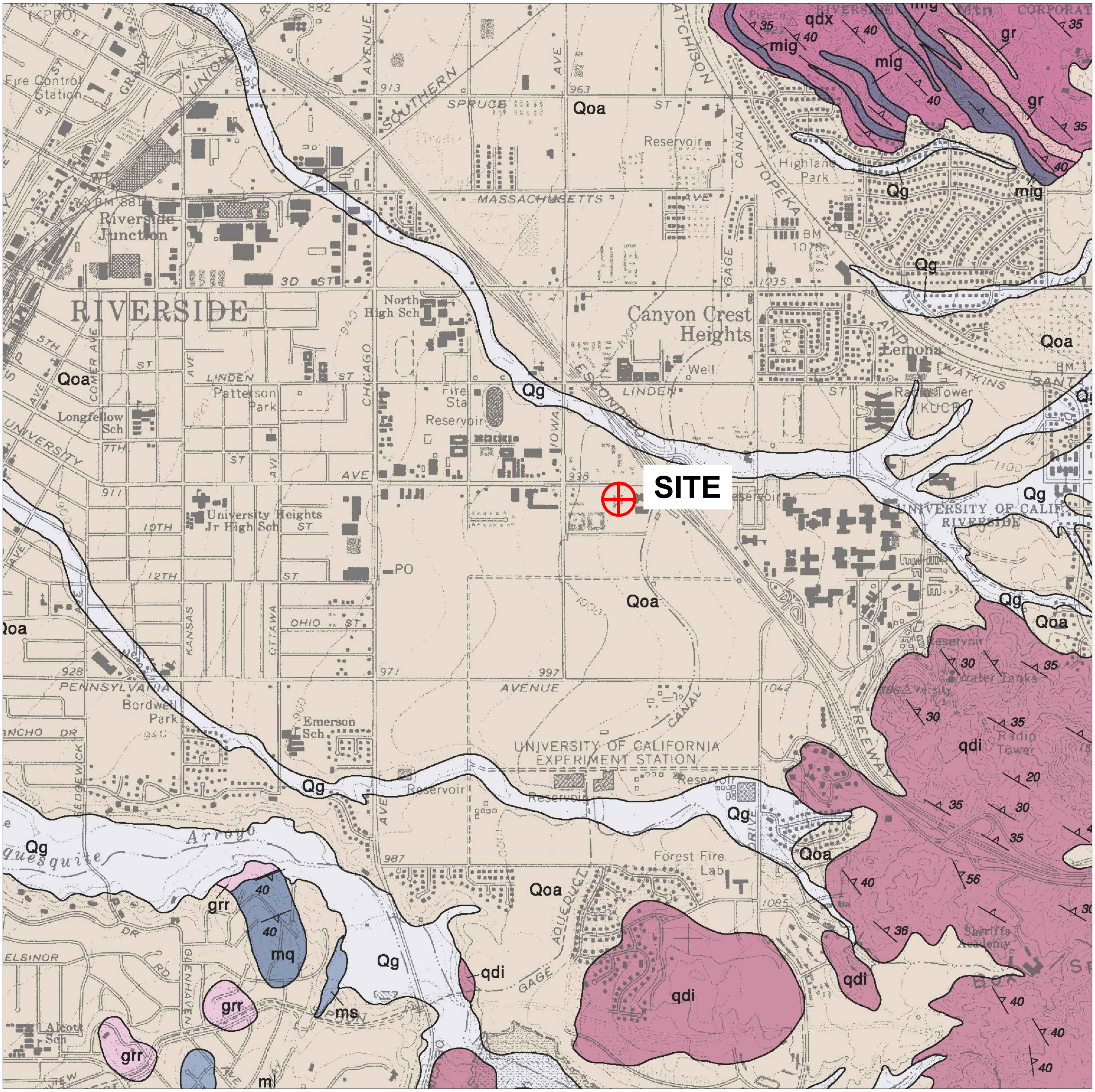
P-1 TD=5' — APPROXIMATE LOCATION OF BORING BY TWINING (2017) TOTAL DEPTH IN FEET

TWINING

N

REFERENCE: GOOGLE EARTH (2022)

SITE PLAN AND BORING LOCATION MAP		
OASIS PARK UNIVERSITY OF CALIFORNIA, RIVERSIDE RIVERSIDE, CA		
PROJECT No. 220759.3	REPORT DATE June 2023	FIGURE 2



N

Qoa Alluvial fan deposits of sand, minor gravel

Qg Alluvial gravel and sand of stream channels

qdi Quartz diorite (tonalite)

qdx Quartz diorite, xenolith rich

SCALE IN FEET

0 2000 4000

REFERENCE: DIBBLEE (2003)

TWINING

GEOLOGIC MAP

OASIS PARK
UNIVERSITY OF CALIFORNIA
RIVERSIDE, CA

PROJECT NO.	REPORT DATE	FIGURE 4
220759.3	June 2023	

LEGEND

- VERY LOW
- LOW
- MODERATE
- HIGH
- VERY HIGH

APPROXIMATE SCALE IN FEET

0 2000 4000

REFERENCE: CITY OF RIVERSIDE COUNTY (2018)

TWINING

LIQUEFACTION ZONES MAP		
OASIS PARK UNIVERSITY OF CALIFORNIA, RIVERSIDE RIVERSIDE, CALIFORNIA		
PROJECT NO. 220759.3	REPORT DATE June 2023	FIGURE 4

TWINING
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APPENDIX A
FIELD EXPLORATION

TWINING

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Appendix A
Field Exploration

General

The field exploration for the proposed project consisted of drilling, testing, sampling, and logging of eight exploratory borings (B-9 through B-14, P-1, and P-2) and performing percolation testing in two of the borings (P-1 and P-2). The approximate locations of the exploration are shown on Figure 2 – Site Plan and Boring Location Map.

The borings were first excavated to 5 feet below ground surface (bgs) using a hand-auger to clear potential underground utilities. Upon completion of exploration, borings B-9 through B-14 were backfilled with neat cement and the others with soil cuttings. The surface of all locations was repaired to match existing conditions, and the paved locations were patched with Portland cement concrete to match existing conditions.

Exploratory Borings

Drilling operation for the borings was performed by Baja Exploration of Escondido, California using a CME-75 truck-mounted drill rig equipped with 8-inch diameter hollow-stem-auger (HSA). The borings were advanced to a maximum depth of 5.0 to 51.5 feet bgs on December 1 and 2, 2022.

Twining previously performed eight exploratory borings at the site in 2017. Those borings are included below.

An explanation of the boring logs is presented as Figure A-1. The boring logs from the current drilling are presented on Figures A-10 through A-17. The boring logs from 2017 are presented as Figures A-2 through A-9. The boring logs describe the earth materials encountered, samples obtained, and show the field and laboratory tests performed. The logs also show the boring number, drilling date, and the name of the logger and drilling subcontractor. The borings were logged by a Twining engineer using the Unified Soil Classification System under the supervision of a registered California Geotechnical Engineer. The boundaries between soil types shown on the logs are approximate because the transition between different soil layers may be gradual. Drive and bulk samples of representative earth materials were obtained from the borings.

Disturbed samples were obtained from select depths using a Standard Penetration Test (SPT) sampler. This sampler consists of a 2-inch O.D., 1.4-inch I.D. split barrel shaft without room for liner. Soil samples obtained by the SPT sampler were retained in plastic bags. A California modified sampler was also used to obtain drive samples of the soils from select depths. This sampler consists of a 3-inch outside diameter (O.D.), 2.4-inch inside diameter (I.D.) split barrel shaft. The samples were retained in brass rings for laboratory testing.

When the boring was drilled to a select depth, the sampler was lowered to the bottom of the boring and then driven a total of 18 inches into the soil using an automatic hammer weighing 140 pounds dropped from a height of 30 inches. The number of blows required to drive the samplers the final 12 inches is presented on the boring logs. Where sampler refusal is encountered and the sampler does not advance 18 inches, the total number of blows per number of inches advanced is presented. The blow counts given are field raw blow counts that have not been modified to account for field and/or depth conditions.

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Percolation Testing

Percolation testing were performed in borings P-1 and P-2. After being advanced to 5 feet bgs using a hand-auger, the borings were drilled to 5 feet bgs again using an 8 inch-diameter, truck-mounted, hollow-stem auger. The borings were drilled under the observation of a field engineer who logged the subsurface conditions encountered and collected samples of the subsurface materials encountered.

The percolation test holes were prepared by placing approximately 1 inch of gravel at the bottom of the hole. A 3-inch diameter perforated PVC pipe wrapped in filter sock was placed at the bottom of the hole and the annular space around the pipe was backfilled with gravel.

After preparing the percolation test holes, the percolation was performed in accordance with the requirements of Riverside County. After presoaking, the test holes were filled with water to at least 12 inches above the bottom of the excavation. Measurements were recorded at 10-minute or 30-minute intervals depending on the results of the "sandy soil criteria test." A minimum of 6 intervals were measured. The average drop that occurred over the last 3 readings was used to determine the percolation rate at each test location. Detailed test data is attached to this appendix.

A reduction factor of 3 was applied to the final measured infiltration rate to obtain the design infiltration rate. A summary of test results is presented in Table A-1, and the detailed test data is attached as Appendix D. Additionally, data from previous percolation testing performed at the site are attached as Appendix E.

Table A-1 – Infiltration Rate with a Reduction Factor of 3

Location	Depth (feet)	Infiltration Rate (in/hour)
P-1	5	0.1
P-2	5	0.4

UNIFIED SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

COARSE-GRAINED SOILS / FINE-GRAINED SOILS

Relative Density	SPT (blows/ft)	Relative Density (%)	Consistency	SPT (blows/ft)
Very Loose	<4	0 - 15	Very Soft	<2
Loose	4 - 10	15 - 35	Soft	2 - 4
Medium Dense	10 - 30	35 - 65	Medium Stiff	4 - 8
Dense	30 - 50	65 - 85	Stiff	8 - 15
Very Dense	>50	85 - 100	Very Stiff	15 - 30
			Hard	>30

NOTE: SPT blow counts based on 140 lb. hammer falling 30 inches

Sample Symbol	Sample Type	Description
	SPT	1.4 in I.D., 2.0 in. O.D. driven sampler
	California Modified	2.4 in. I.D., 3.0 in. O.D. driven sampler
	Bulk	Retrieved from soil cuttings
	Thin-Walled Tube	Pitcher or Shelby Tube

LABORATORY TESTING ABBREVIATIONS

ATT	Atterberg Limits
C	Consolidation
CORR	Corrosivity Series
DS	Direct Shear
EI	Expansion Index
GS	Grain Size Distribution
K	Permeability
MAX	Moisture/Density (Modified Proctor)
O	Organic Content
RV	Resistance Value
SE	Sand Equivalent
SG	Specific Gravity
TX	Triaxial Compression
UC	Unconfined Compression

TWINING

EXPLANATION FOR LOG OF BORINGS

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A-1

DATE DRILLED	9/29/17	LOGGED BY	DHC	**BORING NO.**	**B-1**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
0	Bulk				MAX		SM	Silty SAND with about 5% gravel, reddish brown to brown, dense, moist
5	Driven	33						-- same
10	Driven	39						-- same
15	Driven	38/50 for 2"	9.2	117.7	DS			-- same
20	Driven	39					SM	Silty SAND, brown, dense, moist
25	Driven	45/50 for 6"	14.3	107.4	DS			-- same
30	Driven	28			C		SP	Poorly graded SAND, light to dark brown to white to black, medium dense, moist
35								

BORING LOG 170875.3 - UCR OUTPATIENT PAVILLION.GPJ TWINING LABS.GDT 10/25/17

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 2

DATE DRILLED	9/29/17	LOGGED BY	DHC	BORING NO.	B-1
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
		X	44	6.2	109.4			SM	Silty SAND, brown, dense, moist
40		|	29			#200			-- medium dense
45		X	51	7.5	113.5			SP	Poorly graded SAND, brown to yellow to white, dense, moist
								SM	Silty SAND, light brown, dense, moist
50		|	39						Total Depth = 51.5 feet Backfilled on 9/29/2017 Groundwater not encountered. Borehole backfilled at the completion of testing with soil cuttings.
55									
60									
65									
70									

BORING LOG 170875.3 - UCR OUTPATIENT PAVILLION.GPJ TWINING LABS.GDT 10/25/17

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 2

DATE DRILLED	10/9/17	LOGGED BY	DHC	**BORING NO.**	**B-2**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
0	Bulk						SM	Silty SAND, reddish brown, moist
5	Driven	22						-- same, medium dense
10	Driven	42	9.0	121.0	C			-- same, dense
15	Driven	50 for 6"						-- same, very dense, only partial recovery
20	Driven	69	6.9	116.8				-- same, very dense
25	Driven	30						-- same, dense
30	Driven	74	3.2	121.4			SW	Well graded SAND, very dense, brown to black to red to white, moist
								Total Depth = 31.5 feet Backfilled on 10/9/2017 Groundwater not encountered. Borehole backfilled at the completion of testing with soil cuttings.
35								

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 3

DATE DRILLED 9/29/17	LOGGED BY DHC	**BORING NO.**	**B-3**
DRIVE WEIGHT 140 lbs.	DROP 30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD 8" HSA	DRILLER 2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
0	Bulk				MAX			3 inches of AC with no base
5	Driven	23					SM	Silty SAND with 5% gravel, reddish brown, medium dense, moist
10	Driven	38	3.6	119.0	C		SM	Silty SAND with 10% large grain sand, reddish brown to brown, dense, moist
15	Driven	20			#200		SM	Silty SAND, brown to reddish to light brown, medium dense, moist
20	Driven	55					SM	-- same, dense, with approximately 5% gravel, reddish brown, moist
25	Driven	15			#200		SM	-- same without gravel, medium dense
30	Driven	54	7.0	121.7	DS		SP	Poorly graded SAND, reddish brown, very dense, moist
35								

BORING LOG 170875.3 - UCR OUTPATIENT PAVILLION.GPJ TWINING LABS.GDT 1/20/23

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 4

DATE DRILLED	9/29/17	LOGGED BY	DHC	**BORING NO.**	**B-3**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
			25						-- yellow to brown to red, medium dense
40			40/50 for 5"	8.9	127.6	DS		SM	Silty SAND, reddish brown, very dense, moist
45			40						-- same, dense
50			82	2.8	118.4			SP	Poorly graded SAND, light brown to white to black, very dense, moist
									Total Depth = 51.5 feet Backfilled on 9/29/2017 Groundwater not encountered. Borehole backfilled at the completion of testing with soil cuttings. Surface patched with cold-patch.
55									
60									
65									
70									

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE A - 4
170875.3	October 2017	

BORING LOG 170875.3 - UCR OUTPATIENT PAVILLION.GPJ TWINING LABS.GDT 1/20/23

DATE DRILLED	10/9/17	LOGGED BY	DHC	**BORING NO.**	**B-4**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
								SM	Silty SAND, reddish brown, moist
5		X	48	2.7	133.6				-- same, dense, few organics
10		I	11			#200			-- same, medium dense, light brown
15		X	27			#200		SW	Well graded SAND, medium dense, light brown to black to white to red, moist
									Total Depth = 16.5 feet Backfilled on 10/9/2017 Groundwater not encountered. Borehole backfilled at the completion of testing with soil cuttings.
20									
25									
30									
35									

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 5

DATE DRILLED	10/9/17	LOGGED BY	DHC	**BORING NO.**	**B-5**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
0	X							SM	Silty SAND, reddish brown, moist
5		X	28						-- same, medium dense
10		X	85					SW	Well graded SAND, very dense, light brown with white spots, moist
15		X	45/50 for 5"					SM	Silty SAND, very dense, light brown, moist
20		X	24/50 for 6"	19.0					-- same
25		X	50						-- same, dense, some white spots
30		X	43					SW	Well graded SAND, dense, brown to orange to white to red, moist
35									

BORING LOG 170875.3 - UCR OUTPATIENT PAVILLION.GPJ TWINING LABS.GDT 1/20/23

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 6

DATE DRILLED	10/9/17	LOGGED BY	DHC	**BORING NO.**	**B-5**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
	Driven	26			#200			-- same, more silt
40	Driven	54					SM	Silty SAND, very dense, olive brown to brown, moist, trace gravel
45	Driven	22			#200		ML	Sandy SILT, very stiff; brown, slightly moist
50	Driven	54					ML	-- same, hard, dark brown
								Total Depth = 51.5 feet Backfilled on 10/9/2017 Groundwater not encountered. Borehole backfilled at the completion of testing with soil cuttings.
55								
60								
65								
70								

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 6

DATE DRILLED	10/9/17	LOGGED BY	DHC	**BORING NO.**	**B-6**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
5			37					SM	Silty SAND, dense, reddish brown, moist
10			11			#200		SW	Well graded SAND, medium dense, reddish brown, moist
15			34	2.6	105.4				-- same, dense
20			48					SM	Silty SAND, dense, brown with white spots, moist
25			88	8.7	130.4				-- same, very dense
30			15			#200			-- same, medium dense, reddish to olive brown
35									

BORING LOG 170875.3 - UCR OUTPATIENT PAVILLION.GPJ TWINING LABS.GDT 10/25/17

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 7

DATE DRILLED	10/9/17	LOGGED BY	DHC	**BORING NO.**	**B-6**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
		X	58	6.5	109.9				-- same, very dense
40			29						-- same, medium dense, brown with white spots
45		X	82	12.0	117.1				-- same, very dense, olive brown
50			31						-- same, dense, reddish brown
									Total Depth = 51.5 feet Backfilled on 10/9/2017 Groundwater not encountered. Borehole backfilled at the completion of testing with soil cuttings.
55									
60									
65									
70									

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 7

DATE DRILLED	9/29/17	LOGGED BY	SL	**BORING NO.**	**B-7**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
0	Bulk						SM	Silty SAND with mostly fine sand, brown, medium dense, dry
5	Driven	35						-- same
10	Driven	9						-- moist
15	Driven	24	9.5	125.3				-- mostly fine-medium sand, light brown, dry
20	Driven	29					ML	Sandy SILT, brown, dense, moist
25	Driven	34					SM	Silty SAND with few clay, reddish brown, medium dense, moist
30	Driven	19			#200			-- same
35								Total Depth = 31.5 feet Backfilled on 9/29/2017 Groundwater not encountered. Pipe inserted for percolation testing. Borehole backfilled at the completion of testing with soil cuttings.

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 8

DATE DRILLED	9/29/17	LOGGED BY	DHC	BORING NO.	B-8
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
0								2.5 inches of AC with no base
5			53				SM	Silty SAND with about 5% gravel, reddish brown, dense, moist
10			27					-- more silt and no gravel, medium dense
								Total Depth = 11.5 feet Backfilled on 9/29/2017 Groundwater not encountered. Pipe inserted for percolation testing. Borehole backfilled at the completion of testing with soil cuttings. Surface patched with cold-patch.
15								
20								
25								
30								
35								

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE A - 9
170875.3	October 2017	

DATE DRILLED	12/1/2022	LOGGED BY	CDD	**BORING NO.**	**B-9**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1020 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
								SM	3 inches of asphalt with no base ARTIFICIAL FILL: Silty SAND; dark reddish brown; moist; fine grain sand; fine to coarse gravel; trace mica
								SM	ALLUVIUM: Silty SAND; dark reddish brown; moist; fine grain sand; fine to coarse gravel; trace mica
1015	5			35				SM	-- same; dense; reddish brown; trace fine gravel; fine to medium grain sand
1010	10			42	6.8	112.2		SM	-- same; medium dense; moist; very fine grain sand; fine gravel
1005	15			21				SM	-- same; medium dense; moist; very fine grain sand; fine gravel
1000	20			49	6.6	126.5		SM	-- same; dense; fine to medium grain sand
995	25			35				SM	-- same; dense; light reddish brown; moist; fine to medium grain sand; fine gravel
990	30			50 for 6"	7.5	111.5		SM	-- same; very dense; reddish brown with orange and black laminations; moist; fine to medium grain sand; mostly medium gravel with some fine
985	35								Total Depth = 31.0 feet Backfilled on 12/1/2022 Backfilled with neat cement. Groundwater not encountered. Surface patched with PCC.

BORING LOG 220759.3 - UCR OASIS GEOTECH.GPJ TWINING LABS.GDT 6/24/23

TWINING

LOG OF BORING

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 10

DATE DRILLED	12/1/2022	LOGGED BY	CDD	BORING NO.	B-10
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1021 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
										4 inches of asphalt concrete over 10 inches of base over 3 inches of old asphalt concrete
									SM	ARTIFICIAL FILL:
									SM	Silty SAND; reddish brown; slightly moist; mostly fine grain sand with some medium
1016	5								SM	ALLUVIUM: Silty SAND; reddish brown; moist; mostly fine grain sand with some medium
				25	6.2	112.6	C			-- same; medium dense
1011	10			13					SM	-- same; medium dense; brown; slightly moist; mostly fine sand with some medium
1006	15			39	4.6	109.9	#200, DS		SM	-- same; medium dense; brown; slightly moist; fine to medium grain sand with less silt
1001	20			26					SM	--same; medium dense
996	25			47	2.8	109.2	#200		SW-SM	Well graded SAND with silt; dense; reddish yellow; slightly moist; fine to coarse grain sand; some organics/rootlets
991	30			30					SM	Silty SAND; dense; dark brown; moist; very fine sand; trace mica
986	35									

TWINING

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PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 11

DATE DRILLED	12/1/2022	LOGGED BY	CDD	**BORING NO.**	**B-10**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1021 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
			X	50 for 5"	11.0	123.0			SM	Silty SAND; dense; dark brown; moist; very fine sand; trace mica *(continued)*
									SM	-- same; very dense; reddish brown
981	40		I	57					SM	-- same; very dense; fine to medium grain sand
976	45		X	22/50 for 6"	9.3	124.1			SP-SM	Poorly graded SAND with silt; very dense; reddish brown; moist; fine to medium grain sand; micaceous
971	50		I	40					SM	Silty SAND; dense; reddish brown; moist; fine to medium grain sand
										Total Depth = 51.5 feet Backfilled on 12/1/2022 Backfilled with neat cement. Groundwater not encountered. Surface patched with PCC.
966	55									
961	60									
956	65									
951	70									

TWINING

LOG OF BORING

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Riverside, California

PROJECT NO.	REPORT DATE	FIGURE A - 11
220759.3	June 2023	

DATE DRILLED	12/1/2022	LOGGED BY	CDD	**BORING NO.**	**B-11**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1019 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
										5 inches of asphalt concrete with no base
									SM	ARTIFICIAL FILL: Silty SAND; reddish brown; slightly moist; fine to medium grain sand; fine gravel
									SM	ALLUVIUM: Silty SAND; reddish brown; slightly moist; fine to medium grain sand; fine gravel
1014	5		X	24	5.3	119.2	DS		SM	-- same; medium dense
1009	10			20					SM	-- same; medium dense; brown; fine grain sand
1004	15		X	29	10.4	105.9	C		SM	-- same; medium dense; reddish brown to yellowish brown; slightly moist; fine to medium grain sand
999	20			27					SM	-- same; medium dense; brown; fine grain sand
994	25		X	38	1.9	105.6			SP-SM	Poorly graded SAND with silt; medium dense; light yellowish brown; dry
989	30			27					SM	Silty SAND; medium dense; yellowish brown; slightly moist; fine grain sand
984	35									Total Depth = 31.0 feet Backfilled on 12/1/2022 Backfilled with neat cement. Groundwater not encountered. Surface patched with PCC.

TWINING

LOG OF BORING

OASIS Park
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PROJECT NO.	REPORT DATE	FIGURE A - 12
220759.3	June 2023	

DATE DRILLED	12/1/2022	LOGGED BY	CDD	**BORING NO.**	**B-12**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1014 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
										4 inches of asphalt over 6 inches of base
							CORR, EI, RV		SM	<u>ARTIFICIAL FILL</u>: Silty SAND; reddish brown; dry; fine grain sand; fine to medium gravel
									SM	<u>ALLUVIUM</u>: Silty SAND; reddish brown; dry; fine grain sand; fine to medium gravel
1009	5			31	3.0	114.8	C		SM	-- same; medium dense; slightly moist; fine grain sand
1004	10			25			#200		SP-SM	Poorly graded SAND with silt; medium dense; light yellowish brown; slightly moist; fine to medium grain sand
999	15			48	4.5	106.7	DS		SP-SM	-- same; dense
994	20			35			#200		SM	Silty SAND; dense; light yellowish brown; slightly moist; some silt layers
989	25			56	2.4	116.7	C		SP-SM	Poorly graded SAND with silt; dense; reddish brown; slightly moist; fine to medium grain sand
984	30			45					SM	Silty SAND; dense; reddish brown; slightly moist; mostly fine sand with some medium
979	35									

TWINING

LOG OF BORING

OASIS Park
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Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 13

DATE DRILLED	12/1/2022	LOGGED BY	CDD	**BORING NO.**	**B-12**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1014 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
			X	77	5.3	112.9	DS		SM SM	Silty SAND; dense; reddish brown; slightly moist; mostly fine sand with some medium *(continued)* -- same; very dense
974	40			64					SM	-- same; very dense; light reddish brown; slightly moist; mostly fine grain sand
969	45		X	50 for 6"	5.1	110.9			SM	-- same; very dense; fine to medium sand
964	50			55					SM	-- same; very dense
										Total Depth = 51.5 feet Backfilled on 12/1/2022 Backfilled with neat cement. Groundwater not encountered. Surface patched with PCC.
959	55									
954	60									
949	65									
944	70									

TWINING

LOG OF BORING

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PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 13

DATE DRILLED	12/2/2022	LOGGED BY	CDD	**BORING NO.**	**B-13**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1013 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
	0								5 inches of asphalt concrete with no base
		Bulk		10.8		DS, MAX		SM	ARTIFICIAL FILL: Silty SAND; brown; moist; fine grain sand; fine gravel -- gets looser; yellowish brown
1008	5	Driven	20					SM	ALLUVIUM: Silty SAND; medium dense; yellowish brown; slightly moist; fine grain sand; fine gravel
1003	10	Driven	33	0.7	95.5	#200		SP	Poorly graded SAND; medium dense; yellowish brown; dry; fine to coarse grain sand; sample disturbed
998	15	Driven	40					SP	-- same; dense; light yellowish brown; fine to medium grain sand
993	20	Driven	52	1.6	109.5			SM	Silty SAND; dense; light yellowish brown; dry; mostly fine sand; fine gravel
988	25	Driven	34					SP-SM	Poorly graded SAND with silt; dense; light yellowish brown; slightly moist; fine to medium grain sand
983	30	Driven	40/50 for 6"	0.9	112.5	#200		SP-SM	Poorly graded SAND with silt; very dense; brown; dry; fine grain sand; fine gravel
									Total Depth = 31.0 feet Backfilled on 12/2/2022 Backfilled with neat cement. Groundwater not encountered. Surface patched with PCC.
978	35								

TWINING

LOG OF BORING

OASIS Park
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Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 14

DATE DRILLED	12/2/2022	LOGGED BY	CDD	**BORING NO.**	**B-14**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1013 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
										5 inches of asphalt concrete with no base
							CORR, EI		SM	ARTIFICIAL FILL: Silty SAND; brown; slightly moist; fine grain sand; fine gravel -- @1' some debris and brick pieces
1008	5			38	6.5	116.2	DS			-- same; medium dense; very dark brown; slightly moist; medium to coarse grain sand; fine gravel
									SP-SM	ALLUVIUM: Poorly graded SAND with silt; reddish brown; slightly moist; fine grain sand
1003	10			19			#200		SP-SM	-- same; medium dense; yellowish brown; slightly moist; fine to medium grain sand
998	15			37	2.2	106.2	C		SP-SM	-- same; medium dense
993	20			47			#200		SM	Silty SAND; dense; brown; slightly moist; fine to medium sand
988	25			62	2.6	108.4	DS		SP-SM	Poorly graded SAND with silt; dense; yellowish brown; slightly moist; fine to medium grain sand
983	30			29			#200		SM	Silty SAND; medium dense; yellowish brown; slightly moist
978	35									

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TWINING

LOG OF BORING

OASIS Park
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Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 15

DATE DRILLED	12/2/2022	LOGGED BY	CDD	**BORING NO.**	**B-14**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1013 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
			X	52	8.3	124.5			SM SM	Silty SAND; medium dense; yellowish brown; slightly moist *(continued)* -- same; dense; reddish brown; moist; fine to medium grain sand
973	40		I	34			#200		SM	-- same; dense; brown; moist; fine grain sand
968	45		X	46	12.2	112.1			SM	-- same; medium dense; some mica
963	50		I	19					SM	-- same; medium dense; reddish brown; moist; fine to medium grain sand; trace fine gravel; some mica
										Total Depth = 51.5 feet Backfilled on 12/2/2022 Backfilled with neat cement. Groundwater not encountered. Surface patched with PCC.
958	55									
953	60									
948	65									
943	70									

TWINING

LOG OF BORING

OASIS Park
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Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 15

DATE DRILLED	12/2/2022	LOGGED BY	CDD	**BORING NO.**	**P-1**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1012 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
										7 inches of asphalt concrete with no base
							#200		SM	ARTIFICIAL FILL: Silty SAND; brown; slightly moist; fine grain sand; trace fine gravel
									SM	-- @ 1' changes to light reddish brown; trace subangular medium to coarse gravel
1007	5									ALLUVIUM: Silty SAND; reddish brown; slightly moist; fine grain sand; trace fine gravel -- @3' some caliche veins -- @4' becomes denser
										Total Depth = 5.0 feet Backfilled on 12/2/2022 Backfilled with cuttings. Groundwater not encountered. Surface patched with PCC.
1002	10									
997	15									
992	20									
987	25									
982	30									
977	35									

TWINING

LOG OF BORING

OASIS Park
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Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 16

DATE DRILLED	12/2/2022	LOGGED BY	CDD	**BORING NO.**	**P-2**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1015 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
										5 inches of asphalt with no base
									SM	ARTIFICIAL FILL: Silty SAND; brown; slightly moist; medium grain sand; fine gravel -- @1.5' asphalt and brick debris -- @2' layer of 5" thick asphalt
							#200		SM	ALLUVIUM: Silty SAND; reddish brown; slightly moist; fine grain sand; some fine gravel; some organics/rootlets
1010	5									Total Depth = 5.0 feet Backfilled on 12/2/2022 Backfilled with cuttings. Groundwater not encountered. Surface patched with PCC.
1005	10									
1000	15									
995	20									
990	25									
985	30									
980	35									

TWINING

LOG OF BORING

OASIS Park
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PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 17

TWINING

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APPENDIX B
LABORATORY TESTING

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Appendix B
Laboratory Testing

Laboratory Moisture Content and Density Tests

The moisture content and dry densities of selected driven samples obtained from the exploratory borings were evaluated in general accordance with the latest version of ASTM D2937. The results are shown on the boring logs in Appendix A and summarized in Table B-1.

No. 200 Wash Sieve

The amount of fines passing the No. 200 sieve was evaluated in accordance with ASTM D1140. The results are presented in Table B-2.

Resistance Value (R-value)

R-value testing was performed on a select bulk sample of the near-surface soils encountered at the site. The test was performed in general accordance with ASTM D2844. The result is summarized in Table B-3.

Maximum Dry Density-Optimum Moisture Content

One selected bulk sample was tested to evaluate the maximum dry density and its optimum moisture content. The test was performed in general accordance with ASTM test method D1557. The result is presented on Figure B-1.

Expansion Index

The expansion index of a select soil sample was evaluated in general accordance with ASTM D4829. The specimen was molded under a specified compactive energy at approximately 50 percent saturation. The prepared 1-inch thick by 4-inch diameter specimen was loaded with a surcharge of 144 pounds per square foot and was inundated with tap water. Readings of volumetric swell were made for a period of 24 hours. The result of expansion index test is presented in Table B-4.

Consolidation

Consolidation tests were performed on selected modified-California soil samples in general accordance with the latest version of ASTM D2435. The samples were inundated during testing to represent adverse field conditions. The percent consolidation for each load cycle was recorded as a ratio of the amount of vertical compression to the original height of the sample. Test results are presented on Figures B-2 through B-3 and the results from Hushmand are attached below.

Direct Shear

Direct shear tests were performed on a remolded sample and representative modified-California soil samples in general accordance with the latest version of ASTM D3080 to evaluate the shear strength characteristics of the selected materials. The samples were inundated during shearing to represent adverse field conditions. Test results are presented on Figures B-4 through B-10.

Corrosivity

Soil pH and resistivity tests were performed by Anaheim Test Lab, Inc. (ATLI) of Anaheim, California on a representative soil sample. The resistivity of the soil assumes saturated soil conditions. The chloride and sulfate contents of the selected samples were evaluated in general accordance with the latest versions of Caltrans test methods CT417, CT422, and CT 643. The test results are presented on Table B-6 and the ATLI report included in this appendix.

Table B-1 - Moisture Content and Dry Density

Boring No.	Depth (feet)	Moisture Content (%)	Dry Density (pcf)
B-9	10	6.8	112.2
B-9	20	6.6	126.5
B-9	30	7.5	111.5
B-10	5	6.2	112.6
B-10	15	4.6	109.9
B-10	25	2.8	109.2
B-10	35	11.0	123.0
B-10	45	9.3	124.1
B-11	5	5.3	119.2
B-11	15	10.4	105.9
B-11	25	1.9	105.6
B-12	5	3.0	114.8
B-12	15	4.5	106.7
B-12	25	2.4	116.7
B-12	35	5.3	112.9
B-12	45	5.1	110.9
B-13	10	0.7	95.5
B-13	20	1.6	109.5
B-13	30	0.9	112.5
B-14	5	6.5	116.2
B-14	15	2.2	106.2
B-14	25	2.6	108.4
B-14	35	8.3	124.5
B-14	45	12.2	112.1

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Table B-2 - No. 200 Wash Sieve

Boring No.	Depth (feet)	Percent Passing No. 200 Sieve
B-10	15	14.2
B-10	25	8.0
B-12	10	12.0
B-12	20	31.8
B-13	10	4.3
B-13	30	10.2
B-14	10	10.4
B-14	20	30.1
B-14	30	15.7
B-14	40	46.7
P-1	1-5’ BULK	42.4
P-2	3-5’ BULK	44.4

Table B-3 Resistance Value (R-value)

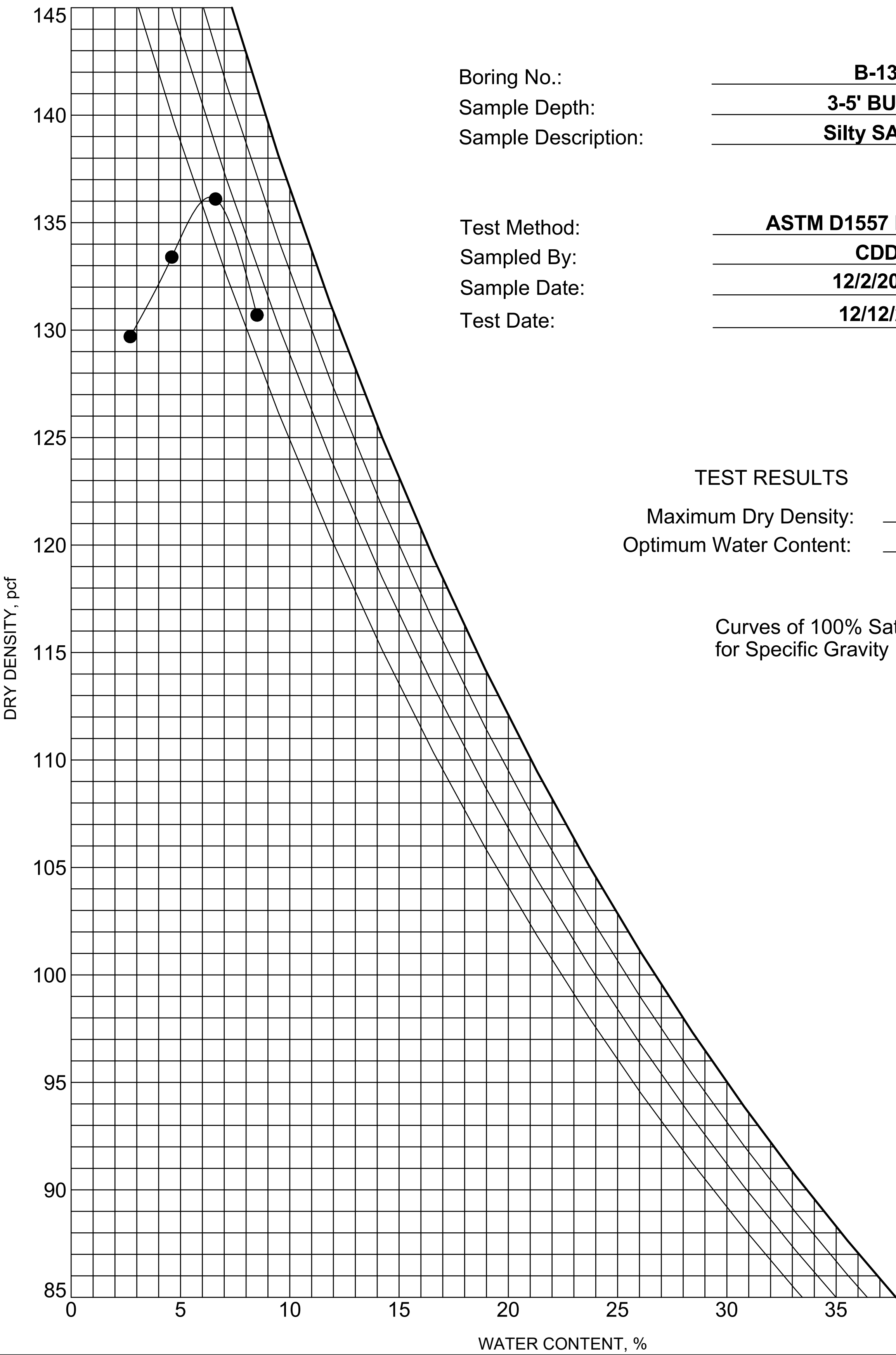
Boring No.	Depth (feet)	R Value
B-12	1 - 5	40

Table B-4 - Expansion Index

Boring No.	Depth (feet)	Expansion Index	Expansion Potential
B-12	1 - 5	0	Very low
B-14	1 - 5	4	Very low

Table B-5 - Corrosivity Test Results

Boring No.	Depth (feet)	pH	Minimum Resistivity (ohm-cm)	Water Soluble Sulfate (ppm)	Water Soluble Chloride (ppm)
B-12	1-5	7.4	6,500	86	18
B-14	1-5	7.2	4,300	139	28



Boring No.:	**B-13**
Sample Depth:	**3-5' BULK**
Sample Description:	**Silty SAND**

Test Method:	**ASTM D1557 Method A**
Sampled By:	**CDD**
Sample Date:	**12/2/2022**
Test Date:	**12/12/22**

TEST RESULTS

Maximum Dry Density: **136.0 pcf**

Optimum Water Content: **6.5 %**

Curves of 100% Saturation
for Specific Gravity Equal to:

2.80

2.70

2.60

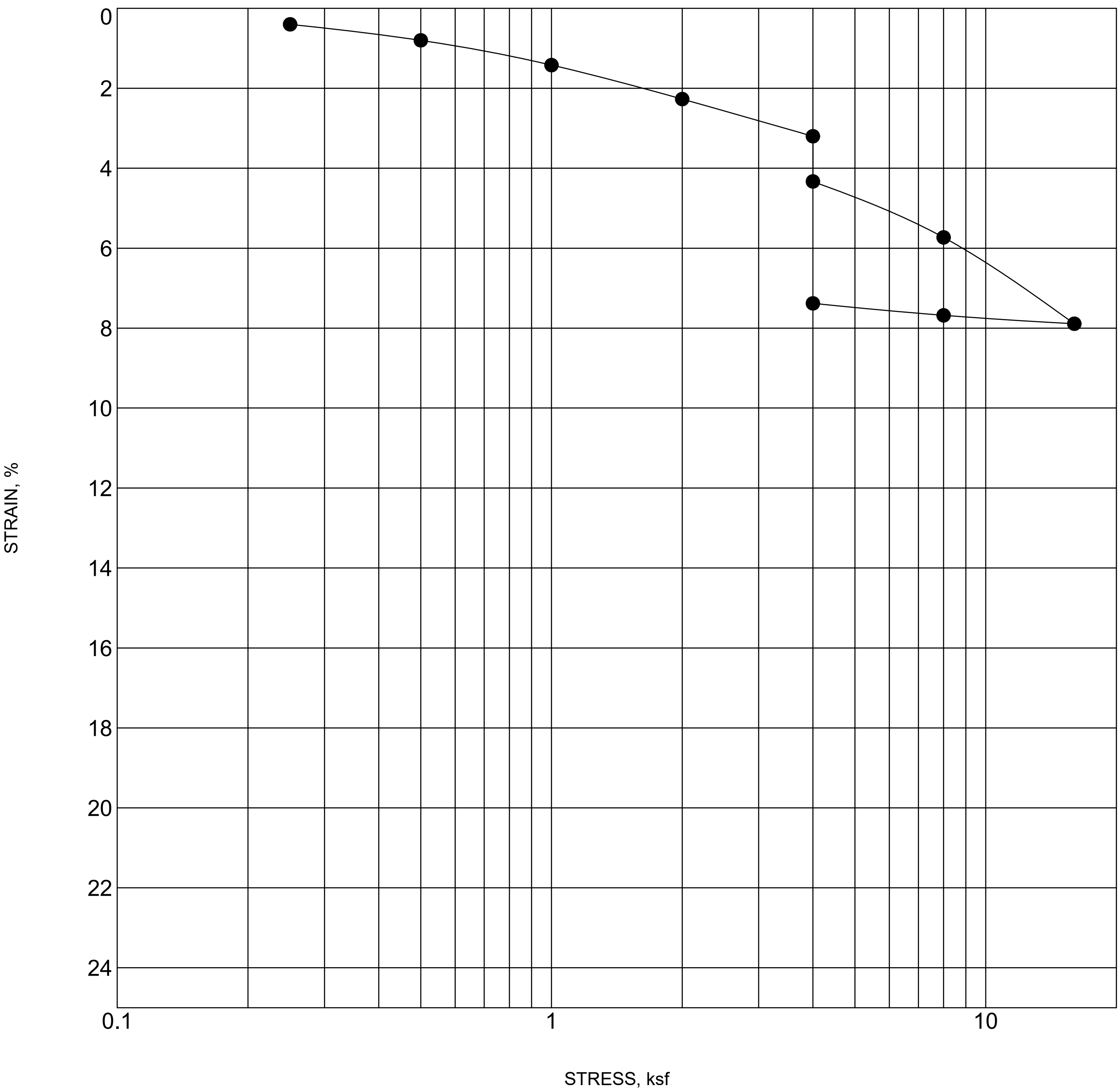
2.50

TWINING

MOISTURE-DENSITY RELATIONSHIP

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE B-1
220759.3	June 2023	



	Sample Location	Soil Description	Dry Density (pcf)	Moisture Content (%)
●	**B-11 at 15 ft**	**Silty SAND**	**105.9**	**10.4**

TWINING

CONSOLIDATION TEST

OASIS Park
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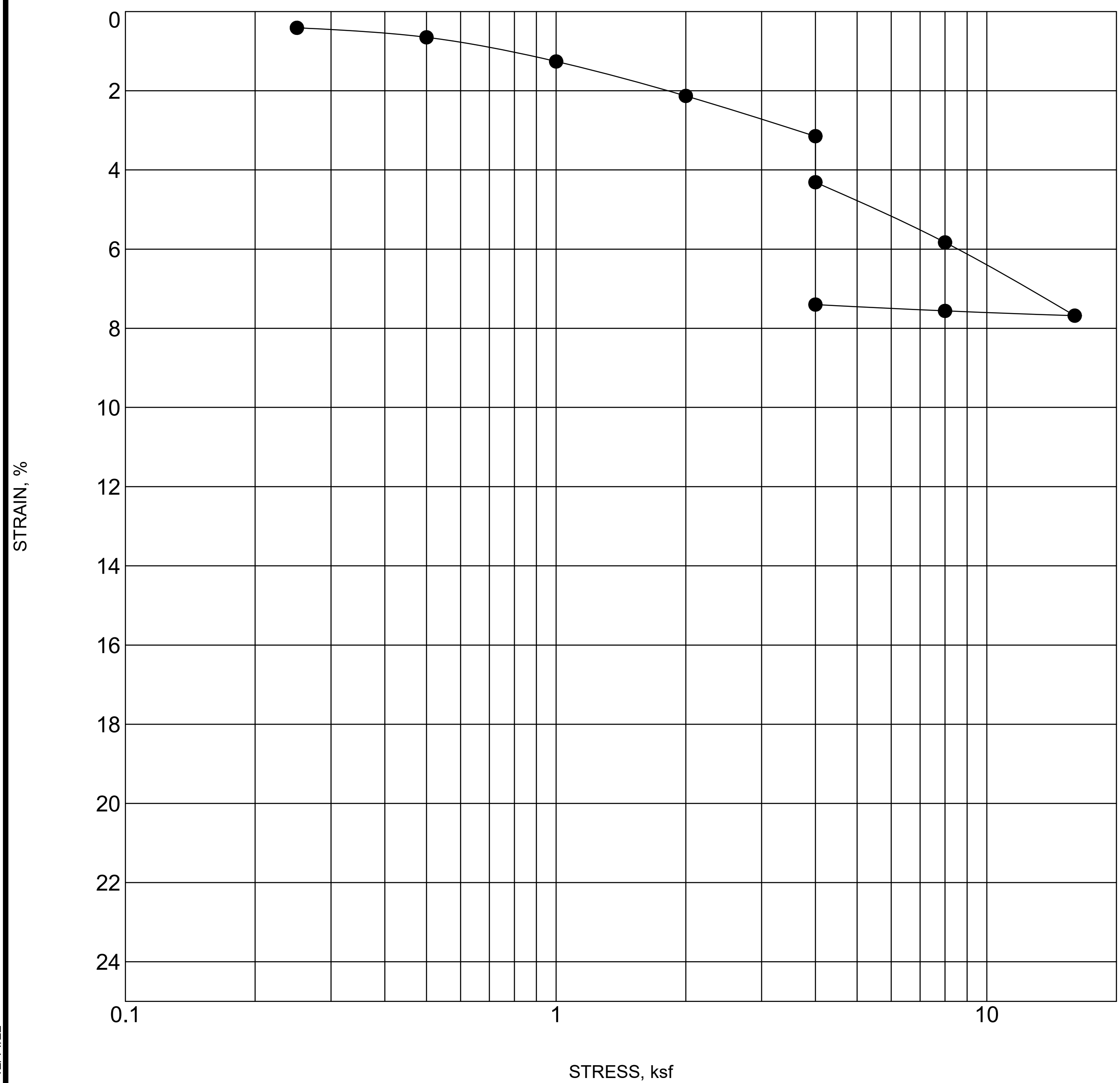
PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE B-2



	Sample Location	Soil Description	Dry Density (pcf)	Moisture Content (%)
●	**B-14 at 15 ft**	**Poorly graded SAND with silt**	**106.2**	**2.2**

CONSOL STRAIN 220759.3 - UCR OASIS GEOTECH.GPJ TWINING LABS.GDT 12/14/22

TWINING

CONSOLIDATION TEST

OASIS Park
University of California, Riverside
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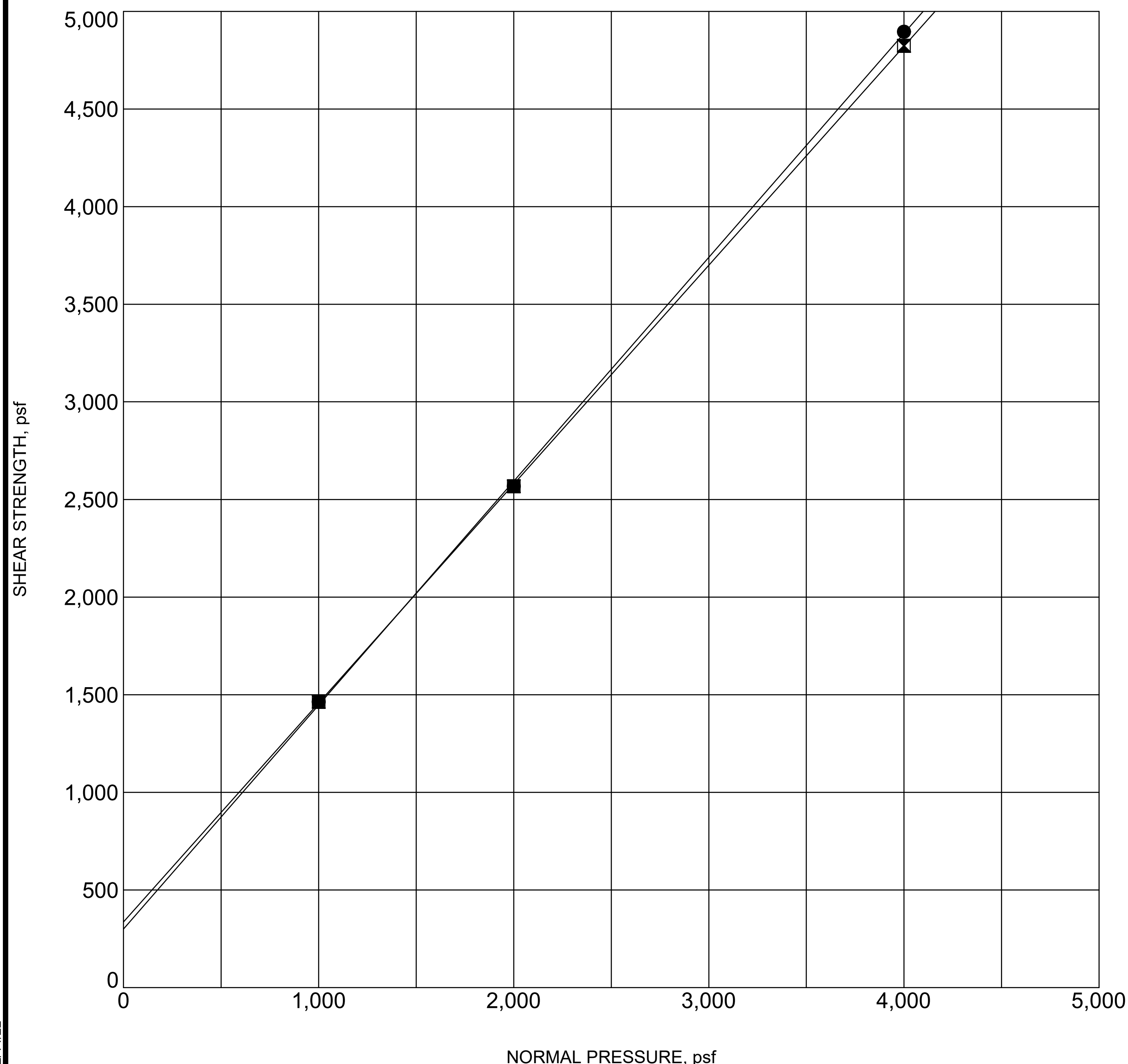
PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE B-3



Shear Strength Parameters

Boring No.:	B-10		
Sample Depth (ft):	15		
Sample Description:	Silty SAND		
Strain Rate (in./min):	0.005		
Dry Density (pcf):	109.9		

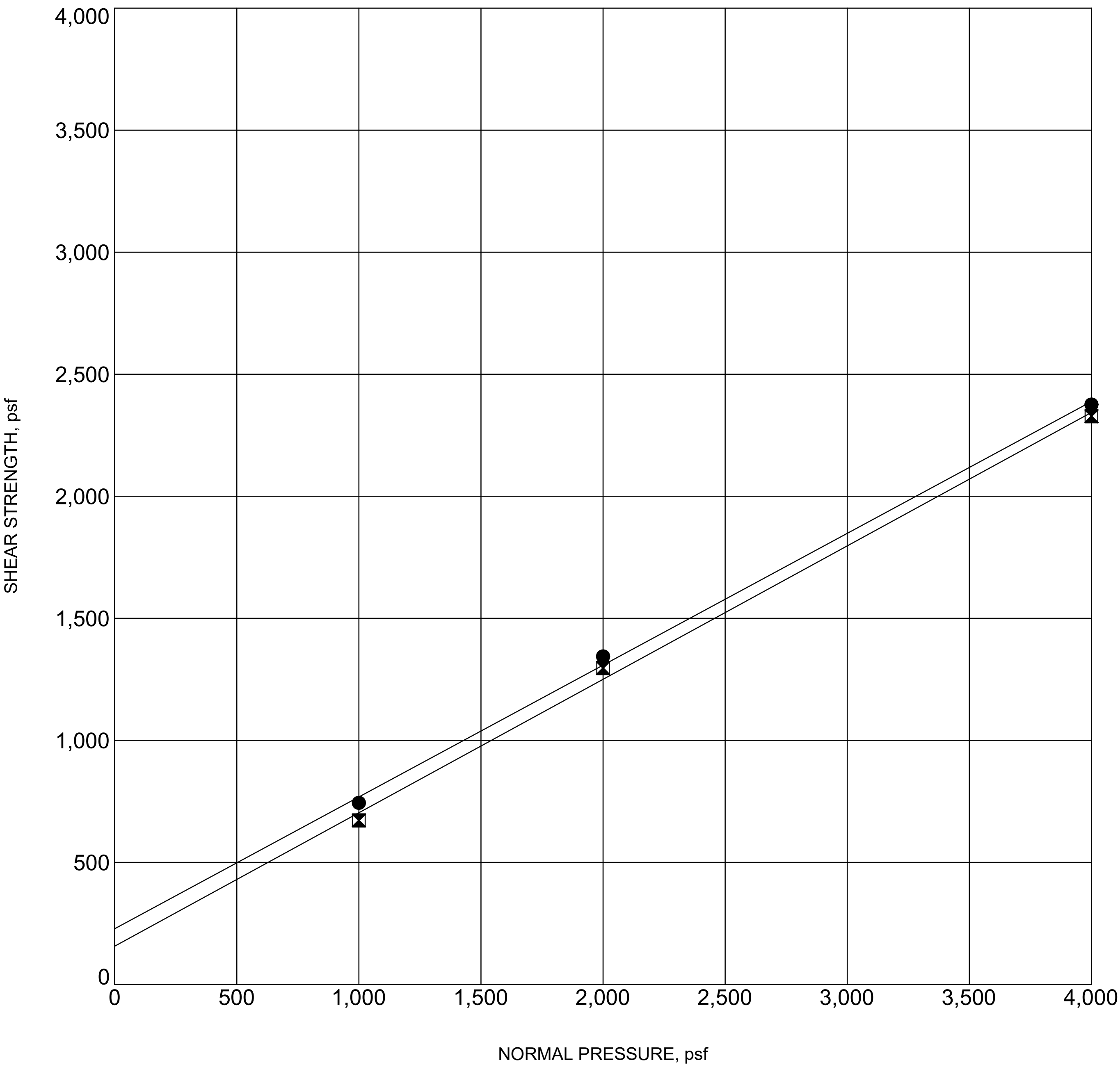
	Peak	**Ultimate**
Cohesion, C (psf):	300	336
Friction Angle, Ø (deg):	49	48
Initial Moisture (%):	4.6	
Final Moisture (%):	12.7	

TWINING

DIRECT SHEAR TEST

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE B-4
220759.3	June 2023	



Boring No.: B-11
Sample Depth (ft): 5
Sample Description: Silty SAND
Strain Rate (in./min): 0.005
Dry Density (pcf): 119.2

Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	228	156
Friction Angle, Ø (deg):	28	29

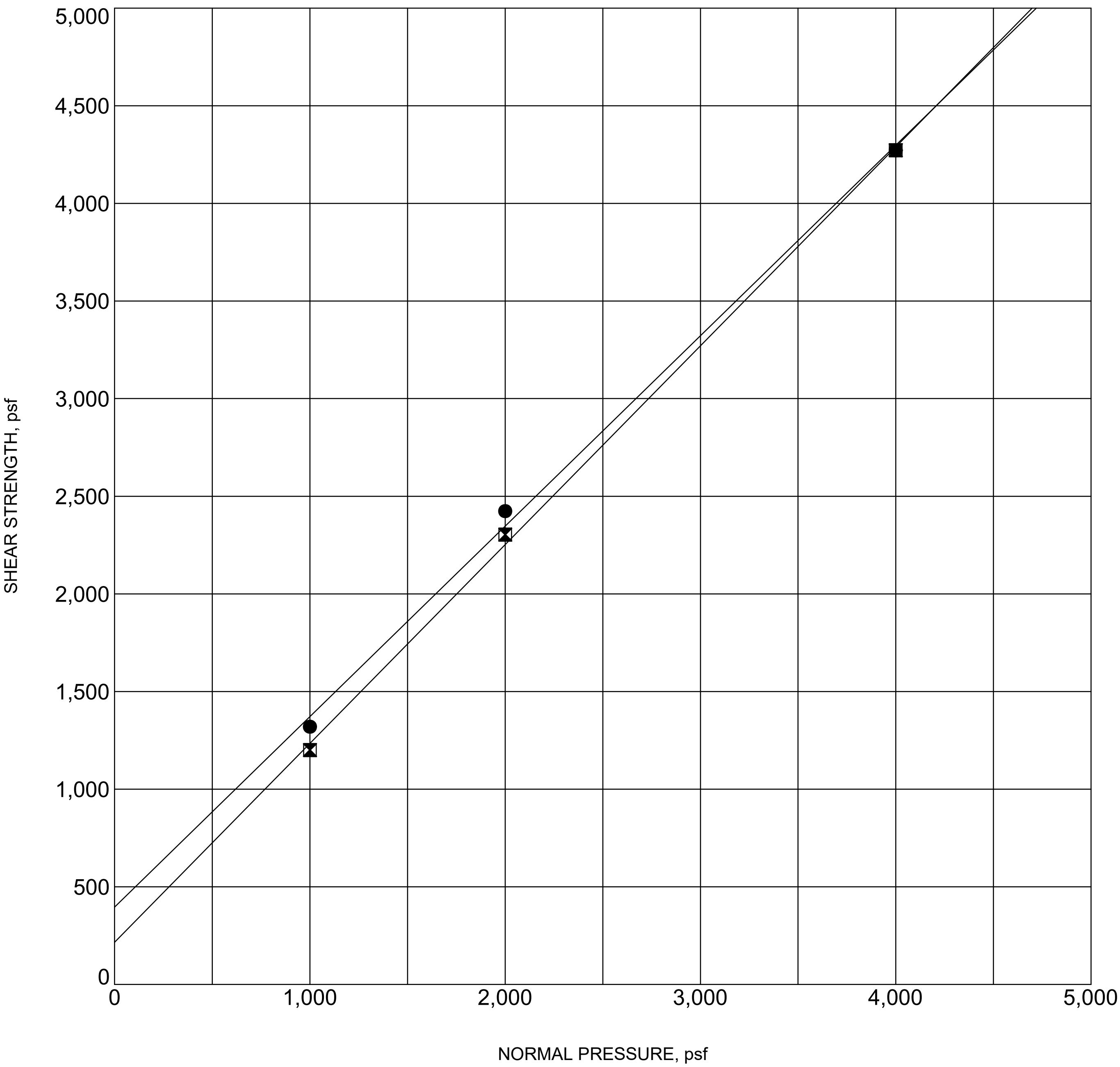
Initial Moisture (%): 5.3
Final Moisture (%): 10.1

TWINING

DIRECT SHEAR TEST

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE B-5



Boring No.:	B-12
Sample Depth (ft):	15
Sample Description:	Poorly graded SAND with silt
Strain Rate (in./min):	0.005
Dry Density (pcf):	106.7

Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	396	216
Friction Angle, Ø (deg):	44	46

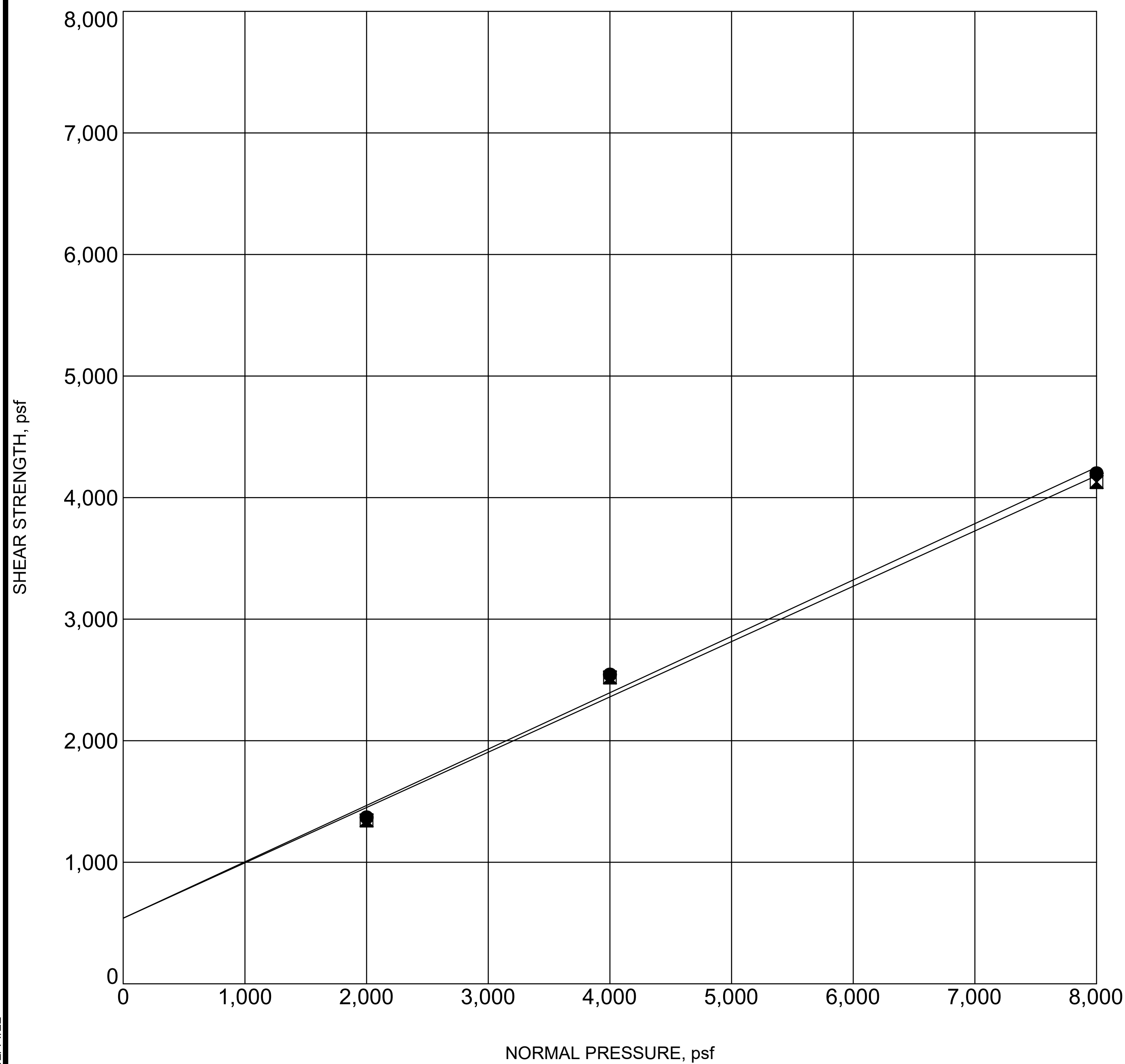
Initial Moisture (%): 4.5
Final Moisture (%): 15.7

TWINING

DIRECT SHEAR TEST

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE B-6



Shear Strength Parameters

		Peak	**Ultimate**
Boring No.:	B-12		
Sample Depth (ft):	35		
Sample Description:	Silty SAND		
Strain Rate (in./min):	0.005		
Dry Density (pcf):	112.9		
Cohesion, C (psf):		540	540
Friction Angle, Ø (deg):		25	24
Initial Moisture (%):		5.3	
Final Moisture (%):		11.4	

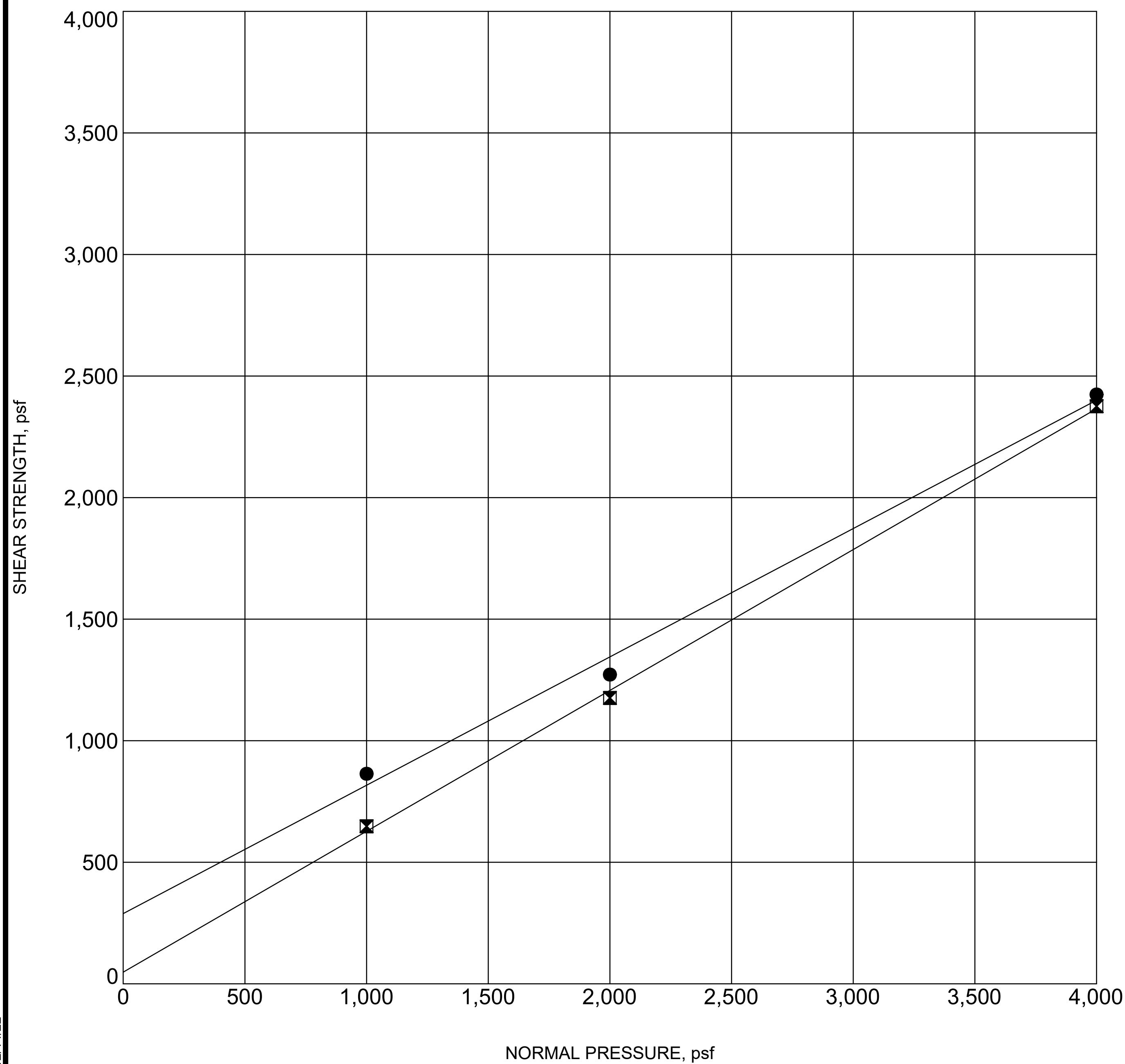
DIRECT SHEAR 220759.3 - UCR OASIS GEOTECH.GPJ TWINING LABS.GDT 12/14/22

TWINING

DIRECT SHEAR TEST

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE B-7



Boring No.: B-13
Sample Depth (ft): 3-5' BULK
Sample Description: Silty SAND
Strain Rate (in./min): 0.005
Dry Density (pcf): 122.6

Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	288	48
Friction Angle, Ø (deg):	28	30

Initial Moisture (%): 6.4
Final Moisture (%): 10.8

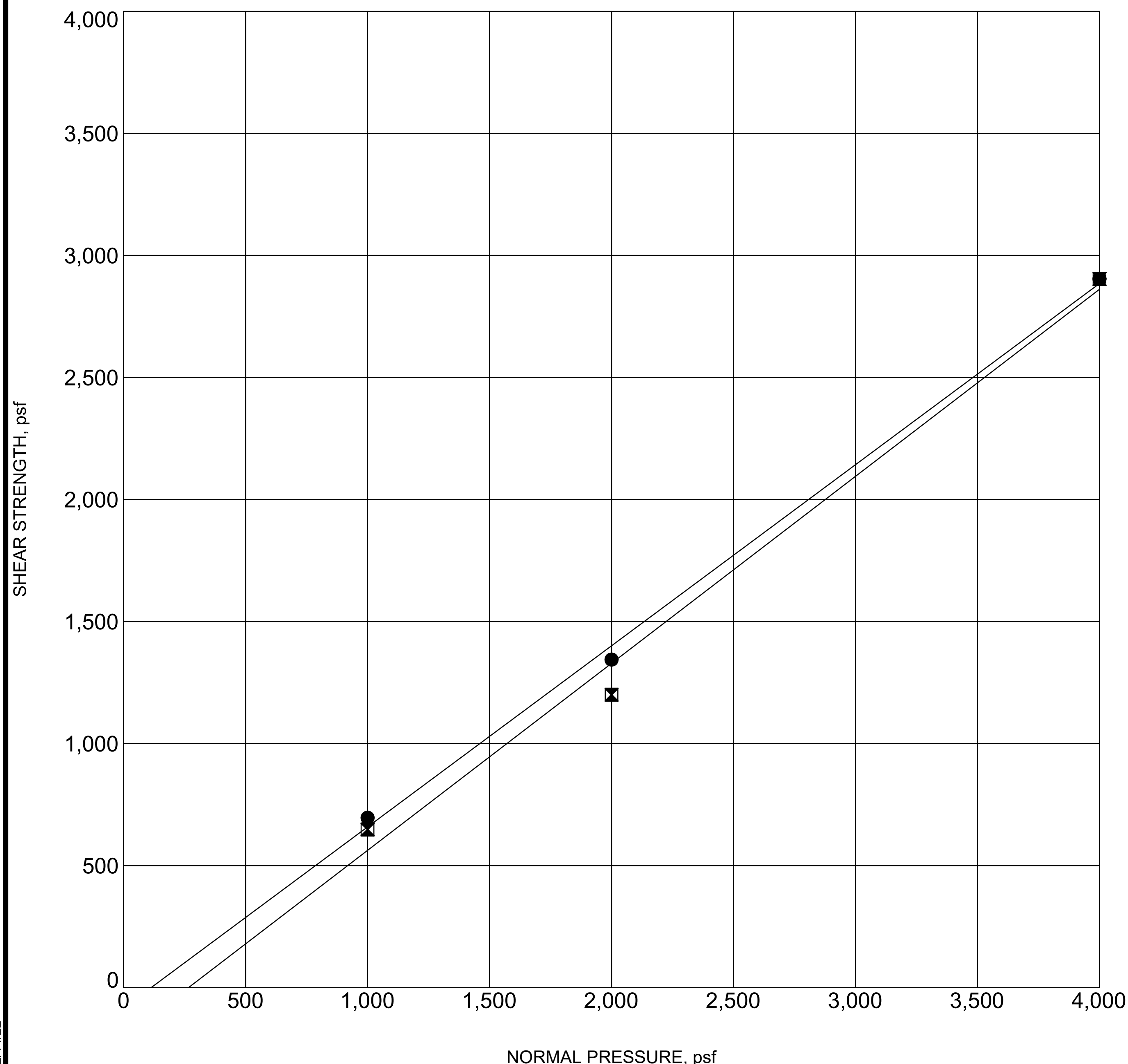
Remolded to 90% relative compaction

TWINING

DIRECT SHEAR TEST

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE B-8
220759.3	June 2023	



Boring No.:	B-14
Sample Depth (ft):	5
Sample Description:	Silty SAND
Strain Rate (in./min):	0.005
Dry Density (pcf):	116.2

Shear Strength Parameters

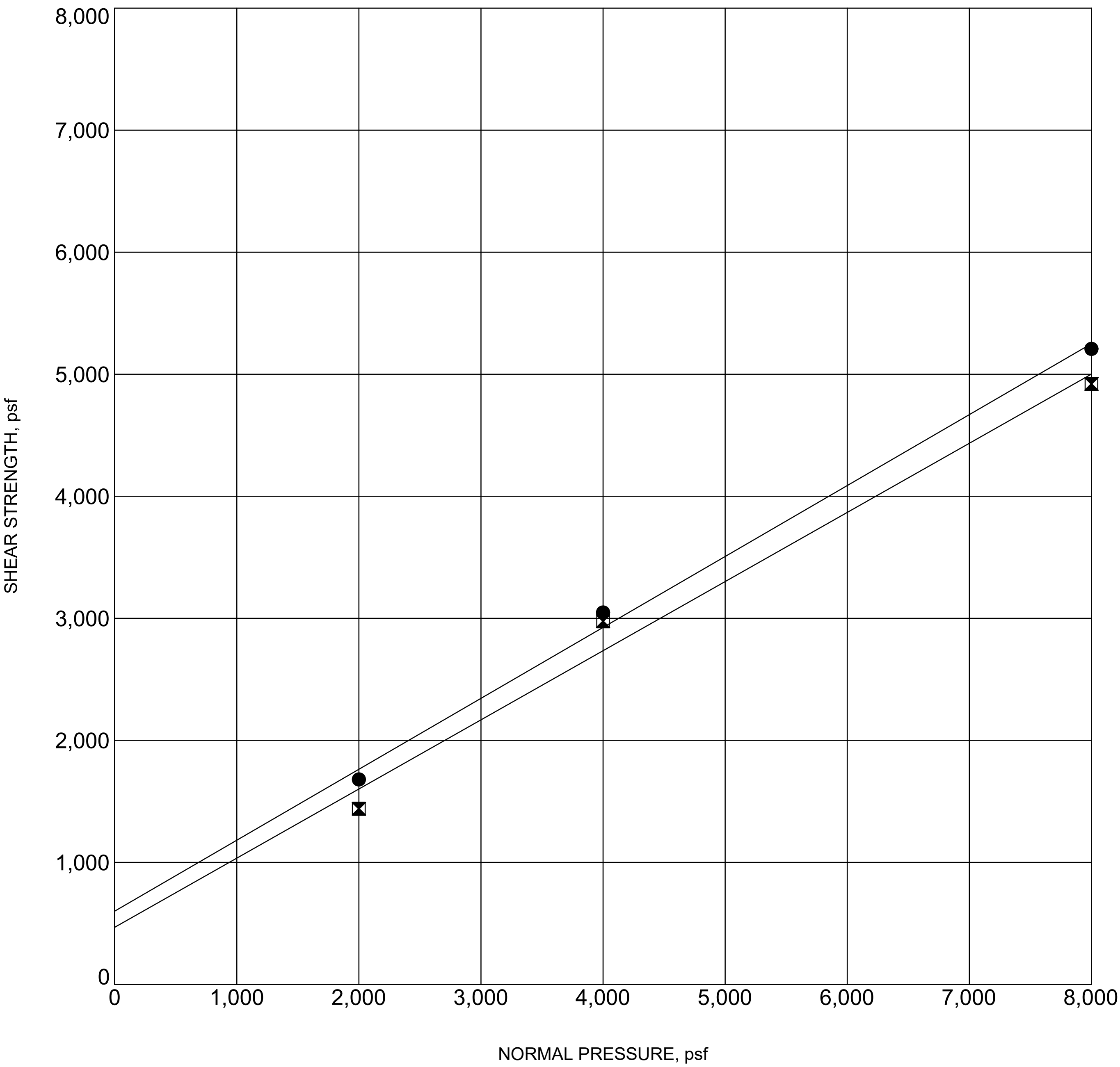
	Peak	Ultimate
Cohesion, C (psf):	0	0
Friction Angle, Ø (deg):	36	37
Initial Moisture (%):	6.5	
Final Moisture (%):	11.6	

TWINING

DIRECT SHEAR TEST

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE B-9



Boring No.:	B-14
Sample Depth (ft):	25
Sample Description:	Silty SAND
Strain Rate (in./min):	0.005
Dry Density (pcf):	108.4

Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	600	468
Friction Angle, Ø (deg):	30	30
Initial Moisture (%):	2.6	
Final Moisture (%):	14.8	

DIRECT SHEAR 220759.3 - UCR OASIS GEOTECH.GPJ TWINING LABS.GDT 12/14/22

TWINING

DIRECT SHEAR TEST

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE B-10

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

Hushmand Associates, Inc.
250 Goddard, Irvine,
CA 92618

p. (949) 777-1274
w. haieng.com
e. hai@haieng.com

January 16, 2023

Twining Inc.
2883 East Spring Street,
Long Beach, CA 90805

Attention: Mr. Doug Crayton

SUBJECT: Laboratory Test Result
Project Name: UCR Oasis
Project No.: 220759.3
HAI Project No.: TWI-23-001

Dear Mr. Crayton:

Enclosed is the result of the laboratory testing program conducted on samples from the above referenced project. The testing performed for this program was conducted in general accordance with the following test procedure:

Type of Test	Test Procedure
Consolidation	ASTM D2435

Attached are: three (3) Consolidation test results.

We appreciate the opportunity to provide our testing services to Twining Inc. If you have any questions regarding the test results, please contact us.

Sincerely,

Kang C. Lin, BS, EIT
Laboratory Manager

M. Varsei

Maryam Varsei, M.Sc.
Senior Staff Engineer

CONSOLIDATION TEST

ASTM D2435

Client :	Twining Inc.	*HAI Project No.:*	TWI-23-001
Project Name:	UCR Oasis	*Tested by:*	KL
Project Number:	220579.3	*Checked by:*	SD
Boring No.:	B-10	*Date:*	01/26/23
Sample No.:	R		
Type of Sample:	Undisturbed Ring		
Depth (ft):	5		
Soil Description:	Brown, Silty Sand (SM)		

Initial Total Weight	Final Total Weight	Final Dry Weight
(g)	(g)	(g)
150.48	159.18	141.11

			Initial Conditions	Final Conditions
Height	H	(in)	1.024	0.935
Height of Solids	H_s	(in)	0.693	0.693
Height of Water	H_w	(in)	0.125	0.241
Height of Air	H_a	(in)	0.206	0.001
Dry Density		**(pcf)**	**114.5**	**134.0**
Water Content		**(%)**	**6.6**	**12.8**
Saturation		**(%)**	**37.7**	**99.4**

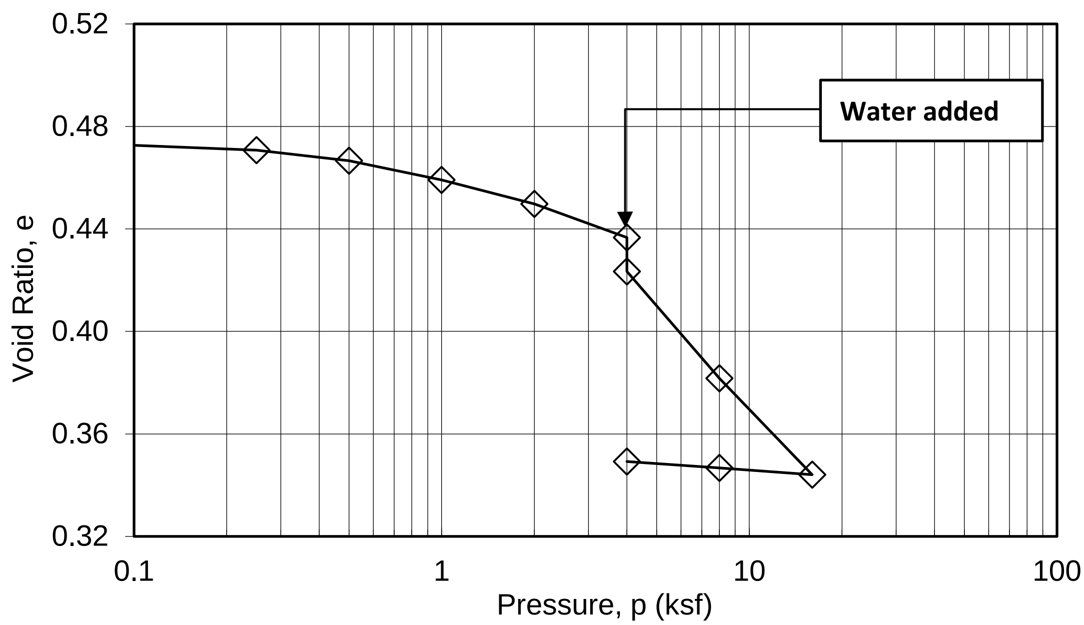
* Saturation is calcualted based on Gs= 2.71

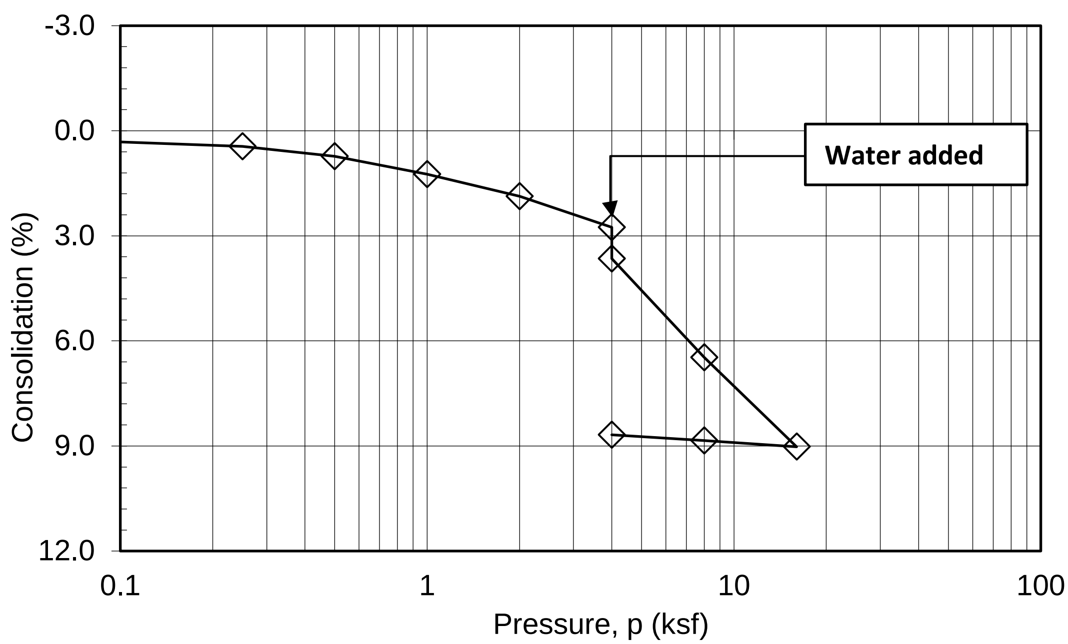
Load (ksf)	**δH (in)**	**H (in)**	**Voids (in)**	**e**	**Consol. (%)**	**a_v (ksf^{-1})**	**M_v (ksf^{-1})**	**Comment**
0.01	-------	1.0240	0.331	0.477	0			
0.25	0.0046	1.0194	0.326	0.471	0.4	2.8E-02	1.9E-02	
0.5	0.0075	1.0165	0.323	0.467	0.7	1.7E-02	1.1E-02	
1	0.0127	1.0113	0.318	0.459	1.2	1.5E-02	1.0E-02	
2	0.0191	1.0049	0.312	0.450	1.9	9.3E-03	6.4E-03	
4	0.0283	0.9957	0.303	0.437	2.8	6.6E-03	4.6E-03	
4	0.0374	0.9866	0.293	0.423	3.7	Water Added		
8	0.0663	0.9577	0.265	0.382	6.5	1.0E-02	7.5E-03	
16	0.0924	0.9316	0.238	0.344	9.0	4.7E-03	3.5E-03	
8	0.0906	0.9334	0.240	0.347	8.8	Unloaded		
4	0.0889	0.9351	0.242	0.349	8.7			

CONSOLIDATION TEST

ASTM D2435

Client :	Twining Inc.	*HAI Project No.:*	TWI-23-001
Project Name:	UCR Oasis	*Tested by:*	KL
Project Number:	220579.3	*Checked by:*	SD
Boring No.:	B-10	*Date:*	01/26/23
Sample No.:	R		
Type of Sample:	Undisturbed Ring		
Depth (ft):	5		
Soil Description:	Brown, Silty Sand (SM)		





CONSOLIDATION TEST

ASTM D2435

Client :	Twining Inc.	*HAI Project No.:*	TWI-23-001
Project Name:	UCR Oasis	*Tested by:*	KL
Project Number:	220579.3	*Checked by:*	SD
Boring No.:	B-12	*Date:*	01/26/23
Sample No.:	R		
Type of Sample:	Undisturbed Ring		
Depth (ft):	5		
Soil Description:	Brown, Silty Sand (SM)		

Initial Total Weight	Final Total Weight	Final Dry Weight
(g)	(g)	(g)
140.69	153.04	136.92

			Initial Conditions	Final Conditions
Height	H	(in)	1.000	0.925
Height of Solids	H_s	(in)	0.673	0.673
Height of Water	H_w	(in)	0.050	0.215
Height of Air	H_a	(in)	0.277	0.038
Dry Density		**(pcf)**	**113.7**	**132.8**
Water Content		**(%)**	**2.8**	**11.8**
Saturation		**(%)**	**15.3**	**84.9**

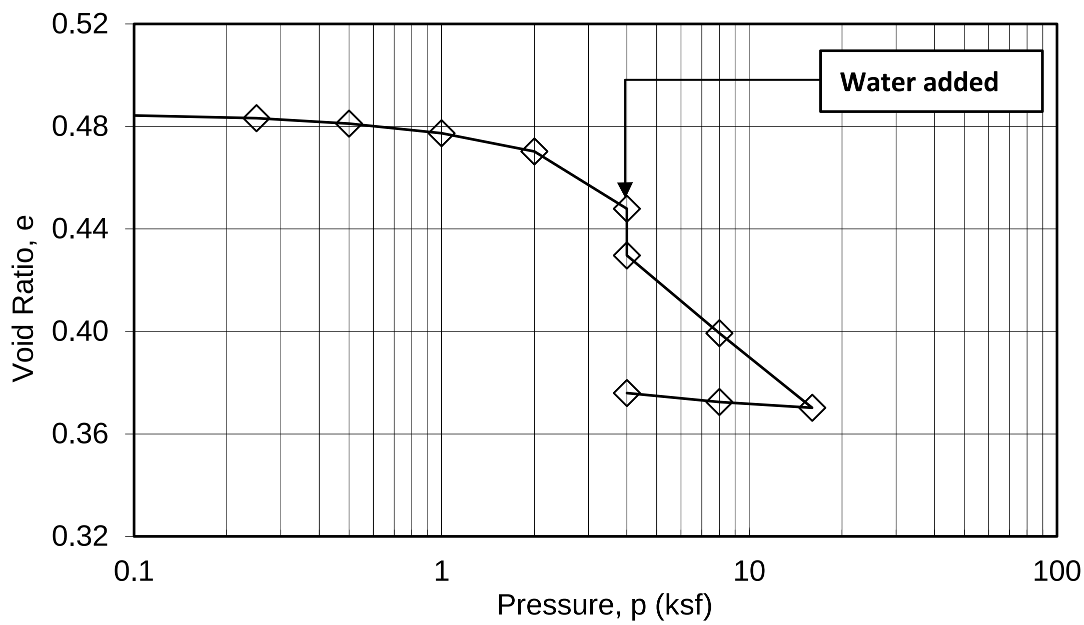
* Saturation is calcualted based on Gs= 2.71

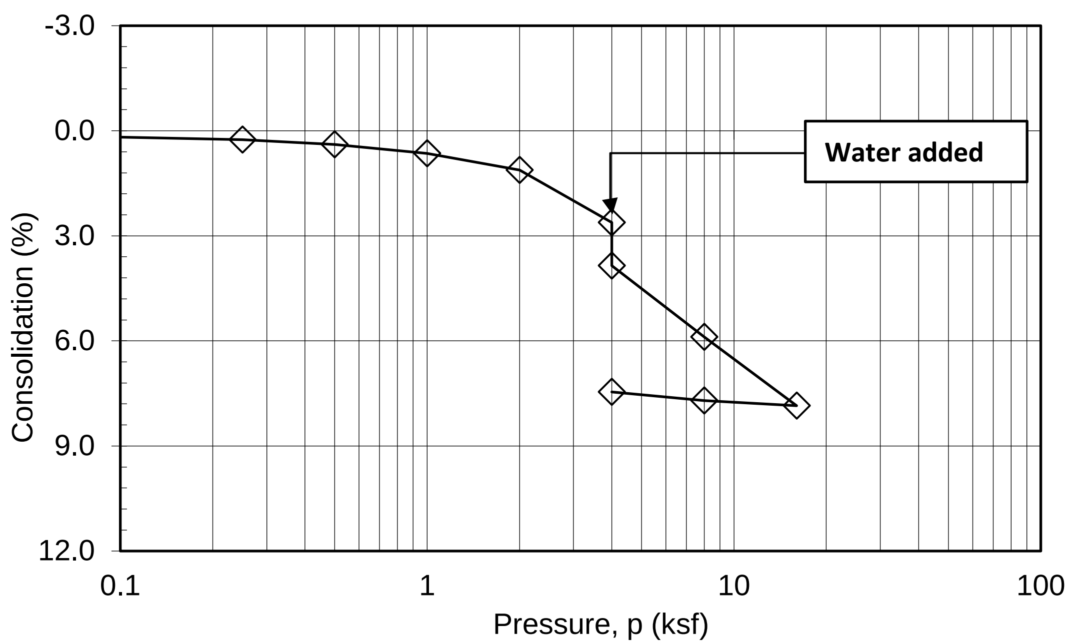
Load (ksf)	**δH (in)**	**H (in)**	**Voids (in)**	**e**	**Consol. (%)**	**a_v (ksf^{-1})**	**M_v (ksf^{-1})**	**Comment**
0.01	-------	1.0000	0.327	0.487	0			
0.25	0.0025	0.9975	0.325	0.483	0.3	1.5E-02	1.0E-02	
0.5	0.0039	0.9961	0.324	0.481	0.4	8.3E-03	5.6E-03	
1	0.0065	0.9935	0.321	0.477	0.6	7.6E-03	5.2E-03	
2	0.0112	0.9888	0.316	0.470	1.1	7.0E-03	4.8E-03	
4	0.0262	0.9738	0.301	0.448	2.6	1.1E-02	7.7E-03	
4	0.0385	0.9615	0.289	0.430	3.8	Water Added		
8	0.0589	0.9411	0.269	0.399	5.9	7.6E-03	5.4E-03	
16	0.0785	0.9215	0.249	0.370	7.8	3.6E-03	2.7E-03	
8	0.0770	0.9230	0.250	0.372	7.7	Unloaded		
4	0.0746	0.9254	0.253	0.376	7.5			

CONSOLIDATION TEST

ASTM D2435

Client :	Twining Inc.	*HAI Project No.:*	TWI-23-001
Project Name:	UCR Oasis	*Tested by:*	KL
Project Number:	220579.3	*Checked by:*	SD
Boring No.:	B-12	*Date:*	01/26/23
Sample No.:	R		
Type of Sample:	Undisturbed Ring		
Depth (ft):	5		
Soil Description:	Brown, Silty Sand (SM)		





CONSOLIDATION TEST

ASTM D2435

Client :	Twining Inc.	*HAI Project No.:*	TWI-23-001
Project Name:	UCR Oasis	*Tested by:*	KL
Project Number:	220579.3	*Checked by:*	SD
Boring No.:	B-12	*Date:*	01/26/23
Sample No.:	R		
Type of Sample:	Undisturbed Ring		
Depth (ft):	25		
Soil Description:	Brown, Silty Sand (SM)		

Initial Total Weight	Final Total Weight	Final Dry Weight
(g)	(g)	(g)
141.21	148.33	130.72

			Initial Conditions	**Final Conditions**
Height	H	(in)	1.000	0.883
Height of Solids	H_s	(in)	0.642	0.642
Height of Water	H_w	(in)	0.140	0.234
Height of Air	H_a	(in)	0.218	0.006
Dry Density		**(pcf)**	**108.6**	**139.4**
Water Content		**(%)**	**8.0**	**13.5**
Saturation		**(%)**	**39.0**	**97.5**

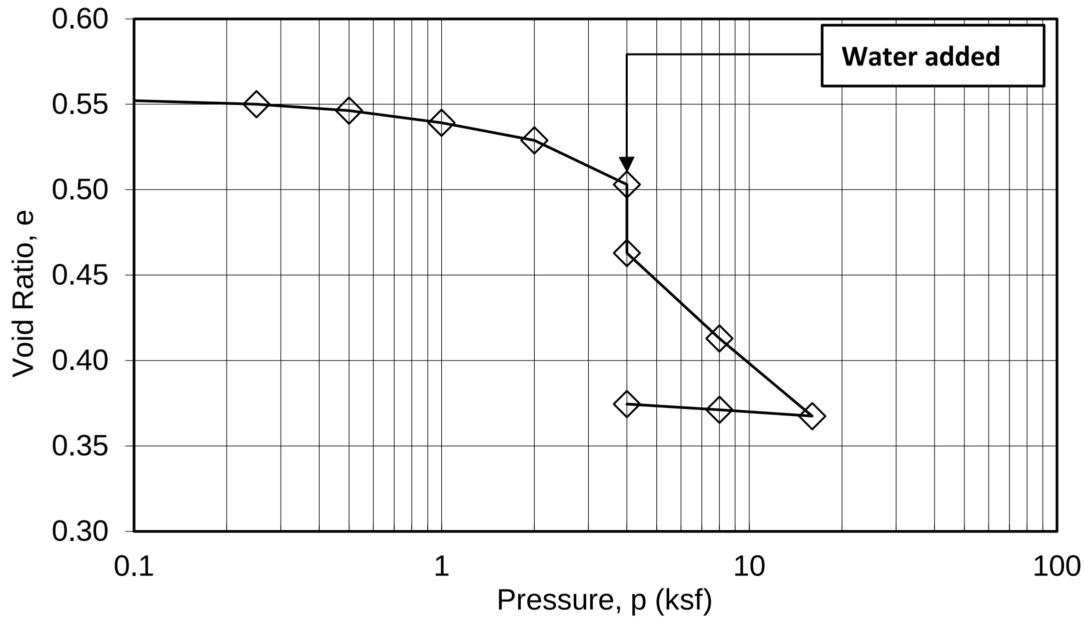
* Saturation is calcualted based on Gs= 2.71

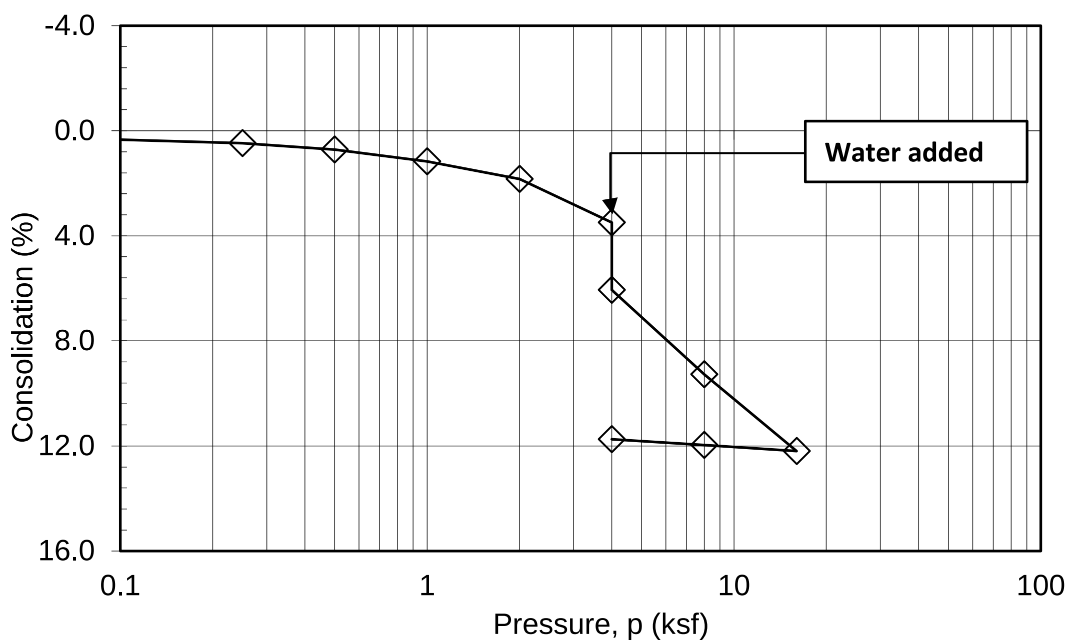
Load (ksf)	**δH (in)**	**H (in)**	**Voids (in)**	**e**	**Consol. (%)**	**a_v (ksf^{-1})**	**M_v (ksf^{-1})**	**Comment**
0.01	-------	1.0000	0.358	0.557	0			
0.25	0.0047	0.9953	0.353	0.550	0.5	3.0E-02	2.0E-02	
0.5	0.0072	0.9928	0.351	0.546	0.7	1.5E-02	1.0E-02	
1	0.0117	0.9883	0.346	0.539	1.2	1.4E-02	9.1E-03	
2	0.0184	0.9817	0.340	0.529	1.8	1.0E-02	6.8E-03	
4	0.0349	0.9651	0.323	0.503	3.5	1.3E-02	8.6E-03	
4	0.0606	0.9394	0.297	0.463	6.1	Water Added		
8	0.0927	0.9073	0.265	0.413	9.3	1.3E-02	8.9E-03	
16	0.1220	0.8781	0.236	0.368	12.2	5.7E-03	4.2E-03	
8	0.1196	0.8804	0.238	0.371	12.0	Unloaded		
4	0.1175	0.8825	0.240	0.374	11.7			

CONSOLIDATION TEST

ASTM D2435

Client :	Twining Inc.	*HAI Project No.:*	TWI-23-001
Project Name:	UCR Oasis	*Tested by:*	KL
Project Number:	220579.3	*Checked by:*	SD
Boring No.:	B-12	*Date:*	01/26/23
Sample No.:	R		
Type of Sample:	Undisturbed Ring		
Depth (ft):	25		
Soil Description:	Brown, Silty Sand (SM)		





ANAHEIM TEST LAB, INC
196 Technology Drive, Unit D
Irvine, CA 92618
Phone (949) 336-6544

DATE: 12/13/2022

TWINING LABS
3310 AIRPORT WAY
LONG BEACH, CA 90806

P.O. NO.: Soils120722

LAB NO.: C-6627, 1-2

SPECIFICATION: CT-643/417/422

MATERIAL: Soil

Project No.: 220759.3
Project: UCR Oasis
WO No.: W01-22-36016
Sample Date: 12/2/2022

ANALYTICAL REPORT

CORROSION SERIES

SUMMARY OF DATA

	pH	MIN RESISTIVITY per CT. 643 ohm-cm	SOLUBLE SULFATES per CT. 417 ppm	SOLUBLE CHLORIDES per CT. 422 ppm
1) B-12 Bulk	7.4	6,500	86	18
2) B-14 Bulk	7.2	4,300	139	28

RESPECTFULLY SUBMITTED

WES BRIDGER LAB MANAGER

TWINING

2883 East Spring Street
Suite 300
Long Beach CA 90806

Tel 562.426.3355
Fax 562.426.6424

APPENDIX C
PREVIOUS LABORATORY TESTING

2883 East Spring Street
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Long Beach CA 90806

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Fax 562.426.6424

TWINING

Appendix B
Laboratory Testing

Laboratory Moisture Content and Density Tests

The moisture content and dry densities of selected driven samples obtained from the exploratory borings were evaluated in general accordance with the latest version of ASTM D 2937. The test results are presented on the logs of the exploratory borings in Appendix A. A Modified Proctor test was also performed on near-surface soils to determine the maximum dry density and optimum water content for compaction. The tests were performed in accordance with ASTM D 1557 Method A. The results are summarized below in Table B-1 and a copy of the curve is attached to this appendix as Figures B-1 and B-2.

Wash Sieve

The amount of fines passing the No. 200 sieve was evaluated by the wash sieve. The test procedure was in general accordance with ASTM D 1140. The results are presented in Table B-2.

Expansion Index Test

The expansion index was evaluated in general accordance with ASTM D 4829. The specimen was molded under a specified compactive energy at approximately 50 percent saturation. The prepared 1-inch thick by 4-inch diameter specimen was loaded with a surcharge of 144 pounds per square foot and was inundated with tap water. Readings of volumetric swell were made for a period of 24 hours. The result of the Expansion Index test is presented on Table B-4.

Consolidation Test

Consolidation tests were performed on a selected driven soil sample by in general accordance with the latest version of ASTM D2435. The sample was inundated during testing to represent adverse field conditions. The percent consolidation for each load cycle was recorded as a ratio of the amount of vertical compression to the original height of the sample. The results of the test are attached to this appendix as Figures B-3 through B-6.

Direct Shear Tests

Direct shear tests were performed on selected remolded and relatively undisturbed soil samples in general accordance with ASTM D 3080 to evaluate the shear strength characteristics of the materials. The samples were inundated during shearing to represent adverse field conditions. The results are summarized in Table B-5. Plots can be found in Figures B-7 through B-12.

2883 East Spring
Street
Suite 300
Long Beach CA
90806

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Corrosivity

Soil pH and resistivity tests were performed by Anaheim Test Lab on a representative soil sample in general accordance with the latest version of California Test Method 643. The chloride content of the selected sample was evaluated in general accordance with the latest version of California Test Method 422. The sulfate content of the selected samples was evaluated in general accordance with the latest version of California Test Method 417. The test results are presented on Table B-6.

Resistance Value (R-Value)

R-value testing was performed on a select bulk sample of the near-surface soils encountered at the site. The test was performed in general accordance with ASTM D 28444. The results are summarized in Table B-7.

Table B-1
Moisture-Density Relationship Testing

ASTM D 1557 Method A

Boring No.	Depth (feet)	Maximum Dry Density (pcf)	Optimum Water Content (%)
B-1	0 – 5	136.0	5.5
B-3	0 – 5	130.0	8.0

Table B-2
No. 200 Wash Sieve Results

Boring No.	Depth (feet)	Percent Passing #200
B-1	40	19.1
B-3	15	27.5
B-3	25	38.4
B-4	10	10.6
B-4	15	11.4
B-5	35	7.1
B-5	45	54
B-6	10	9.7
B-6	30	21.7
B-7	30	38.8

2883 East Spring
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Suite 300
Long Beach CA
90806

Tel 562.426.3355
Fax 562.426.6424

TWINING

Table B-4
Expansion Index Test Result

Boring No.	Depth (feet)	Expansion Index
B-8	0 – 5	9

Table B-5
Direct Shear Tests

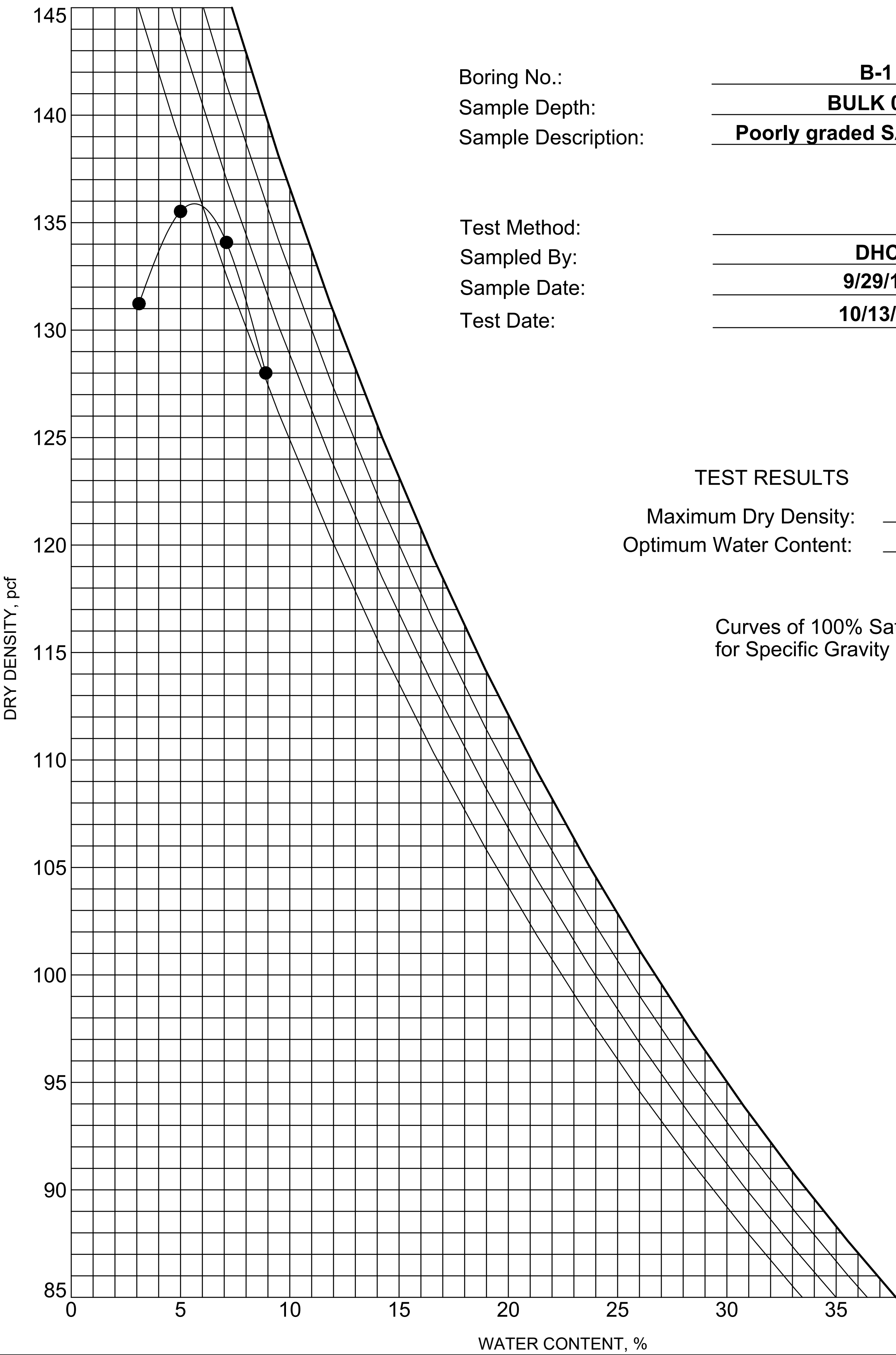
Boring No.	Depth (feet)	Remolded	Peak		Ultimate	
			C (psf)	ϕ (deg)	C (psf)	ϕ (deg)
B-1	15	No	245	38	190	37
B-1	25	No	248	36	190	35
B-3	30	No	275	36	100	36
B-3	40	No	300	36	100	35
B-5	20	No	262	35	50	35
B-6	25	No	840	31	505	32

Table B-6
Soil Corrosivity Test Results

Boring No.	Depth (feet)	pH	Water Soluble Sulfate (ppm)	Water Soluble Chloride (ppm)	Minimum Resistivity (ohm-cm)
B-1	0-5	6.9	161	73	2,800

Table B-7
R-Value Test Results

Boring No.	Depth (feet)	R-Value
B-4	0 – 5	41



Boring No.:	**B-1**
Sample Depth:	**BULK 0-5'**
Sample Description:	**Poorly graded SAND with silt**
Test Method:	
Sampled By:	**DHC**
Sample Date:	**9/29/17**
Test Date:	**10/13/17**

TEST RESULTS

Maximum Dry Density: **136.0** **pcf**

Optimum Water Content: **5.5** **%**

Curves of 100% Saturation
for Specific Gravity Equal to:

2.80

2.70

2.60

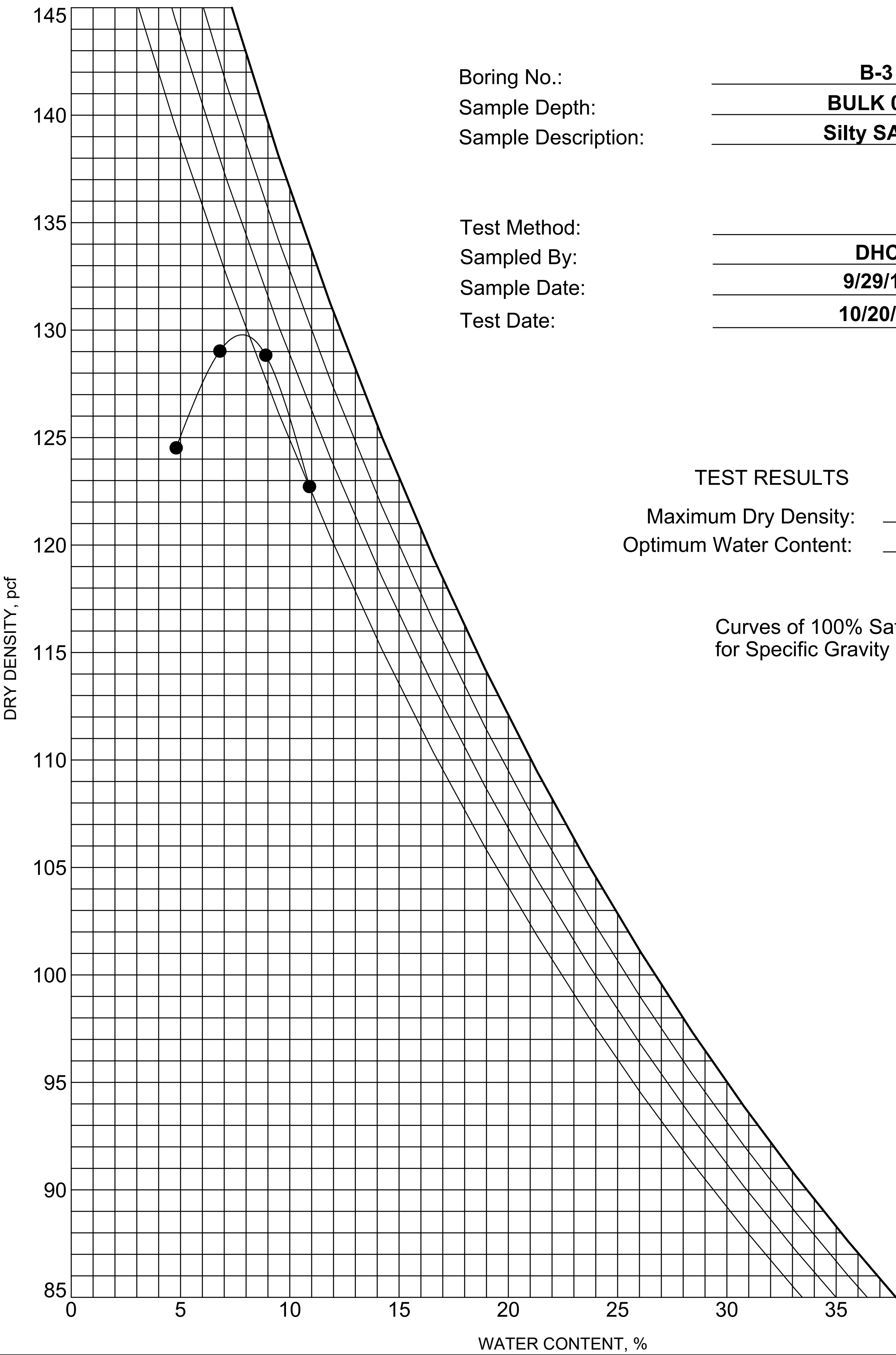
2.50

TWINING

MOISTURE-DENSITY RELATIONSHIP

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE B-1



Boring No.: B-3
Sample Depth: BULK 0-5'
Sample Description: Silty SAND

Test Method:
Sampled By: DHC
Sample Date: 9/29/17
Test Date: 10/20/13

TEST RESULTS

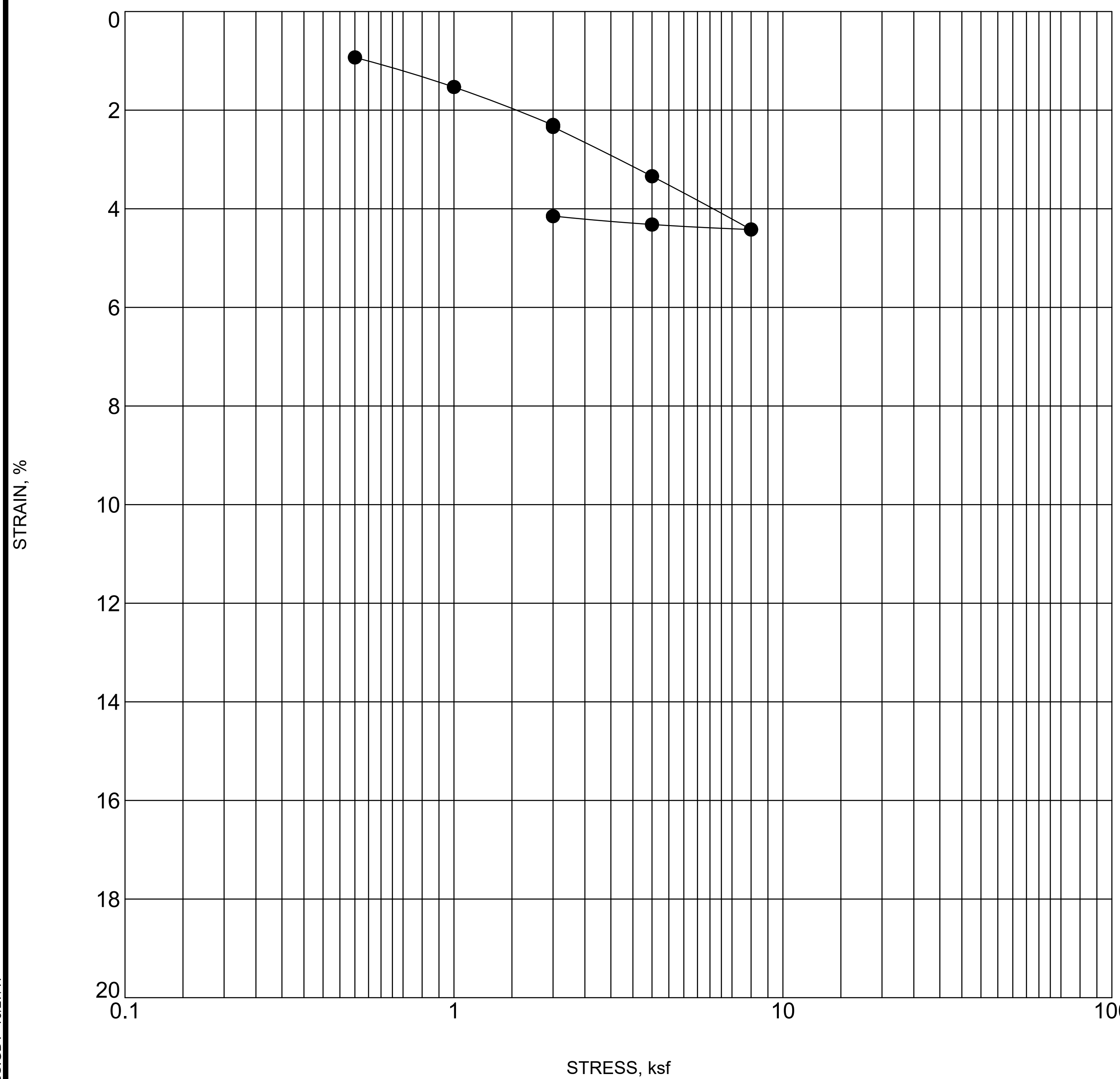
Maximum Dry Density: 130.0 pcf
Optimum Water Content: 8.0 %

Curves of 100% Saturation
for Specific Gravity Equal to:
2.80
2.70
2.60
2.50

MOISTURE-DENSITY RELATIONSHIP

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE B-2
170875.3	October 2017	



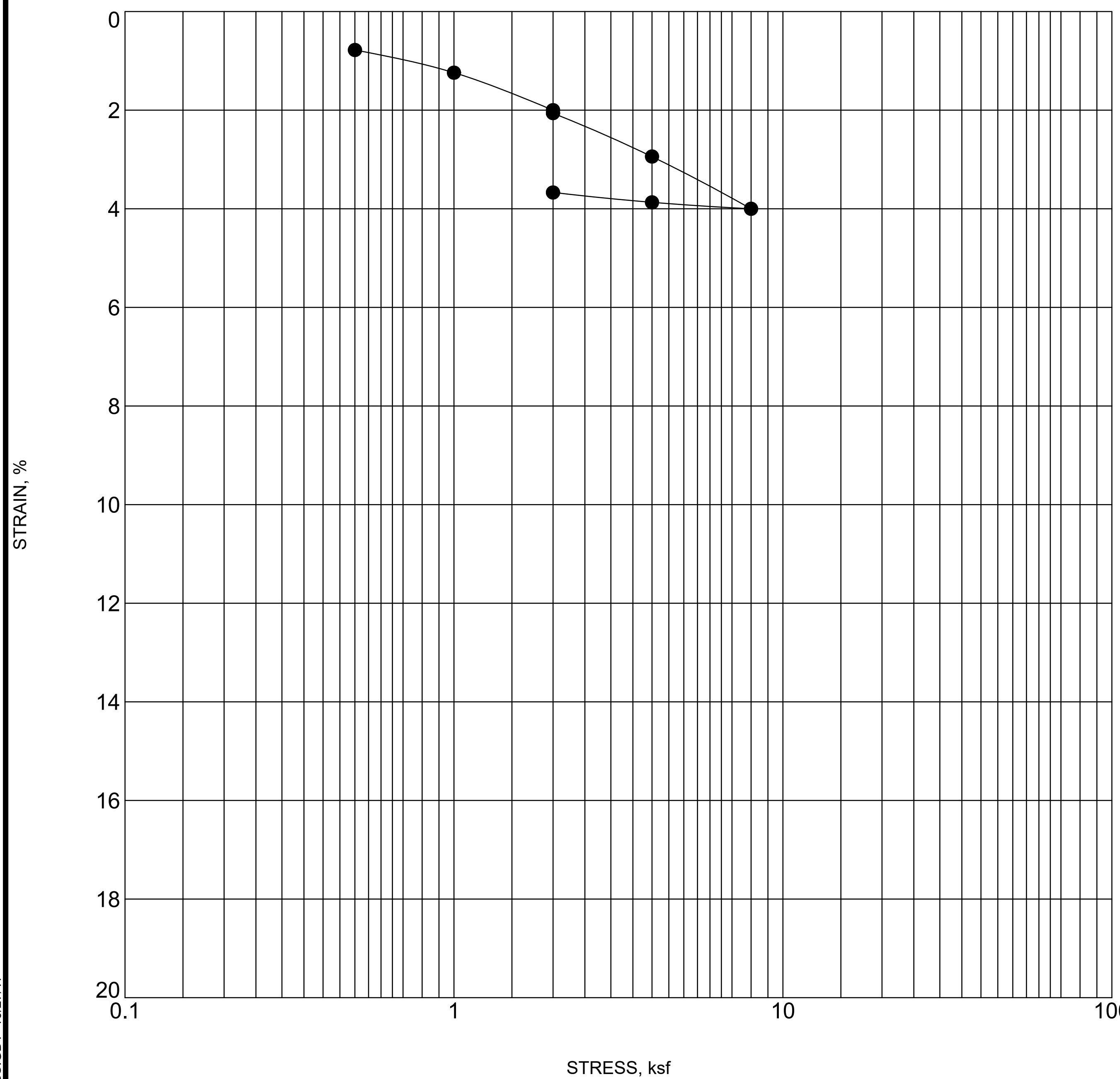
	Sample Location	Soil Description	Dry Density (pcf)	Moisture Content (%)
●	**B-1 at 35 ft**	**Silty SAND**	**109.4**	**6.2**

TWINING

CONSOLIDATION TEST

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE B-3



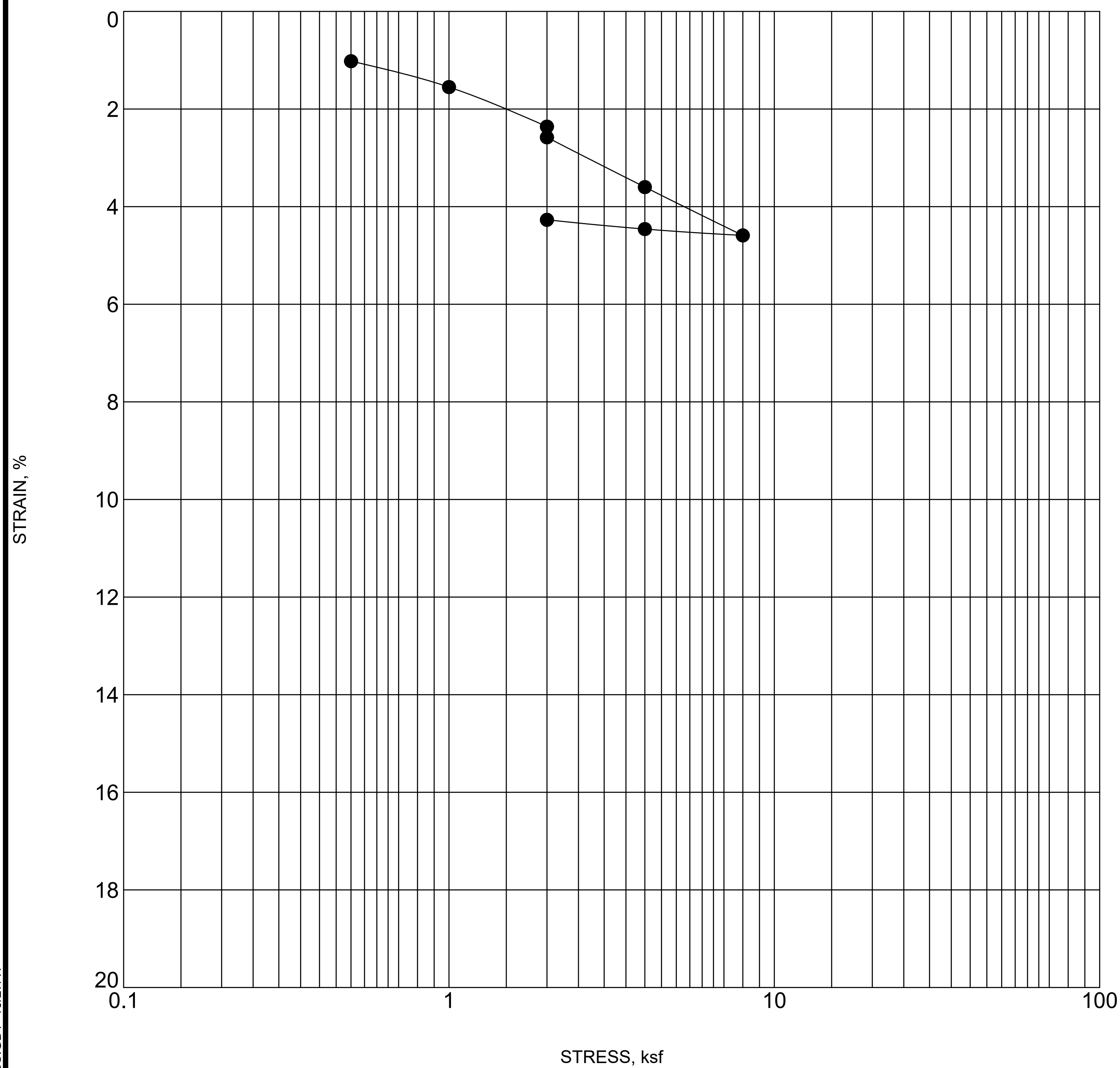
	Sample Location	Soil Description	Dry Density (pcf)	Moisture Content (%)
●	**B-2 at 10 ft**	**Silty SAND**	**9.0**	**121.0**

TWINING

CONSOLIDATION TEST

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE B-4
170875.3	October 2017	



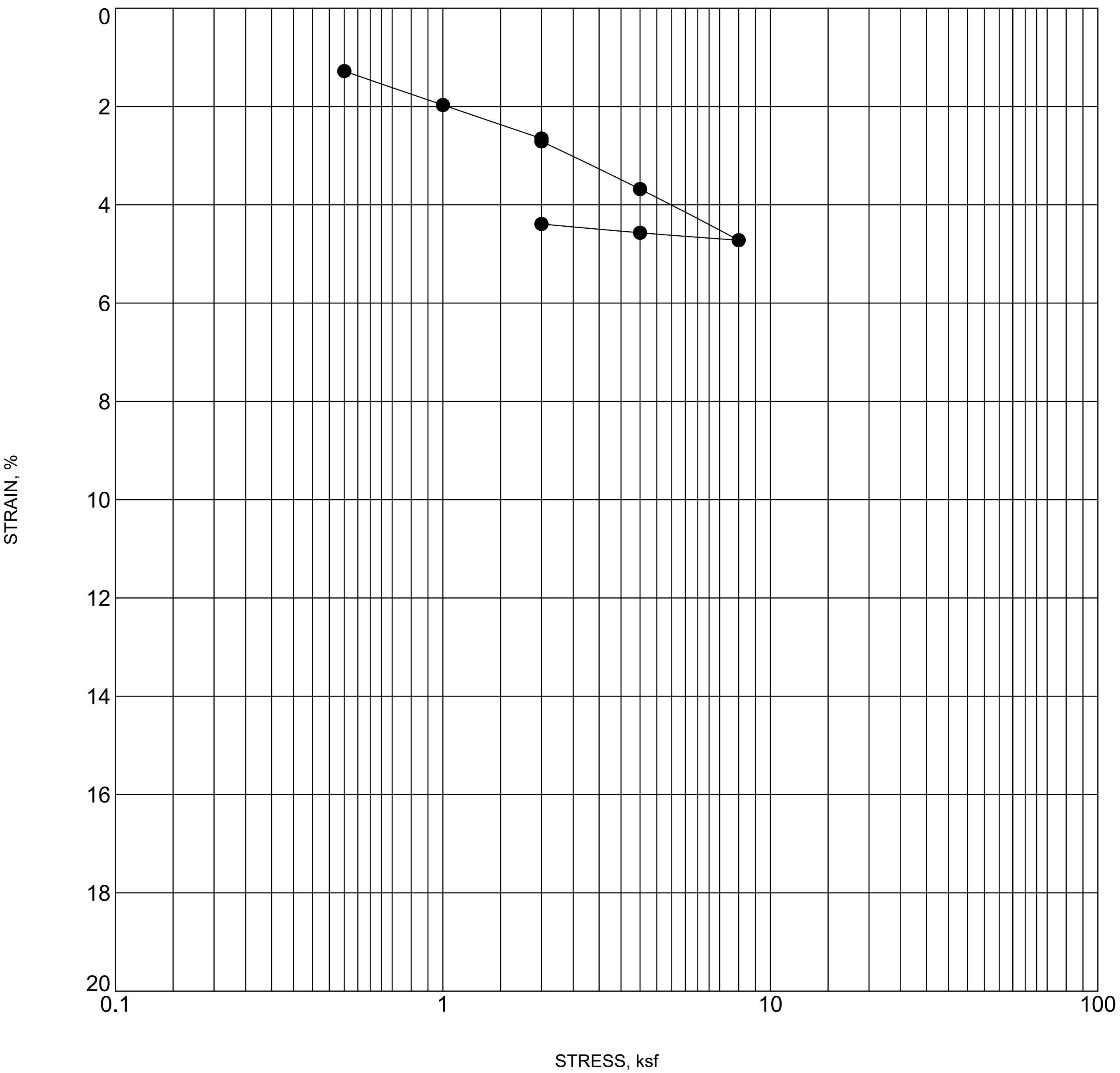
	Sample Location	Soil Description	Dry Density (pcf)	Moisture Content (%)
●	**B-3 at 10 ft**	**Silty SAND**	**119.0**	**3.6**

TWINING

CONSOLIDATION TEST

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE B-5



	Sample Location	Soil Description	Dry Density (pcf)	Moisture Content (%)
●	**B-3 at 20 ft**	**Silty SAND**		

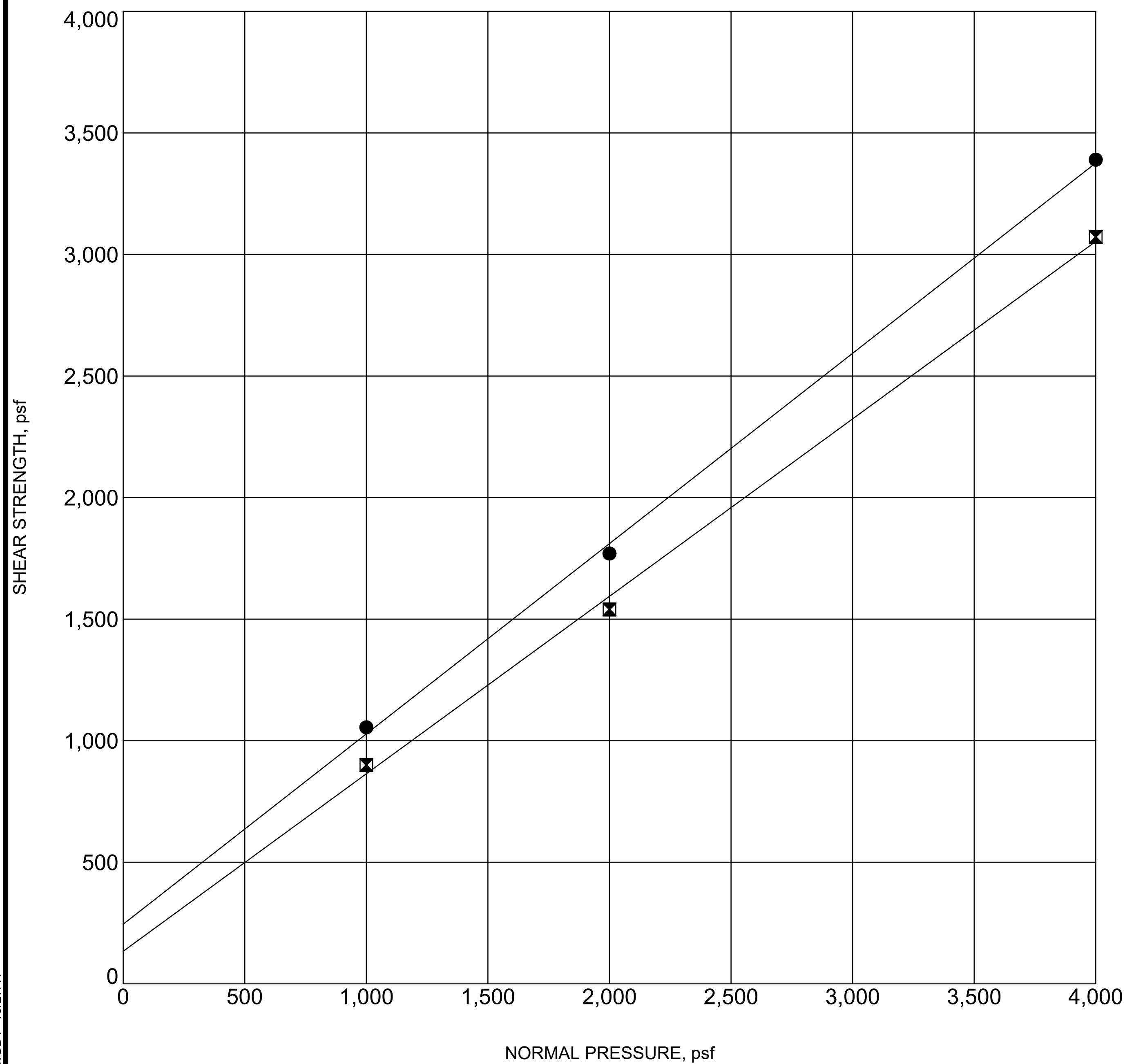
CONSOL STRAIN 170875.3 - UCR OUTPATIENT PAVILLION.GPJ TWINING LABS.GDT 10/27/17

TWINING

CONSOLIDATION TEST

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE B-6



Shear Strength Parameters

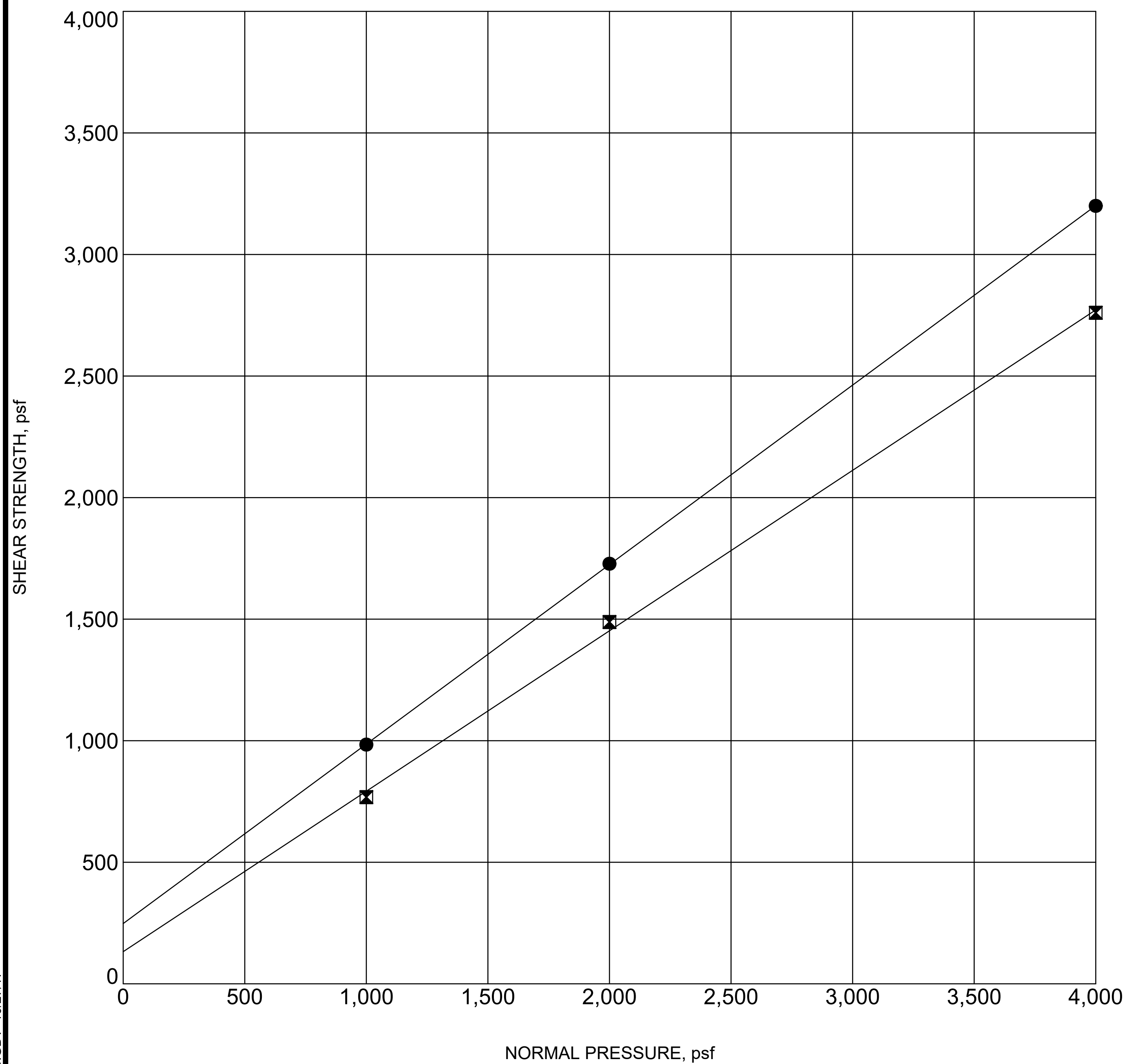
			Peak	**Ultimate**
Boring No.:	B-1			
Sample Depth (ft):	15	**Cohesion, C (psf):**	245	190
Sample Description:	Silty SAND	**Friction Angle, Ø (deg):**	38	37
Strain Rate (in./min):	0.005			
Dry Density (pcf):	117.7	**Initial Moisture (%):**	9.2	
		Final Moisture (%):	17.0	

TWINING

DIRECT SHEAR TEST

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE B-7



Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	248	190
Friction Angle, Ø (deg):	36	35

Initial Moisture (%): 14.3
Final Moisture (%): 14.9

Boring No.:	B-1
Sample Depth (ft):	25
Sample Description:	Silty SAND
Strain Rate (in./min):	0.005
Dry Density (pcf):	107.4

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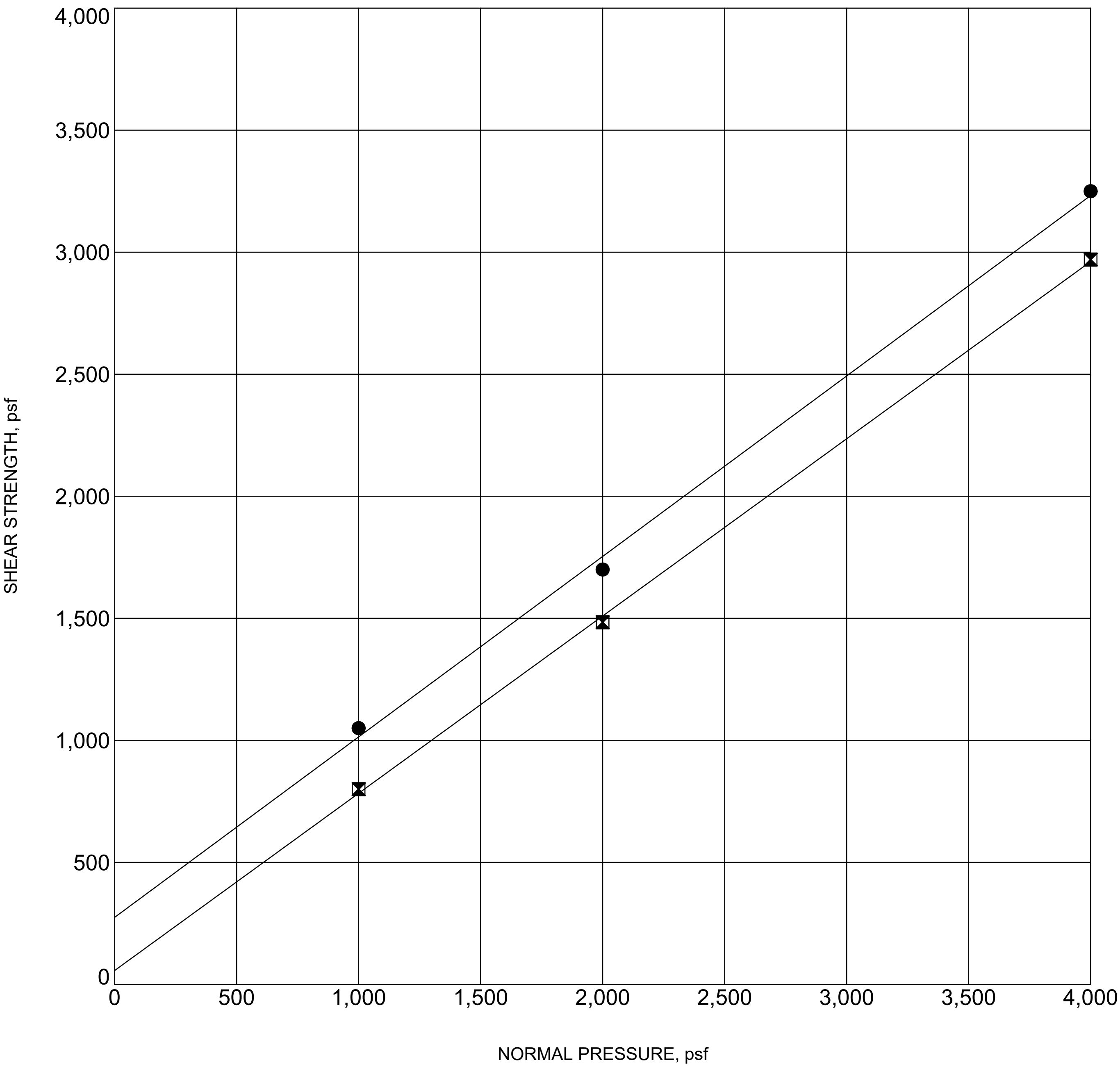
TWINING

DIRECT SHEAR TEST

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE B-8
170875.3	October 2017	



Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	275	100
Friction Angle, Ø (deg):	36	36
Initial Moisture (%):	7.0	
Final Moisture (%):	11.8	

Boring No.: B-3
Sample Depth (ft): 30
Sample Description:
Strain Rate (in./min): 0.005
Dry Density (pcf): 121.7

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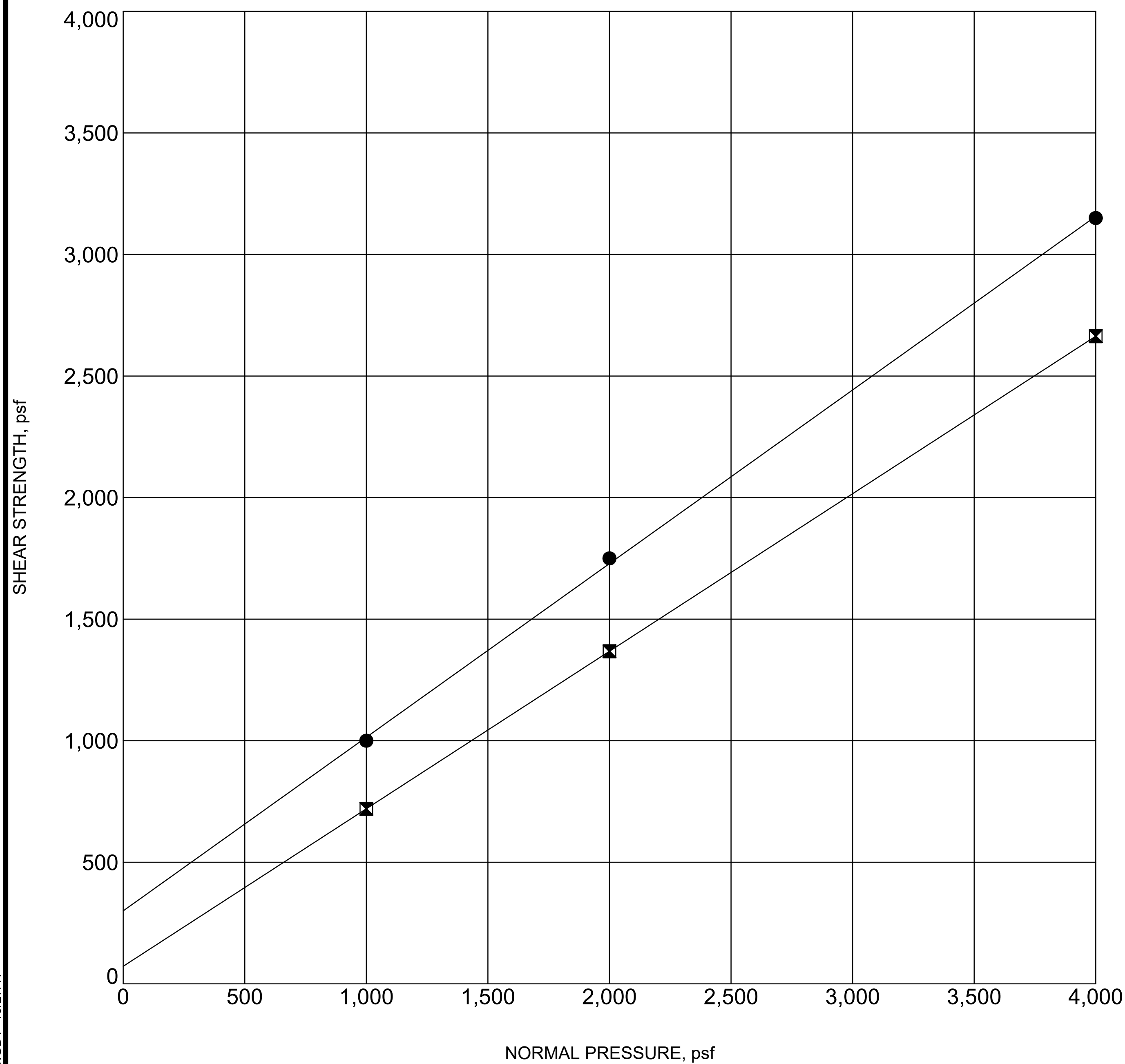
TWINING

DIRECT SHEAR TEST

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE B-9
170875.3	October 2017	



Boring No.: B-3
Sample Depth (ft): 40
Sample Description:
Strain Rate (in./min): 0.005
Dry Density (pcf): 127.6

Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	300	100
Friction Angle, Ø (deg):	36	35

Initial Moisture (%): 8.9
Final Moisture (%): 12.7

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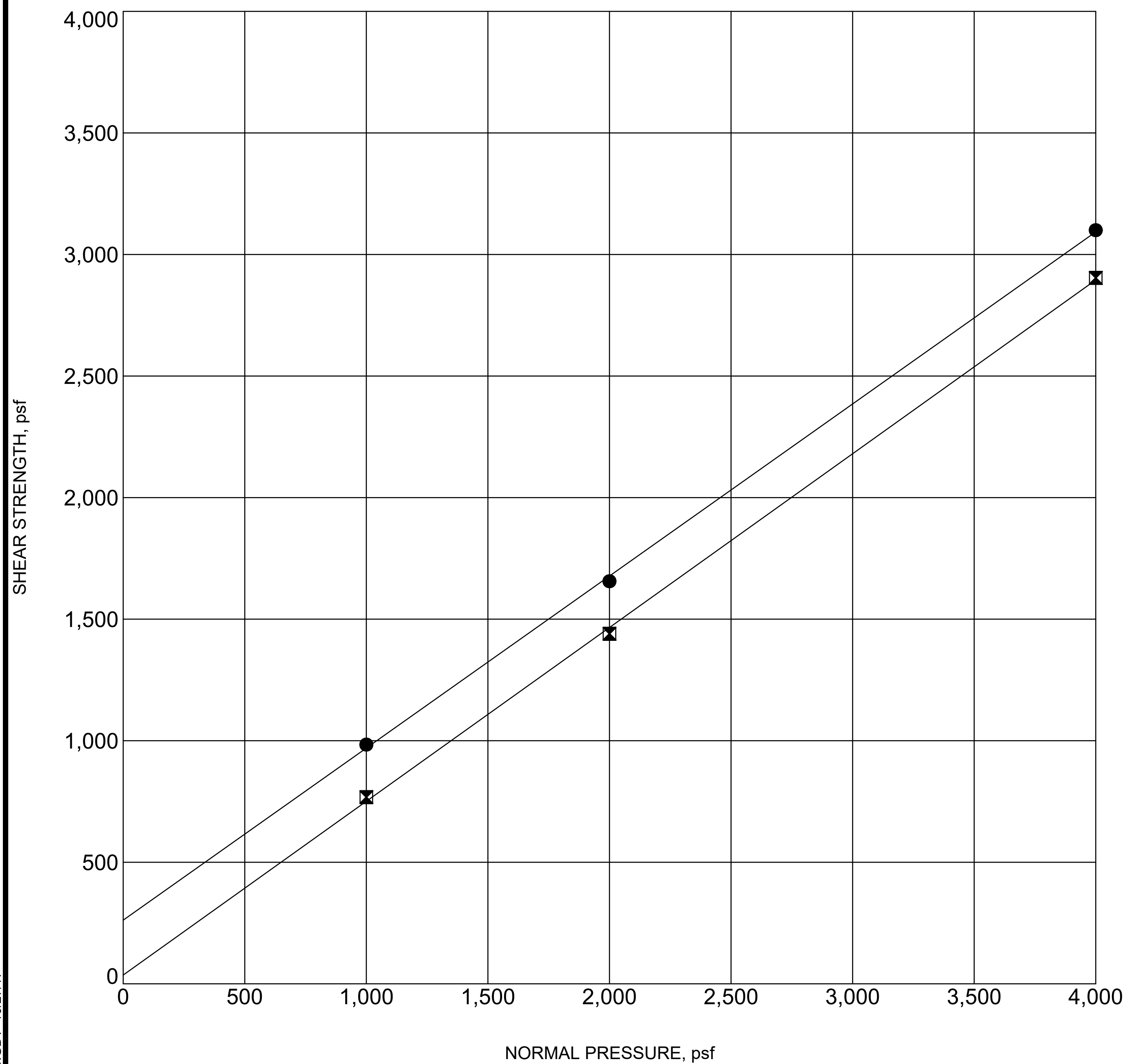
TWINING

DIRECT SHEAR TEST

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE B-10



Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	262	50
Friction Angle, Ø (deg):	35	35

Boring No.: B-5
Sample Depth (ft): 20
Sample Description: Silty SAND
Strain Rate (in./min): 0.005
Dry Density (pcf):

Initial Moisture (%):
Final Moisture (%): 19.0

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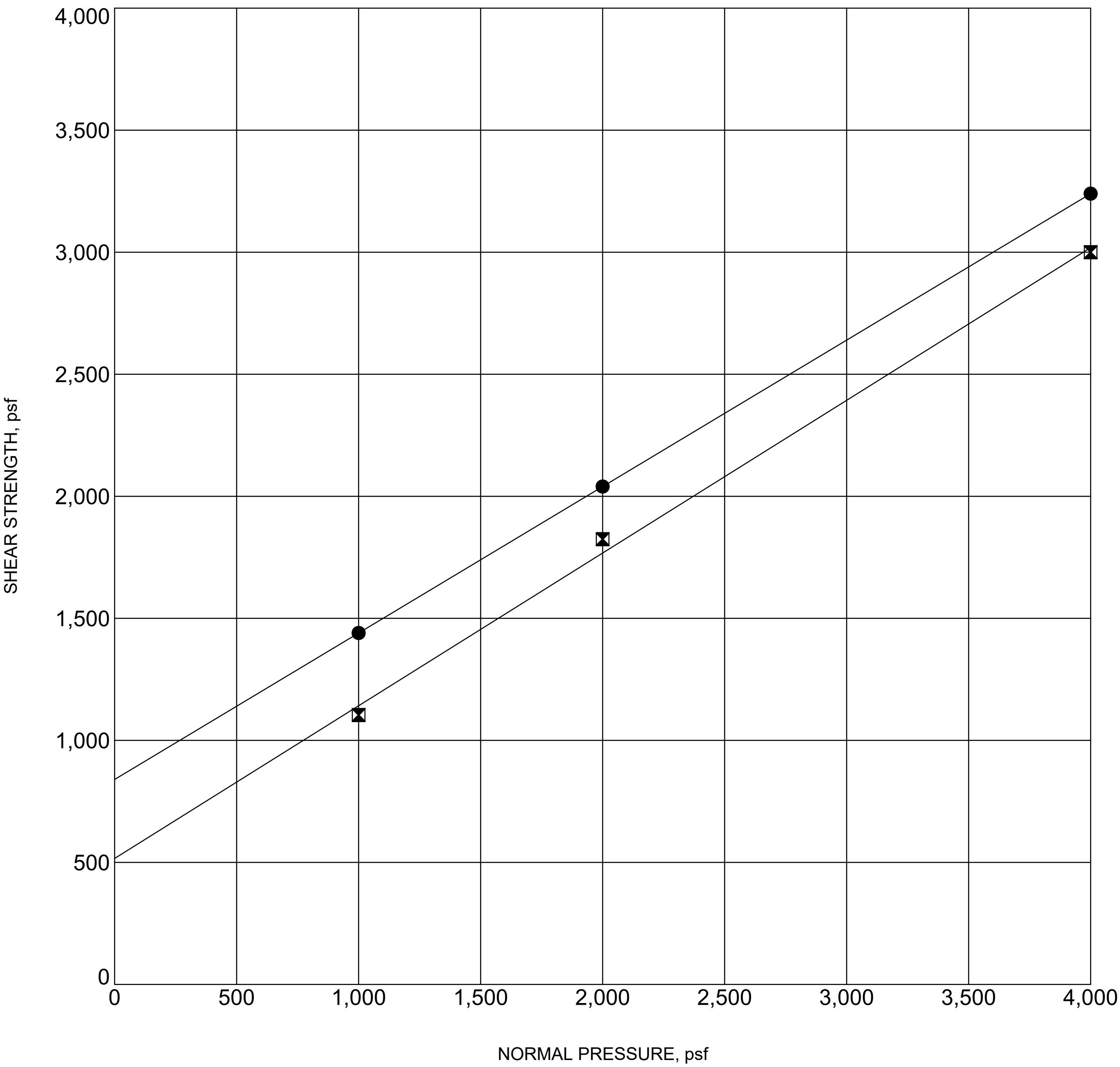
DIRECT SHEAR TEST

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE B-11



Shear Strength Parameters

Boring No.:	B-6		**Peak**	**Ultimate**
Sample Depth (ft):	25	**Cohesion, C (psf):**	840	505
Sample Description:	Silty SAND	**Friction Angle, Ø (deg):**	31	32
Strain Rate (in./min):	0.005			
Dry Density (pcf):	130.4	**Initial Moisture (%):**	8.7	
		Final Moisture (%):	13.4	

DIRECT SHEAR 170875.3 - UCR OUTPATIENT PAVILLION.GPJ TWINING LABS.GDT 10/27/17

TWINING

DIRECT SHEAR TEST

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE B-12
170875.3	October 2017	

TWINING
2883 East Spring Street
Suite 300
Long Beach CA 90806
Tel 562.426.3355
Fax 562.426.6424

APPENDIX D
PERCOLATION TESTING

Infiltration Rate Calculation Sheet

Project :	UCR Oasis Hub		Project No. :	220759.3		Date :	12/2/2022
	Test Hole No.:	P-1	Tested by :	AB/CDD			
Depth of Test Hole, D_T (in):		60	USCS Soil Classification :		Silty SAND		
Test Hole Dimension (inches)					Length	Width	
Diameter (if round) (inches) =		8.00	Sides (if rectangular) =				

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6" ? (Y/N)
1	7:38 AM	8:03 AM	25	15.8	22.2	6.4	Y
2	9:19 AM	9:44 AM	25	18.6	22.2	3.6	N

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

			Δt	H_o	H_f	ΔH	
Trial No.	**Start Time**	**Stop Time**	**Time Interval (min.)**	**Initial Water Height (inches)**	**Final Water Height (inches)**	**Change in Water Level (inches)**	**Tested Infiltration Rate**
1	9:53 AM	10:23 AM	30	42.96	38.40	4.56	0.43
2	10:23 AM	10:53 AM	30	44.40	39.36	5.04	0.46
3	10:53 AM	11:23 AM	30	44.16	39.60	4.56	0.42
4	11:23 AM	11:53 AM	30	43.20	38.64	4.56	0.42
5	11:53 AM	12:23 PM	30	43.80	39.48	4.32	0.40
6	12:24 PM	12:54 PM	30	43.08	38.76	4.32	0.40
7	12:54 PM	1:24 PM	30	43.20	38.64	4.56	0.42

Infiltration Rate with a factor of safety of 3 = 0.1 inch /hr

Infiltration Rate Calculation Sheet

Project :	UCR Clean Technology Park		Project No. :	220759.3		Date :	12/2/2022
Test Hole No.:		P-2	Tested by :	AB/CDD			
Depth of Test Hole, D_T (in):		60	USCS Soil Classification :		Silty SAND		
Test Hole Dimension (inches)					Length	Width	
Diameter (if round) (inches) =		8.00	Sides (if rectangular) =				

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6" ? (Y/N)
1	7:38 AM	8:03 AM	25	30.0	38.4	8.4	Y
2	8:10 AM	8:35 PM	745	25.2	36.2	11.0	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

			Δt	H_o	H_f	ΔH	
Trial No.	**Start Time**	**Stop Time**	**Time Interval (min.)**	**Initial Water Height (inches)**	**Final Water Height (inches)**	**Change in Water Level (inches)**	**Tested Infiltration Rate**
1	8:37 AM	8:47 AM	10	40.20	33.36	6.84	2.12
2	8:48 AM	8:58 AM	10	36.48	32.40	4.08	1.34
3	9:09 AM	9:19 AM	10	36.84	32.28	4.56	1.50
4	9:21 AM	9:31 AM	10	36.00	32.04	3.96	1.32
5	9:32 AM	9:42 AM	10	36.24	32.52	3.72	1.23
6	1:18 PM	1:28 PM	10	38.40	34.44	3.96	1.24

Infiltration Rate with a factor of safety of 3 = 0.4 inch /hr

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APPENDIX E
PREVIOUS PERCOLATION TESTING

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Appendix C
Percolation Testing

Two percolation tests were performed at the project site as shown on Figure 2 – Site Location and Exploration Location Map. Percolation testing was on September 29, 2017 in general conformance with the County of Riverside requirements.

The purpose of the tests was to evaluate the infiltration rates of subgrade soils. At the completion of the boring excavation, a 3-inch diameter slotted PVC pipe was inserted in the borehole. The borehole was presoaked prior to testing. After the completion of presoaking, the borings were filled with water to a minimum depth of 12 inches above the bottom of excavation. Upon completion of the borings and testing, the boreholes were backfilled with soil from the cuttings as noted in the Log of Borings.

The lowest reading was used to determine the infiltration rate. A summary of test results is presented in Table C-1 and the detailed test data is attached to this appendix.

Table C-1 - Summary of Percolation Test Results

Test Location	Depth of Test Hole (ft.)	Design Infiltration Rate (in/hr)
B-7	+/- 30	0.1
B-8	+/- 10	0.9

It is our opinion that an infiltration BMP facility may be feasible at this site. Once the location and depth of the proposed system is determined by the civil engineer, we will review and provide our updated recommendations. At the minimum, any infiltration system should be located at least 15 feet away from any existing and proposed building foundations.

Infiltration Rate Calculation Sheet

Project :	UCR - Outpatient Pavillion	Project No. :	170875.3	Date :	9/29/2017
Test Hole No.:	B-7	Tested by :	SL		
Depth of Test Hole, D_T (in):	360	USCS Soil Classification :	SM		

Test Hole Dimension (inches)		Length	Width	
Diameter (if round) (inches) =	8	Sides (if rectangular) =		

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6" ? (Y/N)
1	7:51 AM	8:51 AM	60	248.4	360.0	111.6	Y
2	8:51 AM	9:51 AM	60	252.0	360.0	108.0	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

			Δt	H_o	H_f	ΔH	
Trial No.	**Start Time**	**Stop Time**	**Time Interval (min.)**	**Initial Water Height (inches)**	**Final Water Height (inches)**	**Change in Water Level (inches)**	**Tested Infiltration Rate**
1	9:48 AM	9:58 AM	10	123.60	121.20	2.40	0.2
2	9:58 AM	10:08 AM	10	121.20	114.00	7.20	0.7
3	10:08 AM	10:18 AM	10	114.00	109.20	4.80	0.5
4	10:18 AM	10:28 AM	10	109.20	105.60	3.60	0.4
5	10:28 AM	10:38 AM	10	105.60	104.28	1.32	0.1
6	10:38 AM	10:48 AM	10	104.28	102.12	2.16	0.2
7	10:48 AM	10:58 AM	10	102.12	100.32	1.80	0.2
8	10:58 AM	11:08 AM	10	109.20	106.32	2.88	0.3
9							
10							
11							
12							
13							
14							
15							

Recommended Infiltration Rate = Min. Tested Rate/2 = 0.1 inch /hr

Infiltration Rate Calculation Sheet

Project :	UCR - Outpatient Pavillion		Project No. :	170875.3		Date :	9/29/2017
Test Hole No.:		B-8	Tested by :	SL			
Depth of Test Hole, D_T (in):		120	USCS Soil Classification :		SM		
Test Hole Dimension (inches)					Length	Width	
Diameter (if round) (inches) =		8	Sides (if rectangular) =				

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6" ? (Y/N)
1	9:04 AM	10:04 AM	60	48.6	105.6	57.0	Y
2	10:05 AM	11:05 AM	60	96.0	105.6	9.6	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

			Δt	H_o	H_f	ΔH	
Trial No.	**Start Time**	**Stop Time**	**Time Interval (min.)**	**Initial Water Height (inches)**	**Final Water Height (inches)**	**Change in Water Level (inches)**	**Tested Infiltration Rate**
1	11:07 AM	11:47 AM	40	24.00	8.16	15.84	2.6
2	11:50 AM	12:20 PM	30	24.60	15.00	9.60	1.8
3	12:22 PM	12:52 PM	30	28.20	16.68	11.52	1.9
4	12:54 PM	1:24 PM	30	31.80	19.20	12.60	1.8
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

Recommended Infiltration Rate = Min. Tested Rate/2 = 0.9 inch /hr

Appendix D

Preliminary Stormwater Quality Management Plan

PRELIMINARY STORMWATER QUALITY MANAGEMENT PLAN

For
University of California, Riverside – OASIS Park
APN 253-050-005, 006, 007, & 008

PREPARED FOR:
University of California, Riverside
Planning, Design & Construction
1223 University Avenue Suite 240
Riverside, CA 92507

PREPARED BY:
Psomas
401 B Street, Suite 1600
San Diego, CA 92101

DATE:
September 5, 2023

REGISTERED PROFESSIONAL ENGINEER
SARAH K. CURRAN
No. C69620
CIVIL
STATE OF CALIFORNIA

9/5/2023

Sarah Curran, RCE C69620 Date

September 5, 2023

UCR OASIS Park
Psomas Project No. 5MIL130100

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2.0 Water Quality and Management Overview 2
2.1 Phase II Small MS4 Post-Construction Management Requirements 2
3.0 Existing Conditions **2**
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5.0 Pollutants of Concern **3**
6.0 Best Management Practices **3**
6.1 Best Management Practices (BMP) Recommendations 3
7.0 Treatment Volume and Flow Rate Calculations **4**
7.1 Stormwater Treatment Recommendations 4

APPENDICES

Appendix A: University's Phase II Small MS4 Post-Construction Stormwater Management Documents and Checklist

Appendix B: Geotechnical Report

Appendix C: Exhibits

Appendix D: BMP Design Details

Appendix E: V_{BMP} and Q_{BMP} Worksheets

Appendix F: Isohyetal Map

1.0 Project Background

The University of California, Riverside ("UCR" or "University") is developing an Opportunities to Advance Sustainability, Innovation and Social Inclusion (OASIS) Park ("Project") at 1200 University Avenue and a portion of 1150 and 1160 University Avenue (Accessor Parcel Number [APN] 253-050-005 and a portion of APNs 253-050-006, 253-050-007, and 253-050-008), south of University Avenue, north of Everton Place, and west of Gage Canal, a Caltrans yard and Interstate 215/State Route 60 (I-215/SR-60)freeway, in the City of Riverside, California. The property comprises approximately 8 acres,approximately 4 of which will be improved as part of the Project ("Project site"). The scope of the Project includes the design and construction of one to two new buildings, a gathering space,open spaces, a work yard, and stormwater treatment facilities. The eastern portion of the site may also be improved with surface-level adjustments to parking spaces/restriping and new landscaping.

<u>Vicinity Map</u>

The Project will be required to comply with University's Phase II Small Municipal Separate Storm Sewer System (MS4) Permit. Since it will create/replace more than 5,000 square feet of impervious surface, it will be defined as a Regulated Project and therefore required to implement measures for site design, runoff reduction, stormwater treatment, and baseline hydromodification management. This report has been prepared to support the programming of the Project site and the California Environmental Quality Act (CEQA) permitting process. The future Design Build Team will ultimately be responsible for the detailed design of stormwater improvements for the Project.

2.0 Water Quality and Management Overview

2.1 Phase II Small MS4 Post-Construction Management Requirements

The post-construction stormwater management for the Project shall follow the University's Phase II Small MS4 Post-Construction Stormwater Management Requirements documents and Phase II Small MS4 Post-Construction Stormwater Management Checklist, provided in Appendix A.

3.0 Existing Conditions

The property, including the Project site, is located within the Santa Ana River Watershed. Onsite and offsite stormwater is collected and discharged by overland flow, basins, above-ground drainage, and underground storm drain systems. Three (3) existing storm drain inlet structures, located at the north side of the property, capture the combined flows and conveys them through an existing 18-inch reinforced concrete pipe (RCP) storm drain line that ultimately discharges to an existing City-owned 24-inch storm drain main line within University Avenue. Runoff from adjacent properties (e.g. I-215/SR 60, Caltrans, Gage Canal) contributes to the stormwater collected on the property and is conveyed by concrete ribbon gutters to the three storm drain inlets.

Parking Lot 50 is a recently improved (2017) surface parking lot that has implemented stormwater management facilities. Sheet flow stormwater is channelized though curb cuts to existing bioretention basins and collected at inlets located within the basins before connecting to the existing 18-inch storm drain lateral.

Parking Lot 51 stormwater sheet flows on impervious pavement north and west to the concrete ribbon gutters, which carry flows north to the three storm drain inlets described above.

Infiltration rates around the property vary between 0.1 to 0.9 in/hour per the geotechnical report, dated ~~1/25/2023~~. The geotechnical report is provided in Appendix B.

According to the Federal Emergency Management Agency (“FEMA”) Special Flood Hazard Area / Flood Insurance Rate Map (FIRM), the Project site is located outside of the 100-year flood plain.

4.0 Proposed Conditions

Approximately four acres of the larger 8.3-acre property will be demolished, graded, and improved as part of the Project. Landscaping, pavers and other permeable materials will be incorporated into the 4 +/- acre improved site which, as a result, will increase the perviousness from the existing condition.

As a baseline condition, bioretention Stormwater Best Management Practices (BMPs) will be implemented to treat and detain stormwater runoff from the improved Project site before ultimately connecting to the existing 18-inch storm drain lateral which, in turn, connects to the City of Riverside 24-inch main, similar to the existing conditions. See the Preliminary Hydrology Study for the *Existing Hydrology Map* and *Preliminary Hydrology Exhibit* for existing and proposed drainage conditions. As an enhancement, infiltration BMPs can be incorporated to also achieve LEED Rainwater Management credits.

Runoff from Parking Lot 51 and the adjacent properties (e.g. I-215/SR 60 freeway, Caltrans yard, Gage Canal) will be collected via new catch basins before entering the improved Project site and conveyed via new storm drain, or similar, to the existing 18-inch lateral, without any new treatment, detention or retention. Similarly, drainage from Parking Lot 50 will continue to be bypassed around the improved project site and connected to the 18-inch lateral, as it is in the existing condition. See the Preliminary Hydrology Study for the *Preliminary Hydrology Exhibit* for the proposed drainage conditions.

5.0 Pollutants of Concern

The property, including the Project site, is tributary to the Santa Ana River Reach 3. This waterway is listed as impaired under the 303(d) list for the following listed pollutants of concern:

- Copper
- Lead
- Pathogens

The BMP's selected for the Project site should prioritize treatment of the listed pollutants.

Potential pollutant source areas in the Project site include a network of vegetated landscaping, surface parking stalls, paved vehicular and pedestrian pathways, building roofs, and service yards.

6.0 Best Management Practices

6.1 Best Management Practices (BMP) Recommendations

The preliminary Water Quality Management Plan (pWQMP) exhibit in Appendix C represents conceptual BMPs for the Project. Associated design fact sheets are provided in Appendix D.

Approximately 6,965 square feet of bioretention basins are proposed to treat and store Project site runoff. Runoff will be collected and discharged to the basins before connecting to the existing 18-inch storm drain lateral. These bioretention BMP's will consist of a vegetated area with a mulch layer (2 to 3 inches), engineered soil media (18 to 36 inches), and a gravel layer (12 inches) with perforated pipes. The non-infiltrating bioretention basin BMP's provide necessary flow based treatment to meet UCR's pollution control requirements.

Permeable pavers may be used to both treat and reduce the stormwater runoff at the entrance at University Avenue. Permeable pavers will be placed on top of a reservoir layer (12 inches) so that drainage will infiltrate into the native subsoil. Overflow drainage will be connected to the existing 18-inch storm drain lateral.

As an enhancement, and to achieve LEED Rainwater Management credits, an infiltration basin may be used to capture and infiltrate onsite runoff and drainage. The basin will consist of vegetation of native grasses and should not exceed 5 feet maximum in depth. Any flows that exceed the basin's volume will be directed to the downstream conveyance system.

7.0 Treatment Volume and Flow Rate Calculations

7.1 Stormwater Treatment Recommendations

The Riverside County Design Handbook for Low Impact Development Best Management Practices (2011) was used to calculate the runoff volume (V_{BMP}) and peak design discharge (Q_{BMP}) for the 85th Percentile 24-hour storm event of each drainage area as indicated in the pWQMP Exhibit and summarized in the following table:

Stormwater Treatment Summary			
Subarea	Area (AC)	V_{BMP} (cubic feet)	Q_{BMP} (cfs)
2-A	1.65	1,681	0.2
2-B	2.97	3,734	0.3
Total			**0.5**

Based on the calculated V_{BMP}, the Bioretention Facilities BMP worksheet was used to develop the conceptual sizing of this BMP presented in this report and is summarized as follows:

Stormwater Treatment Facilities			
BMP	Tributary Subareas (AC)	V_{BMP} (cubic feet)	Minimum Surface Area (ft^2)
Biofiltration Basin	2-B	3,734	5,787

Reference Appendix E for concept V_{BMP}, Q_{BMP} and BMP sizing worksheet and Appendix F for Isohyetal Map for the 85th Percentile 24-hour storm event.

APPENDIX A

University's Phase II Small MS4 Post-Construction Stormwater Management Documents and Checklist

11/10/2021

Applicability

Site Design Measures are required for all projects that **create and/or replace** (including projects with no net increase in impervious footprint) **between 2,500 square feet and 5,000 feet of impervious surface**.

Low Impact Development (LID) Design Standards are required for all development projects that **create and/or replace 5,000 square feet or more of impervious surface** (Regulated Projects).

Requirements

1) **Projects that create and/or replace between 2,500 square feet and 5,000 feet of impervious surface** shall implement one or more of the following **site design measures** to reduce project site runoff:
   a) Stream Setbacks and Buffers – a vegetated area including trees, shrubs, and herbaceous vegetation that exists or is established to protect a stream system;
   b) Soil Quality Improvement and Maintenance – improvement and maintenance of soil through soil amendments and creation of microbial community;
   c) Tree planting and preservation – planting and preservation of health, established threes that include both evergreens and deciduous , as applicable;
   d) Rooftop and Impervious Area Disconnection – rerouting of rooftop drainage pipes to drain rainwater to rain barrels, cisterns, or permeable areas instead of the storm sewer;
   e) Porous Pavement – pavement that allows runoff to pass through it, thereby reducing the runoff from a site and surrounding areas and filtering pollutants;
   f) Green Roofs – a vegetative layer grown on a roof (rooftop garden);
   g) Vegetated Swales – a vegetated, open-channel management practice designed specifically to treat and attenuate stormwater runoff;
   h) Rain Barrels and Cisterns – system that collects and stores stormwater runoff from a roof or other impervious surface
2) Project proponents shall use the **State Water Board Post-Construction Water Balance Calculator or equivalent to quantify the runoff reduction** resulting from implementation of **site design measures**.[1]
3) **Site Design Measures** shall be based on the objective of achieving infiltration, evapotranspiration and/or harvesting/reuse of the 85th percentile rainfall event, to the extent feasible, to meet **6) Numeric Sizing Criteria for Stormwater Retention and Treatment**. Site design measures shall be used to reduce the amount of runoff, to the extent technically feasible, for which retention and runoff is required. Any remaining runoff from impervious drainage management areas (DMAs) may then be directed to one or more bioretention facilities as specified in **7) Stormwater Treatment Measures and Baseline Hydromodification Management Measures**.

[1] The State Water Board Post-Construction Water Balance Calculator referenced in the Phase II Small MS4 permit can be found at https://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.html

4) **Projects that create and/or replace 5,000 square feet or more of impervious surface (Regulated Projects)** shall implement measures for **site design, runoff reduction, stormwater treatment,** and **baseline hydromodification management.**

   a) Where a redevelopment project results in an increase of more than 50 percent of the impervious surface of a previously existing development, runoff from the entire project, consisting of all existing, new, and/or replaced impervious surfaces, must be included to the extent feasible.

   b) Where a redevelopment project results in an increase of less than 50 percent of the impervious surface of a previously existing development, only runoff from the new and/or replaced impervious surface of the project must be included.

5) **Source Control Measures** – Regulated Projects with pollutatant-generating activities and sources are required to implement standard permanent and/or operational source control measures as applicable. Measures for the following pollutant-generating activities and sources shall be designed consistent with recommendations from the CASQA Stormwater BMP Handbook for New Development and Redevelopment or equivalent manual, and include:

   a) Accidental spills or leaks
   b) Interior floor drains
   c) Parking/Storage area maintenance
   d) Indoor and structural pest control
   e) Landscape/outdoor pesticide use
   f) Pools, spas, ponds, decorative fountains, and other water features
   g) Restaurants, grocery stores, and other food service operations
   h) Storage and handling of solid waste
   i) Outdoor storage of equipment or materials
   j) Vehicle and equipment cleaning
   k) Vehicle and equipment repair and maintenance
   l) Fuel dispensing areas
   m) Loading docks
   n) Fire sprinkler test water
   o) Drain or wash water from boiler drain lines, condensate drain lines, rooftopequipment, drainage sumps, and other sources
   p) Unauthorized non-storm water discharges
   q) Building and grounds maintenance

6) **Numeric Sizing Criteria for Stormwater Retention and Treatment** – Facilities designed to evapotranspire, infiltrate, harvest/use, and biotreat stormwater must meet at least one of the following **hydraulic sizing design criteria**:

   a) **Volumetric Criteria**

i) The maximized capture stormwater volume for the tributary area, on the basis of historical rainfall records, determined using the formula and volume capture coefficients in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87 (1998) pages 175-178 (that is, approximately the 85th percentile 24-hour storm runoff event); or

ii) The volume of annual runoff required to achieve 80 percent or more capture, determined in accordance with the methodology in Section 5 of CASQA's Stormwater Best Management Practice Handbook, New Development and Redevelopment (2003), using local rainfall data.

b) **Flow-based Criteria**

i) The flow of runoff produced from a rain event equal to at least 0.2 inches per hour intensity; or

ii) The flow of runoff produced from a rain event equal to at least 2 times the 85th percentile hourly rainfall intensity as determined from local rainfall records

7) **Stormwater Treatment Measures and Baseline Hydromodification Management Measures** – After implementation of Site Design Measures, runoff from remaining impervious DMAs must be directed to one or more facilities designed to infiltrate, evapotranspire, and/or biotreat the amount of runoff specified in **6) Numeric Sizing Criteria for Stormwater Retention and Treatment**. The facilities must be demonstrated to be at least as effective as a bioretention system with the following design parameters:

1) Maximum surface loading rate of 5 inches per hour, based on the flow rates calculated. A sizing factor of 4% of tributary impervious area may be used.

2) Minimum surface reservoir volume equal to surface area times a depth of 6 inches.

3) Minimum planting medium depth of 18 inches. The planting medium must sustain a minimum infiltration rate of 5 inches per hour throughout the life of the project and must maximize runoff retention and pollutant removal. A mixture of sand (60%-70%) meeting the specifications of American Society for Testing and Materials (ASTM) C33 and compost (30%-40%) may be used.

4) Subsurface drainage/storage (gravel) layer with an area equal to the surface area and having a minimum depth of 12 inches.

5) Underdrain with discharge elevation at top of gravel layer.

6) No compaction of soils beneath the facility, or ripping/loosening of soils if compacted.

7) No liners or other barriers interfering with infiltration.

8) Appropriate plant palette for the specified soil mix and maximum available water use.

a) **Alternative Designs for Bioretention Facilities** — Facilities, or a combination of facilities, of a different design than **Stormwater Treatment Measures and Baseline Hydromodification Management Measures** may be permitted if the following measures of equivalent effectiveness are demonstrated:

1) Equal or greater amount of runoff infiltrated or evapotranspired.
2) Equal or lower pollutant concentrations in runoff that is discharged after bioretention.
3) Equal or greater protection against shock loadings and spills.
4) Equal or greater accessibility and ease of inspection and maintenance.

b) **Allowed Adjustments for Bioretention Facilities for Special Site Conditions** – The bioretention design parameters as specified in **Stormwater Treatment Measures and Baseline Hydromodification Management Measures** may be adjusted for the following special site conditions:

1) Facilities located within 10 feet of structures or other potential geotechnical hazards established by the geotechnical expert for the project may incorporate an impervious cutoff wall between the bioretention facility and the structure or other geotechnical hazard.
2) Facilities in areas with documented high concentrations of pollutants in underlying soil or groundwater, facilities located where infiltration could contribute to a geotechnical hazard, and facilities located on elevated plazas or other structures may incorporate an impervious liner and may locate the underdrain discharge at the bottom of the subsurface drainage/storage layer (this configuration is commonly known as a "flow-through planter").
3) Facilities located in areas of highly infiltrative soils or high groundwater, or where connection of underdrain to a surface drain or to a subsurface storm drain are infeasible, may omit the underdrain.

c) **Exceptions to Requirements for Bioretention Facilities** – Contingent on a demonstration that use of bioretention or a facility of equivalent effectiveness is infeasible, other types of biotreatment or media filters (such as tree-box-type biofilters or in-vault media filters) may be used for the following:

1) Projects creating or replacing an acre or less of impervious area, and located in a designated pedestrian-oriented commercial district (i.e., smart growth projects), and having at least 85% of the entire project site covered by permanent structures;
2) Facilities receiving runoff solely from existing (pre-project) impervious areas;
3) Historic sites, structures, or landscapes that cannot alter their original configuration in order to maintain their historic integrity.

UCR CleanWater

Phase II Small MS4 Post-Construction Stormwater Management Checklist

Projects That Create/Replace >2,500 sf of impervious surface

11/29/2022

Applicability

Site Design Measures to reduce project site stormwater runoff are required for all projects that create and/or replace **between 2,500 square feet and 5,000 square feet** of impervious surface.

Low Impact Development (LID) Design Standards to effectively reduce stormwater runoff and pollutants are required for all development and redevelopment projects that create and/or replace **5,000 square feet or more** of impervious surface.

Instructions

Complete this checklist to facilitate and document project stormwater management planning, and forward to EH&S Environmental Programs for compliance review.

Project Information

Project Name:	Project #:
Project Location:	
Description of Project:	
Project Type: New Development ☐ Redevelopment[1] ☐ Retrofit ☐ Landscaping ☐ Road ☐ Utility ☐ Other ☐____________________________	
Total Project Site Area (sq ft):____________ Disturbed (sq ft):____________ New Impervious (sq ft):____________ Replaced Impervious (sq ft):[1]____________ Will redevelopment result in an increase of more than 50% of existing impervious surface? Yes ☐ No ☐ [1]Where a redevelopment project results in an increase of more than 50% of the impervious surface of a previously existing development, runoff from the entire project consisting of all existing, new, and/or replaced impervious surfaces, must be included in the stormwater management design to the extent feasible Surface Areas for Redevelopment or Road Projects (square feet): Total Pre-project Impervious:____________ Total Post-project Impervious:____________	

Stormwater Management Design Checklist

PART A – Projects that create and/or replace between 2,500 and 5,000 square feet of impervious surface.

Select one or more of the following site design measures to reduce project site runoff: (check all that apply):

☐ Stream Setbacks and Buffers – a vegetated area including trees, shrubs, and herbaceous vegetation that exists or is established to protect a stream system

☐ Soil Quality Improvement and Maintenance – improvement and maintenance of soil through soil amendments and creation of microbial community

☐ Tree planting and preservation – planting and preservation of health, established threes that include both evergreens and deciduous , as applicable

☐ Rooftop and Impervious Area Disconnection – rerouting of rooftop drainage pipes to drain rainwater to rain barrels, cisterns, or permeable areas instead of the storm sewer

☐ Porous Pavement – pavement that allows runoff to pass through it, thereby reducing the runoff from a site and surrounding areas and filtering pollutants

☐ Green Roofs – a vegetative layer grown on a roof (rooftop garden)

☐ Vegetated Swales – a vegetated, open-channel management practice designed specifically to treat and attenuate stormwater runoff

☐ Rain Barrels and Cisterns – system that collects and stores stormwater runoff from a roof or other impervious surface

The State Water Resources Control Board Post-Construction Water Balance Calculator (or equivalent) must be used to quantify the runoff reduction resulting from implementation of site design measures, and the calculations may be attached to, or accompany this checklist.

Describe the site design measures selected (attach additional sheets if necessary):

Size of area that will drain to each BMP (sq ft):__________

Volume of runoff that will be managed by each BMP (cu ft):__________

Pollutants that will be managed by each BMP (check each that apply):

☐ Trash ☐ Sediment ☐ Dry weather flow ☐ Other:__________

Pre-project runoff volume (cu ft):__________ Project-related runoff volume increase (cu ft):__________

Project-related runoff volume increase with reduction credits (cu ft):__________

If post-construction stormwater runoff volume cannot be balanced with site design measures only, additional measures for runoff reduction, stormwater treatment, and baseline hydromodification management must be designed for the project as described in PART B.

PART B – Projects that create and/or replace 5,000 square feet or more of impervious surface.

Projects that create and/or replace 5,000 square feet or more of impervious surface shall implement measures for site design, runoff reduction, stormwater treatment, and baseline hydromodification management.

Source Control Measures: Projects with pollutant-generating activities and sources shall be required to implement standard permanent and/or operational source control measures as applicable.

Please check the pollutant generating activities or sources below that apply to this project (check all that apply):

- ☐ Accidental spills or leaks
- ☐ Building and grounds maintenance
- ☐ Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources
- ☐ Fire sprinkler test water
- ☐ Fuel dispensing areas
- ☐ Indoor and structural pest control
- ☐ Interior floor drains
- ☐ Landscape/outdoor pesticide use
- ☐ Loading docks
- ☐ Outdoor storage of equipment or materials
- ☐ Parking/storage area maintenance
- ☐ Pools, spas, ponds, decorative fountains, and other water features
- ☐ Restaurants, grocery stores, and other food service operations
- ☐ Storage and handling of solid waste
- ☐ Unauthorized non-stormwater discharges
- ☐ Vehicle and equipment cleaning
- ☐ Vehicle and equipment repair and maintenance

Source control measures shall be designed consistent with recommendations from the CASQA Development BMP Online Handbook (June 2021).

Describe the source control BMPs that will be implemented for the project for all pollutant generating activities checked above (attached additional sheets if necessary):

Numeric Sizing Criteria for Stormwater Retention and Treatment

Facilities designed to evapotranspire, infiltrate, harvest/use, and biotreat storm water to meet at least one of the following hydraulic sizing design criteria:

1) Volumetric Criteria: a) The maximized capture storm water volume for the tributary area, on the basis of historical rainfall records, determined using the formula and volume capture coefficients in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87 (1998) pages 175-178 (that is, approximately the 85th percentile 24-hour storm runoff event); or	2) Flow-based Criteria a) The flow of runoff produced from a rain event equal to at least 0.2 inches per hour intensity; or b) The flow of runoff produced from a rain event equal to at least 2 times the

b) The volume of annual runoff required to achieve 80 percent or more capture, determined in accordance with the methodology in Section 5 of CASQA's Stormwater Best Management Practice Handbook, New Development and Redevelopment (2003), using local rainfall data.	85th percentile hourly rainfall intensity as determined from local rainfall records.

Site design measures shall be based on the objective of achieving infiltration, evapotranspiration and/or harvesting/reuse of the 85th percentile rainfall event, to the extent feasible, to meet numeric sizing criteria for stormwater retention and treatment. Site design measures shall be used to reduce the amount of runoff, to the extent technically feasible, for which retention and runoff is required. Remaining runoff from impervious drainage management areas may then be directed to one or more bioretention facilities.

The State Water Resources Control Board SMARTS Post-Construction Calculator (or equivalent) must be used to quantify the runoff reduction, and the calculations may be attached to, or accompany this checklist.

For BMP selection, please refer to the Riverside County Design Handbook for Low Impact Development Best Management Practices for the Santa Ana watershed, accessible at: http://www.floodcontrol.co.riverside.ca.us/NPDES/LIDBMP.aspx.

Describe the BMP(s) selected for this project to achieve infiltration, evapotranspiration, and/or harvesting/reuse of the 85th percentile rainfall event, to the extent feasible, and meet at least one of the hydraulic sizing design criteria (attach additional sheets if necessary):

Size of area that will drain to each BMP (sq ft):__________

Volume of runoff that will be managed by each BMP (cu ft):__________

Pollutants that will be managed by each BMP (check each that apply):

☐ Trash ☐ Sediment ☐ Dry weather flow ☐ Other:__________

Pre-project runoff volume (cu ft):__________ Project-related runoff volume increase (cu ft):__________

Project-related runoff volume increase with reduction credits (cu ft):__________

Stormwater Treatment Measures and Baseline Hydromodification Management Measures

After implementation of site design measures and one or more facilities designed to infiltrate, evapotranspirate, and/or biotreat runoff specified by numeric sizing criteria, any remaining runoff from impervious drainage management areas may then be directed to one or more bioretention facilities designed to infiltrate, evapotranspire, and/or biotreat runoff and meet numeric sizing criteria for stormwater retention and treatment so long as the facilities are demonstrated to be at least as effective as a bioretention system with the following design parameters (check all that apply):

☐ Maximum surface loading rate of 5 inches per hour, based on the flow rates calculated. A sizing factor of 4% of tributary impervious area may be used.

☐ Minimum surface reservoir volume equal to surface area times a depth of 6 inches.

☐ Minimum planting medium depth of 18 inches. The planting medium must sustain a minimum infiltration rate of 5 inches per hour throughout the life of the project and must maximize runoff retention and pollutant removal. A mixture of sand (60%-70%) meeting the specifications of American Society for Testing and Materials (ASTM) C33 and compost (30%-40%) may be used.

☐ Subsurface drainage/storage (gravel) layer with an area equal to the surface area and having a minimum depth of 12 inches.

☐ Underdrain with discharge elevation at top of gravel layer.

☐ No compaction of soils beneath the facility, or ripping/loosening of soils if compacted.

☐ No liners or other barriers interfering with infiltration.

☐ Appropriate plant palette for the specified soil mix and maximum available water use.

Allowed Adjustments for Bioretention Facilities for Special Site Conditions

Do any of the following special site conditions apply?

☐ Facilities located within 10 feet of structures or other potential geotechnical hazards established by the geotechnical expert for the project may incorporate an impervious cutoff wall between the bioretention facility and the structure or other geotechnical hazard.

☐ Facilities in areas with documented high concentrations of pollutants n underlying soil or groundwater, facilities located where infiltration could contribute to a geotechnical hazard, and facilities located on elevated plazas or other structures may incorporate an impervious liner and may locate the underdrain discharge at the bottom of the subsurface drainage/storage layer (this configuration is commonly known as a “flow-through planter”).

☐ Facilities located in areas of highly infiltrative soils or high groundwater, or where connection of underdrain to a surface drain or to a subsurface storm drain are infeasible, may omit the underdrain.

Exceptions to Requirements for Bioretention Facilities

Is the use of bioretention or a facility of equivalent effectiveness infeasible? Contingent on a demonstration of infeasibility, other types of biotreatment or media filters (such as tree-box-type biofilters or in-vault media filters may be used for the following (check any that apply):

☐ Projects creating or replacing an acre or less of impervious area, and located in a designated pedestrian-oriented commercial district (i.e., smart growth projects), and having at least 85% of the entire project site covered by permanent structures;

☐ Facilities receiving runoff solely from existing (pre-project) impervious areas;

☐ Facilities located in areas of highly infiltrative soils or high groundwater, or where connection of underdrain to a surface drain or to a subsurface storm drain are infeasible, may omit the underdrain.

APPENDIX B

Geotechnical Report

TWINING
Engineering a Better Tomorrow

Geotechnical Investigation Report

Proposed OASIS Park
University of California, Riverside
Riverside, California

<u>Prepared for:</u>

University of California, Riverside
1223 University Avenue, Suite 240
Riverside, CA 92507

June 29, 2023
Project No.: 220759.3

TWINING

2883 East Spring Street
Suite 300
Long Beach CA 90806

Tel 562.426.3355
Fax 562.426.6424

June 29, 2023
Project No.: 220759.3

Ms. Daneca Stevens
Project Manager
Planning, Design, and Construction
University of California, Riverside
1223 University Avenue, Suite 240
Riverside, CA 92507

Subject: **Geotechnical Investigation Report**
Proposed OASIS Park
University of California, Riverside
Riverside, California

Dear Ms. Stevens,

In accordance with your request and authorization, we are presenting the results of our geotechnical investigation for the proposed OASIS Park project located at the University of California, Riverside in Riverside, California. The purpose of our investigation is to characterize subsurface conditions of the site and evaluate seismic and geologic hazards at the site.

This report was prepared in accordance with the requirements of the 2022 California Building Code (2022 CBC) and ASCE 7-16 (ASCE, 2017). The geotechnical engineer of record from the Design/Build team shall utilize this report and provide geotechnical recommendations for the construction and design of the proposed project.

We appreciate the opportunity to be of service on this project. Should you have any questions regarding this report or if we can be of further service, please do not hesitate to contact the undersigned.

Respectfully submitted,
TWINING, INC.

REGISTERED PROFESSIONAL ENGINEER
PAUL C. SOLTIS
G-2606
Ex. 12/31/24
GEOTECHNICAL
STATE OF CALIFORNIA

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1. INTRODUCTION

This report presents the results of the geotechnical investigation performed by Twining, Inc. (Twining) for the proposed OASIS Park project located at University of California, Riverside in Riverside, California. A description of the site and the proposed improvements is provided in the following section. The objectives of this investigation have been to characterize subsurface conditions of the site and evaluate seismic and geologic hazards at the site. Our investigation was performed in conformance with the 2022 California Building Code (2022 CBC) and ASCE 7-16 (ASCE, 2017).

2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The overall OASIS site is located at the existing Parking Lot 50 and 1200 University Avenue on University of California, Riverside campus in Riverside, California, as shown on Figure 1 – Site Location Map. The approximate site coordinates are latitude 33.974715°N and longitude 117.336899°W, on the Riverside East, California 7½-Minute Quadrangle, according to the United States Geological Survey (USGS) topographic maps (USGS 2022). The overall OASIS site is bound by University Avenue on the north, the Gage Canal on the east, Everton Place on the south, and commercial properties on the west. The western third of the site is currently occupied by the University Extension building, a four-story parking garage, and surface parking lots. The eastern portion of the site is covered by Parking Lots 50 and 51. Three buildings previously occupied the site of Lot 50 and were demolished around 2017. The site covers approximately 8.25 acres. The site is relatively flat with a surface elevation that varies from approximately 1011 feet mean sea level (msl) in the northwest corner, to 1024 feet msl in the northeast corner, to 1022 feet msl in the southeast corner, to 1013 feet msl in the southwest corner. Twining previously conducted borings in September of 2017 for an abandoned Outpatient Pavilion project that was planned for Parking Lot 50. The borings from that investigation and this current investigation are used in the preparation of this report.

The proposed project will consist of the construction of a new technology park consisting of research laboratories, technology incubator, training facilities, hybrid-learning room, offices, community spaces, other supporting uses, and parking on the western portion of the OASIS Site. Associated improvements such as new flatwork, landscape areas, and utilities are also expected. We note that a conceptual plan layout of the proposed development is not available at the time of preparation of this report. The scope of our report is to provide a comprehensive evaluation of the site; we note that additional borings/investigation may be required depending on the actual locations of the new structures relative to completed boring locations. A site plan and the locations of our borings are depicted on Figure 2 – Site Plan and Boring Location Map.

3. SCOPE OF WORK

Our scope of work included review of background information, pre-field activities and field exploration, laboratory testing, and report preparation. These tasks are described in the following subsections.

3.1. Literature Review

We reviewed readily available background data including published geologic maps, topographic maps, aerial photographs, seismic hazard maps and literature, and flood hazard maps relevant to the subject site. Relevant information has been incorporated into this report. A partial list of literature reviewed is presented in the "Selected References" section of this report.

3.2. Pre-Field Activities

Before starting our exploration program, we performed a geotechnical site reconnaissance to observe the general surficial conditions at the site and to select field exploration locations. After exploration locations were delineated, Underground Service Alert was notified of the planned locations a minimum of 72 hours prior to excavation. Additionally, existing as-built utility plans were reviewed by Twining and the University to determine if the proposed boring locations conflicted with existing underground utilities.

3.3. Field Exploration

The field exploration consisted of drilling, testing, sampling, and logging of 8 exploratory borings (B-9 through B-14, P-1, and P-2) and percolation testing in 2 of the borings (P-1 and P-2) conducted at the site on December 1 and 2, 2022. The approximate exploration locations are shown on Figure 2 – Site Plan and Boring Location Map. Additionally, Twining previously conducted 8 borings at the site in September and October of 2017. The locations of those borings are also shown on Figure 2.

The borings were advanced to approximate depths of 5 to 51.5 feet below ground surface (bgs) using a CME-75 truck-mounted drill rig equipped with 8-inch-diameter hollow-stem-auger (HSA). All borings were first excavated to 5 feet bgs using a hand-auger to clear potential underground utilities.

Drive samples of the soils were obtained from the borings using a Standard Penetration Test (SPT) sampler without room for liner and a modified California split-spoon sampler. The samplers were driven using a 140-pound automatic hammer falling approximately 30 inches. The blow counts to drive the samplers were recorded, and subsurface conditions encountered in the borings were logged by a Twining field engineer under the supervision of a California Registered Geotechnical Engineer. Bulk samples were collected from the upper 5-foot soil cuttings. The samples were transported to Twining's geotechnical engineering laboratory in Long Beach, California for examination and testing.

In-situ percolation testing was performed in borings P-1 and P-2, which were advanced to 5 feet bgs, to provide estimates of infiltration rate of the site soils. In 2017 Twining conducted percolation tests at borings B-7 and B-8 at depths of 30 feet and 10 feet, respectively. The results of the infiltration testing are discussed in Appendix A – Field Exploration.

Upon completion of exploration, the borings deeper than 5 feet were backfilled with lean concrete grout. The 5-foot-deep borings were backfilled with soil cuttings. The surface was repaired to match existing conditions.

Detailed descriptions of the field exploration and the soils encountered during the current and previous drilling are presented in Appendix A – Field Exploration.

3.4. Geotechnical Laboratory Testing

Laboratory tests were performed on selected samples obtained from the borings to aid in the soil classification and to evaluate the engineering properties of site soils. The following tests were performed in general accordance with ASTM and Caltrans standards:

- In-situ moisture and density (ASTM D2937),
- #200 Wash (ASTM D1140),
- Atterberg Limits (ASTM D4318),
- Expansion Index (ASTM D4829),

- Consolidation (ASTM D2435),
- Direct shear (ASTM D3080),
- Maximum dry density and optimum moisture content (ASTM D1557),
- Resistance value (R-value) (ASTM D2844), and
- Corrosivity (Caltrans test methods CT417, CT422, and CT 643).

Detailed laboratory test procedures and results are presented in Appendix B – Laboratory Testing.

3.5. Report Preparation

We compiled and analyzed the data collected from our field exploration and laboratory testing. We performed engineering analyses based on our literature review and data from field exploration and laboratory testing programs. Our analyses included the following:

- Site geology, and subsurface conditions,
- Groundwater conditions,
- Geologic hazards and seismic design parameters, and
- Liquefaction potential and seismic settlement.

We prepared this report to present our conclusions from this investigation.

4. GEOLOGY AND SUBSURFACE CONDITIONS

The regional and site geology and subsurface conditions are described in this section, based on our data review and field investigation. A portion of the geologic map is reproduced as Figure 3 – Geologic Map. Detailed subsurface conditions are presented in Appendix A – Field Exploration.

4.1. Regional Geology

The project site is located within the central portion of the Perris Block, a relatively stable terrain which is bounded on the north by the Cucamonga fault zone, on the east by the San Jacinto fault zone, on the south by the San Felipe fault zone, and on the west by the Elsinore fault zone. The Perris Block, in turn, is situated within the northern portion of the Peninsular Ranges geomorphic province. The Peninsular Range province occupies the southwestern portion of the state, south of the Transverse Ranges and west of the Colorado geomorphic provinces.

The Peninsular Ranges province is characterized generally by northwest-trending mountains and valleys, traversed by northwest-trending faults. Within the Perris Block, the predominant rock exposures comprise a multitude of Cretaceous-age plutonic emplacements known collectively as the southern California batholith. Locally these plutons intruded Jurassic-age metavolcanic and metasedimentary rocks and Paleozoic-age limestone, schist, and gneiss. Valleys are mantled by Quaternary-age alluvial fan deposits and recent alluvium derived from erosion of the adjacent mountains.

According to geologic mapping published by the Dibblee Geological Foundation (Dibblee, 2003), the project site is underlain by Pleistocene alluvial fan deposits (map symbol: Qoa). These deposits are described as “deposits of sand, minor gravel, tan to light reddish brown.” A portion of this geologic map is reproduced as Figure 3, Regional Geologic Map.

4.2. Surface and Subsurface Conditions

Earth materials encountered during our subsurface investigation generally consist of a thin layer of undocumented fill underlain by alluvial fan deposits which extend to the total depth of exploration. Based on our field observations, the undocumented fill consists of silty sand on the order of 1 to 8 feet in thickness, with the average depth of approximately 3.5 feet. It should be noted that the undocumented fill thickness may vary across the site. The alluvial deposits consist predominantly of medium dense to very dense sand with varying amounts of fines.

Detailed information regarding the exploratory excavations is presented in Appendix A - Field Exploration.

4.3. Groundwater

Groundwater was not encountered within our exploratory borings drilled to a maximum depth of approximately 51½ feet below the existing grade. Based on our review of the California Water Resource website, the groundwater level is reportedly situated at a depth greater than 150 feet below the ground surface. Groundwater conditions may vary across the site due to stratigraphic and hydrologic conditions and may change over time because of seasonal and meteorological fluctuations, or of activities by humans at this and nearby site.

5. GEOLOGIC HAZARDS AND SEISMIC DESIGN CONSIDERATIONS

The site is in a seismically active area, as is the majority of southern California, and the potential for strong ground motion in the project area is considered high during the design life of the proposed development. The hazards associated with seismic activity in the vicinity of the site area discussed in the following sections.

5.1. Active Faulting and Surface Fault Rupture

The subject site is not located within a State of California Alquist-Priolo Earthquake Fault Zone (Alquist-Priolo EFZ, formerly known as a Special Studies Zone) (Hart and Bryant, 1997). The closest know active fault to the site is the San Jacinto fault, located approximately 6.21 miles to the northeast from the project site. It is our opinion that the likelihood of fault rupture occurring at the site during the design life of the proposed improvements is low.

5.2. Liquefaction Potential

Liquefaction is the phenomenon in which loosely deposited granular soils with silt and clay contents of less than approximately 35 percent, and non-plastic silts located below the water table undergo rapid loss of shear strength when subjected to strong earthquake-induced ground shaking. Ground shaking of sufficient duration results in the loss of grain-to-grain contact due to a rapid rise in pore water pressure and causes the soil to behave as a fluid for a short period of time.

Liquefaction is generally known to occur in loose, saturated, relatively clean, fine-grained cohesionless soils at depths shallower than approximately 50 feet. Factors to consider in the evaluation of soil liquefaction potential include groundwater conditions, soil type, grain size distribution, relative density, degree of saturation, and both the intensity and duration of ground motion. Other phenomena associated with soil liquefaction include sand boils, ground oscillation, and loss of foundation bearing capacity.

The California Geological Survey (CGS) has not published literature or maps within the project site that would indicate a state-designated Zone of Required Investigation for Liquefaction. However, Riverside County has mapped the site in an area of “Low” concern for liquefaction. Based on the depth of groundwater approximately 150 feet bgs, and site subsurface conditions, it is our opinion that liquefaction potential at the site is low.

5.3. Seismic Settlement Potential

Seismic settlement can occur when loose to medium dense granular materials densify during seismic shaking and liquefaction. Seismic settlement may occur in dry, unsaturated, as well as saturated soils. Based on the results of our field exploration, we believe that seismic settlement is possible at the site. The geotechnical engineer of record for the Design/Build team should evaluate the possibility of seismic settlement at the site.

5.4. Landslides

The area of the project site is not within an area with the potential for earthquake-induced landslides. Considering the site is flat and not close to significant slopes, the potential for earthquake-induced landslides to occur at the site is considered negligible.

5.5. Tsunamis and Seiches

Tsunamis are waves generated by massive landslides near or under sea water. Based on California Official Tsunami Inundation Maps, the site is not located on any State of California Tsunami Inundation Map for Emergency Planning. The potential for the site to be adversely impacted by earthquake-induced tsunamis is negligible.

Seiches are standing wave oscillations of an enclosed water body after the original driving force has dissipated. The potential for the site to be adversely impacted by earthquake-induced seiches is considered negligible due to the lack of any significant enclosed bodies of water located in the vicinity of the site.

5.6. Flooding

The Federal Emergency Management Agency (FEMA) has prepared flood insurance rate maps (FIRMs) for use in administering the National Flood Insurance Program, effective September 26, 2008. Based on our review of online FEMA flood mapping, the site is located within Zone X with minimal flood hazard.

5.7. Deaggregated Seismic Source Parameters

We performed a seismic hazard de-aggregation analysis for the peak ground acceleration with a probability of exceedance of 2% in 50 years. The analysis used the USGS Unified Hazard Tool based on the 2014 USGS seismic source model. The results of the analysis indicate the controlling modal moment magnitude and fault distance are 8.1 Mw and 6.3 miles (10.1 km), respectively.

5.8. Site Class for Seismic Design

Based on the SPT resistance, it is our opinion that Site Class D may be used for the project seismic design according to Chapter 20 of ASCE 7-16.

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5.9. Seismic Design Parameters

Seismic design for new buildings should be based on the 2022 CBC and ASCE 7-16. As the site is classified as seismic Site Class D and the mapped spectral acceleration parameter at period 1-second, S_1, is greater than 0.2 g, the 2022 CBC requires a site-specific ground motion hazard analysis following Section 11.4.7 of ASCE 7-16 for new buildings.

Alternatively, Exception 2 in Section 11.4.8 of ASCE 7-16 may be used for the project new buildings in lieu of the site-specific ground motion hazard analysis. For seismic design of new buildings based on this exception, seismic design parameters in Table 1 may be used, based on site coordinates of latitude 33.974715°N and longitude 117.336899°W.

Table 1 – Seismic Design Parameters Based on 2022 CBC and ASCE 7-16 for Design Based on Exception 2 in Section 11.4.8 of ASCE 7-16

Design Parameters	Value
Site Class	D
Mapped Spectral Acceleration Parameter at Period of 0.2-Second, S_s (g)	1.5
Mapped Spectral Acceleration Parameter at Period 1-Second, S_1 (g)	0.6
Site Coefficient, F_a	1
Site Coefficient, F_v	1.7
Adjusted MCE_R[1] Spectral Response Acceleration Parameter, S_{MS} (g)	1.5
Adjusted MCE_R[1] Spectral Response Acceleration Parameter, S_{M1} (g)	1.02
Design Spectral Response Acceleration Parameter, S_{DS} (g)	1
Design Spectral Response Acceleration Parameter, S_{D1} (g)	0.68
Risk Coefficient, C_{RS}	0.934
Risk Coefficient, C_{R1}	0.909
Peak Ground Acceleration, PGA_M[2] (g)	0.656
Seismic Design Category[3]	D
Long-Period Transition Period, T_L (seconds)	8
$Ts = S_{D1} / S_{DS}$	0.68

When using the above parameters for seismic design, the seismic design coefficient C_s should be calculated as follows:

For $T \le 1.5T_S$, $C_S = S_{DS}/(R/I_e)$

For $T_L \ge T > 1.5T_S$, $C_S = 1.5\ S_{D1}/(T\ R/I_e)$

For $T > T_L$, $C_S = 1.5\ (S_{D1}\ T_L)/(T^2\ R/I_e)$

where

T = the fundamental period of the structure(s) determined in Section 12.8.2 of ASCE 7-16;

R = the response modification factor determined in Table 12.2-1 of ASCE 7-16; and

I_e = the importance factor determined in accordance with Section 11.5.1 of ASCE 7-16.

Notes: [1] Risk-Targeted Maximum Considered Earthquake.
[2] Peak Ground Acceleration adjusted for site effects.
[3] For S_1 greater than or equal to 0.75g, the Seismic Design Category is E for risk category I, II, and III structures and F for risk category IV structures.

6. LIMITATIONS

This report presents geotechnical data and seismic design criteria for the proposed project site. The information may be used by the project design team to develop recommendations based on the information provided. The designer should supplement this data with additional data as the deem necessary to provide thorough geotechnical design recommendations.

Due to the limited nature of our field explorations, conditions not observed and described in this report may be present on the site. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. It should be understood that conditions different from those anticipated in this report may be encountered during grading operations.

Site conditions, including groundwater elevation, can change with time as a result of natural processes or the activities of man at the subject site or at nearby sites. Changes to the applicable laws, regulations, codes, and standards of practice may occur as a result of government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Twining, Inc. has no control.

Twining performed its evaluation using the degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical professionals with experience in this area in similar soil conditions. No other warranty, either express or implied, is made as to the conclusions and recommendations contained in this report.

7. SELECTED REFERENCES

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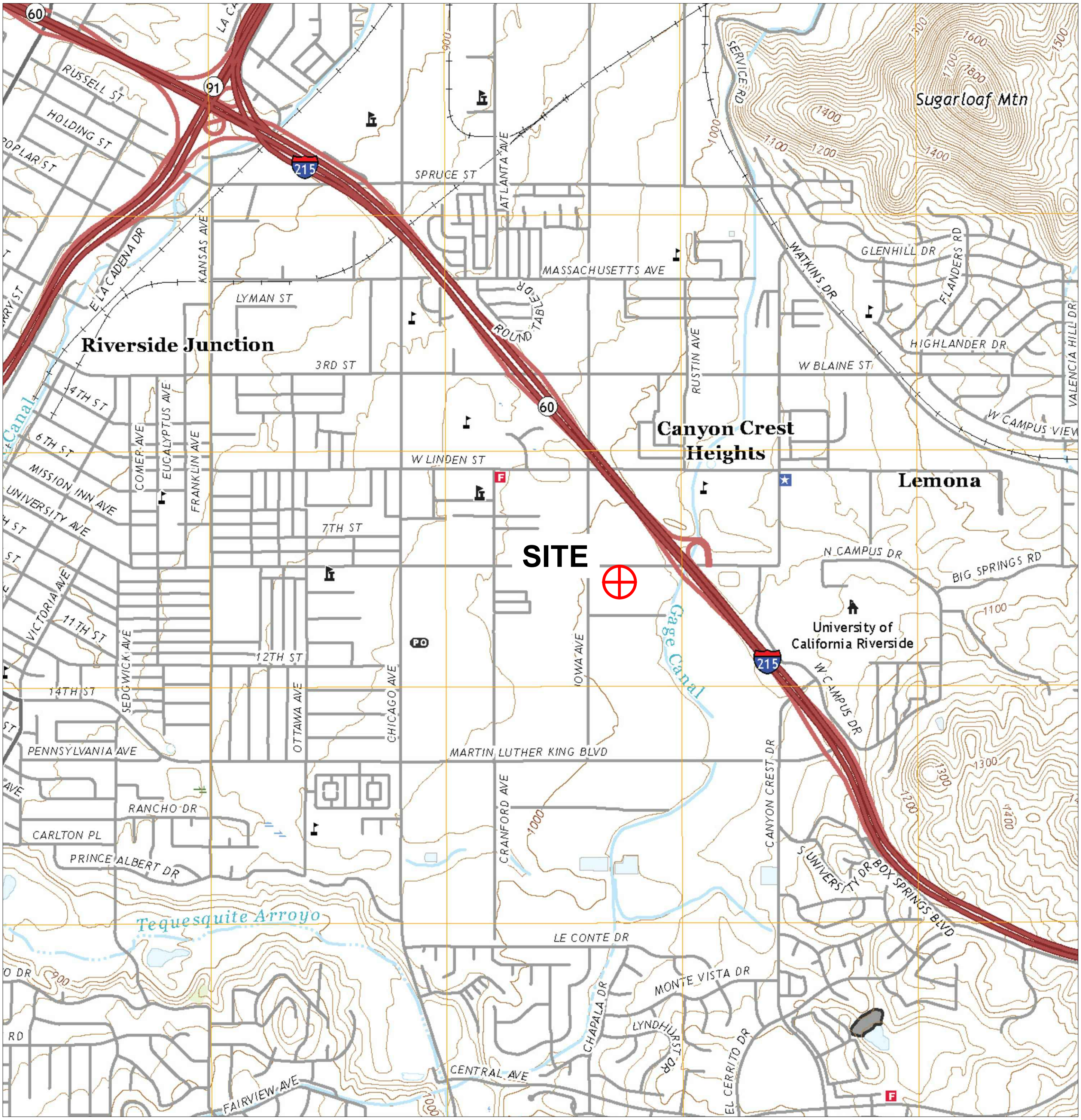
FIGURES



N

APPROXIMATE LOCATION OF PROJECT

SCALE IN FEET

0 2000 4000

REFERENCE: USGS (2022)

TWINING

SITE LOCATION MAP

OASIS PARK
UNIVERSITY OF CALIFORNIA
RIVERSIDE, CA

PROJECT NO.	REPORT DATE	FIGURE 1
220759.3	June 2023	

SCALE IN FEET

0 100 200

NOTE: ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE

LEGEND

B-1 TD=51.5' — APPROXIMATE LOCATION OF BORING BY TWINING (2022) TOTAL DEPTH IN FEET

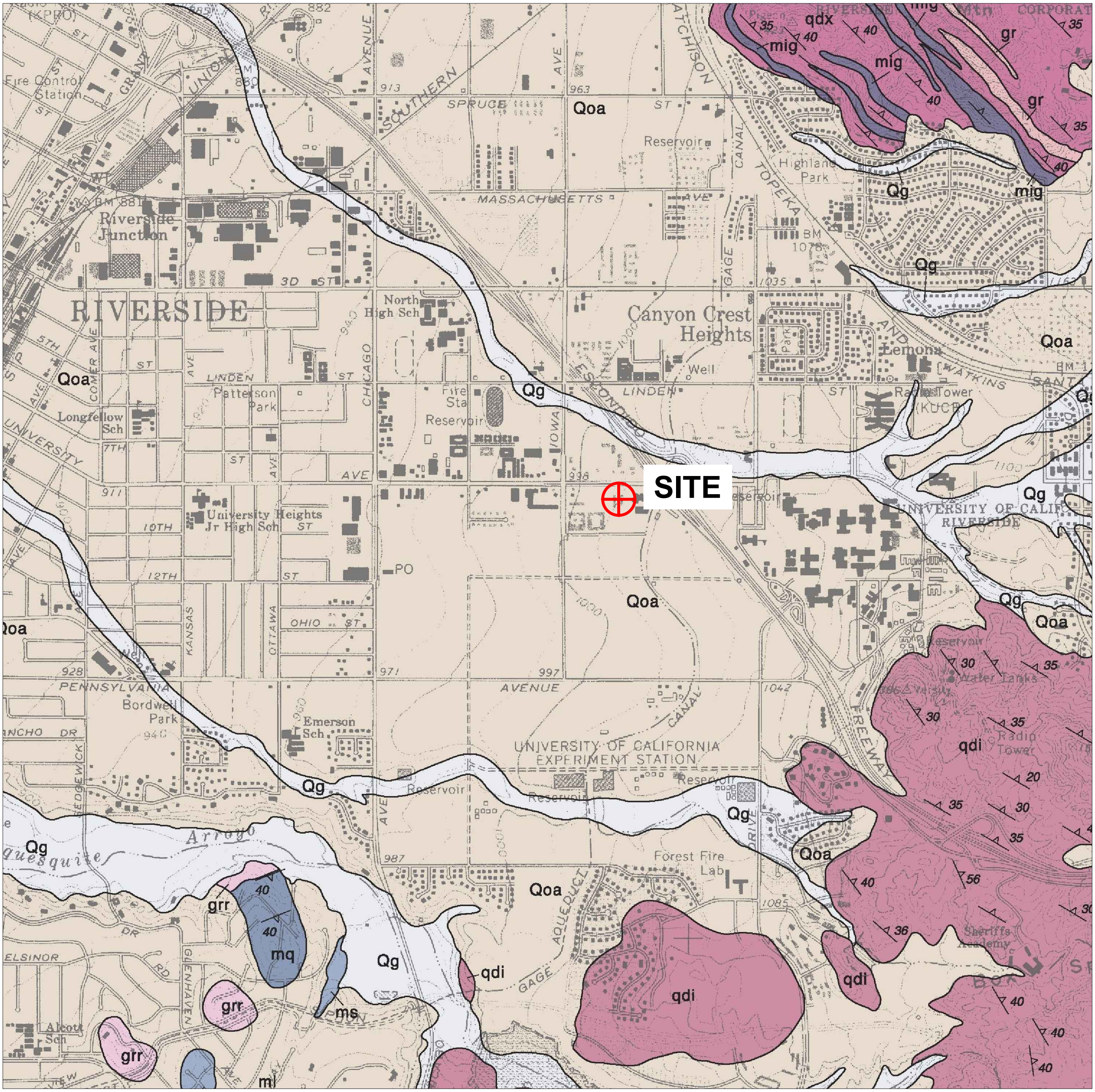
P-1 TD=5' — APPROXIMATE LOCATION OF BORING BY TWINING (2017) TOTAL DEPTH IN FEET

N

REFERENCE: GOOGLE EARTH (2022)

TWINING

SITE PLAN AND BORING LOCATION MAP		
OASIS PARK UNIVERSITY OF CALIFORNIA, RIVERSIDE RIVERSIDE, CA		
PROJECT No. 220759.3	REPORT DATE June 2023	FIGURE 2



Qoa	Alluvial fan deposits of sand, minor gravel
Qg	Alluvial gravel and sand of stream channels
qdi	Quartz diorite (tonalite)
qdx	Quartz diorite, xenolith rich

N

SCALE IN FEET

0 2000 4000

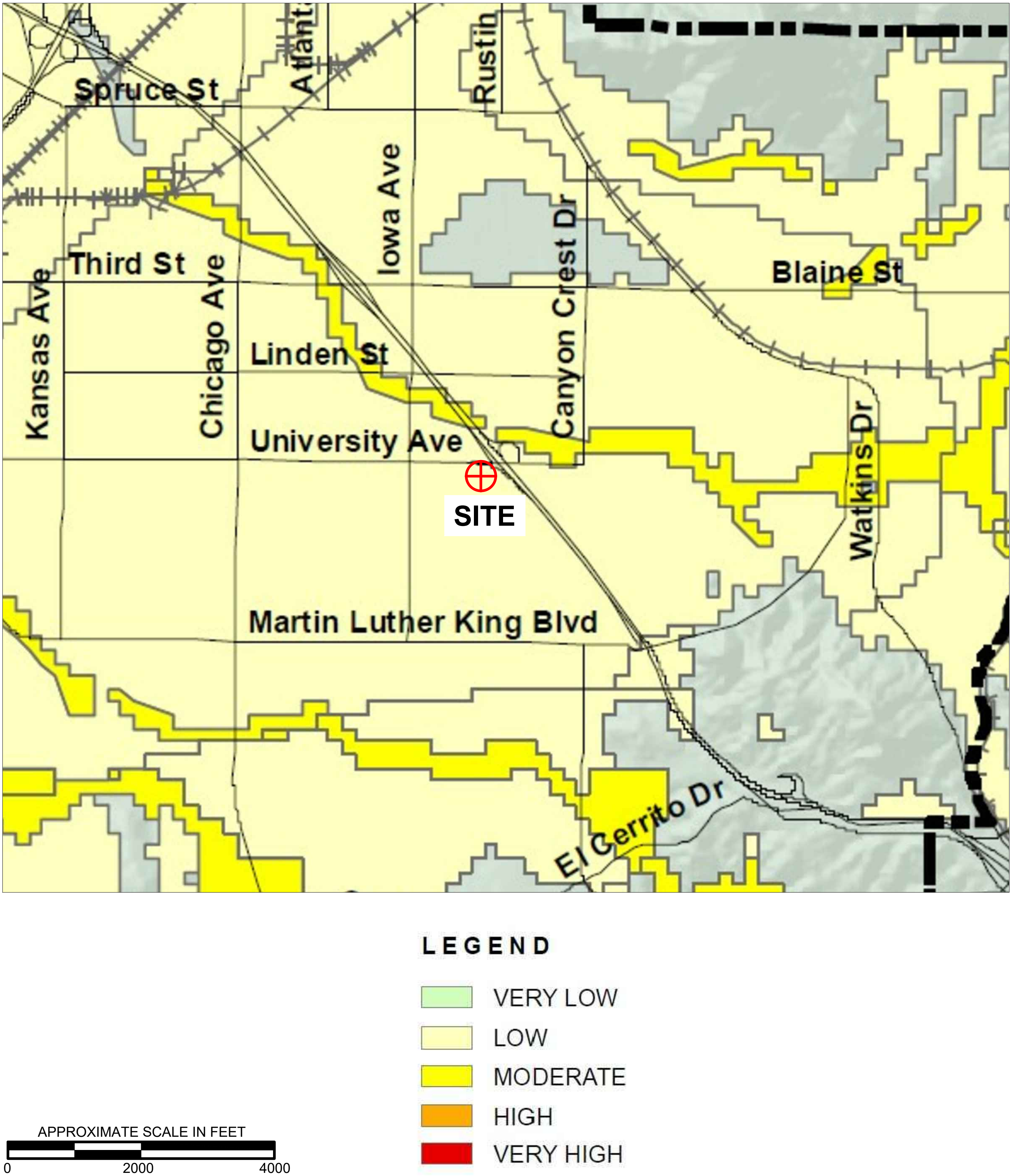
REFERENCE: DIBBLEE (2003)

TWINING

GEOLOGIC MAP

OASIS PARK
UNIVERSITY OF CALIFORNIA
RIVERSIDE, CA

PROJECT NO.	REPORT DATE	FIGURE 4
220759.3	June 2023	



REFERENCE: CITY OF RIVERSIDE COUNTY (2018)

TWINING

LIQUEFACTION ZONES MAP		
OASIS PARK UNIVERSITY OF CALIFORNIA, RIVERSIDE RIVERSIDE, CALIFORNIA		
PROJECT NO. 220759.3	REPORT DATE June 2023	FIGURE 4

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APPENDIX A
FIELD EXPLORATION

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Appendix A
Field Exploration

General

The field exploration for the proposed project consisted of drilling, testing, sampling, and logging of eight exploratory borings (B-9 through B-14, P-1, and P-2) and performing percolation testing in two of the borings (P-1 and P-2). The approximate locations of the exploration are shown on Figure 2 – Site Plan and Boring Location Map.

The borings were first excavated to 5 feet below ground surface (bgs) using a hand-auger to clear potential underground utilities. Upon completion of exploration, borings B-9 through B-14 were backfilled with neat cement and the others with soil cuttings. The surface of all locations was repaired to match existing conditions, and the paved locations were patched with Portland cement concrete to match existing conditions.

Exploratory Borings

Drilling operation for the borings was performed by Baja Exploration of Escondido, California using a CME-75 truck-mounted drill rig equipped with 8-inch diameter hollow-stem-auger (HSA). The borings were advanced to a maximum depth of 5.0 to 51.5 feet bgs on December 1 and 2, 2022.

Twining previously performed eight exploratory borings at the site in 2017. Those borings are included below.

An explanation of the boring logs is presented as Figure A-1. The boring logs from the current drilling are presented on Figures A-10 through A-17. The boring logs from 2017 are presented as Figures A-2 through A-9. The boring logs describe the earth materials encountered, samples obtained, and show the field and laboratory tests performed. The logs also show the boring number, drilling date, and the name of the logger and drilling subcontractor. The borings were logged by a Twining engineer using the Unified Soil Classification System under the supervision of a registered California Geotechnical Engineer. The boundaries between soil types shown on the logs are approximate because the transition between different soil layers may be gradual. Drive and bulk samples of representative earth materials were obtained from the borings.

Disturbed samples were obtained from select depths using a Standard Penetration Test (SPT) sampler. This sampler consists of a 2-inch O.D., 1.4-inch I.D. split barrel shaft without room for liner. Soil samples obtained by the SPT sampler were retained in plastic bags. A California modified sampler was also used to obtain drive samples of the soils from select depths. This sampler consists of a 3-inch outside diameter (O.D.), 2.4-inch inside diameter (I.D.) split barrel shaft. The samples were retained in brass rings for laboratory testing.

When the boring was drilled to a select depth, the sampler was lowered to the bottom of the boring and then driven a total of 18 inches into the soil using an automatic hammer weighing 140 pounds dropped from a height of 30 inches. The number of blows required to drive the samplers the final 12 inches is presented on the boring logs. Where sampler refusal is encountered and the sampler does not advance 18 inches, the total number of blows per number of inches advanced is presented. The blow counts given are field raw blow counts that have not been modified to account for field and/or depth conditions.

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Percolation Testing

Percolation testing were performed in borings P-1 and P-2. After being advanced to 5 feet bgs using a hand-auger, the borings were drilled to 5 feet bgs again using an 8 inch-diameter, truck-mounted, hollow-stem auger. The borings were drilled under the observation of a field engineer who logged the subsurface conditions encountered and collected samples of the subsurface materials encountered.

The percolation test holes were prepared by placing approximately 1 inch of gravel at the bottom of the hole. A 3-inch diameter perforated PVC pipe wrapped in filter sock was placed at the bottom of the hole and the annular space around the pipe was backfilled with gravel.

After preparing the percolation test holes, the percolation was performed in accordance with the requirements of Riverside County. After presoaking, the test holes were filled with water to at least 12 inches above the bottom of the excavation. Measurements were recorded at 10-minute or 30-minute intervals depending on the results of the “sandy soil criteria test.” A minimum of 6 intervals were measured. The average drop that occurred over the last 3 readings was used to determine the percolation rate at each test location. Detailed test data is attached to this appendix.

A reduction factor of 3 was applied to the final measured infiltration rate to obtain the design infiltration rate. A summary of test results is presented in Table A-1, and the detailed test data is attached as Appendix D. Additionally, data from previous percolation testing performed at the site are attached as Appendix E.

Table A-1 – Infiltration Rate with a Reduction Factor of 3

Location	Depth (feet)	Infiltration Rate (in/hour)
P-1	5	0.1
P-2	5	0.4

UNIFIED SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

COARSE-GRAINED SOILS / FINE-GRAINED SOILS

Relative Density	SPT (blows/ft)	Relative Density (%)	Consistency	SPT (blows/ft)
Very Loose	<4	0 - 15	Very Soft	<2
Loose	4 - 10	15 - 35	Soft	2 - 4
Medium Dense	10 - 30	35 - 65	Medium Stiff	4 - 8
Dense	30 - 50	65 - 85	Stiff	8 - 15
Very Dense	>50	85 - 100	Very Stiff	15 - 30
			Hard	>30

NOTE: SPT blow counts based on 140 lb. hammer falling 30 inches

Sample Symbol	Sample Type	Description
	SPT	1.4 in I.D., 2.0 in. O.D. driven sampler
	California Modified	2.4 in. I.D., 3.0 in. O.D. driven sampler
	Bulk	Retrieved from soil cuttings
	Thin-Walled Tube	Pitcher or Shelby Tube

LABORATORY TESTING ABBREVIATIONS

ATT	Atterberg Limits
C	Consolidation
CORR	Corrosivity Series
DS	Direct Shear
EI	Expansion Index
GS	Grain Size Distribution
K	Permeability
MAX	Moisture/Density (Modified Proctor)
O	Organic Content
RV	Resistance Value
SE	Sand Equivalent
SG	Specific Gravity
TX	Triaxial Compression
UC	Unconfined Compression

TWINING

EXPLANATION FOR LOG OF BORINGS

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A-1

STANDARD LOG EXPLANATION 220759.3 - UCR OASIS GEOTECH.GPJ TWINING LABS.GDT 6/24/23

DATE DRILLED	9/29/17	LOGGED BY	DHC	**BORING NO.**	**B-1**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
0	X					MAX		SM	Silty SAND with about 5% gravel, reddish brown to brown, dense, moist
5		X	33						-- same
10		X	39						-- same
15		X	38/50 for 2"	9.2	117.7	DS			-- same
20		X	39					SM	Silty SAND, brown, dense, moist
25		X	45/50 for 6"	14.3	107.4	DS			-- same
30		X	28			C		SP	Poorly graded SAND, light to dark brown to white to black, medium dense, moist
35									

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE A - 2
170875.3	October 2017	

DATE DRILLED	9/29/17	LOGGED BY	DHC	**BORING NO.**	**B-1**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
	Driven	44	6.2	109.4			SM	Silty SAND, brown, dense, moist
40	Driven	29			#200			-- medium dense
45	Driven	51	7.5	113.5			SP	Poorly graded SAND, brown to yellow to white, dense, moist
							SM	Silty SAND, light brown, dense, moist
50	Driven	39						Total Depth = 51.5 feet Backfilled on 9/29/2017 Groundwater not encountered. Borehole backfilled at the completion of testing with soil cuttings.
55								
60								
65								
70								

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 2

DATE DRILLED	10/9/17	LOGGED BY	DHC	**BORING NO.**	**B-2**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
0								SM	Silty SAND, reddish brown, moist
5			22						-- same, medium dense
10			42	9.0	121.0	C			-- same, dense
15			50 for 6"						-- same, very dense, only partial recovery
20			69	6.9	116.8				-- same, very dense
25			30						-- same, dense
30			74	3.2	121.4			SW	Well graded SAND, very dense, brown to black to red to white, moist
35									Total Depth = 31.5 feet Backfilled on 10/9/2017 Groundwater not encountered. Borehole backfilled at the completion of testing with soil cuttings.

BORING LOG 170875.3 - UCR OUTPATIENT PAVILLION.GPJ TWINING LABS.GDT 10/25/17

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE A - 3
170875.3	October 2017	

DATE DRILLED	9/29/17	LOGGED BY	DHC	**BORING NO.**	**B-3**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
0	Bulk				MAX			3 inches of AC with no base
5	Driven	23					SM	Silty SAND with 5% gravel, reddish brown, medium dense, moist
10	Driven	38	3.6	119.0	C		SM	Silty SAND with 10% large grain sand, reddish brown to brown, dense, moist
15	Driven	20			#200		SM	Silty SAND, brown to reddish to light brown, medium dense, moist
20	Driven	55					SM	-- same, dense, with approximately 5% gravel, reddish brown, moist
25	Driven	15			#200		SM	-- same without gravel, medium dense
30	Driven	54	7.0	121.7	DS		SP	Poorly graded SAND, reddish brown, very dense, moist
35								

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 4

DATE DRILLED	9/29/17	LOGGED BY	DHC	**BORING NO.**	**B-3**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
			25						-- yellow to brown to red, medium dense
40			40/50 for 5"	8.9	127.6	DS		SM	Silty SAND, reddish brown, very dense, moist
45			40						-- same, dense
50			82	2.8	118.4			SP	Poorly graded SAND, light brown to white to black, very dense, moist
									Total Depth = 51.5 feet Backfilled on 9/29/2017 Groundwater not encountered. Borehole backfilled at the completion of testing with soil cuttings. Surface patched with cold-patch.
55									
60									
65									
70									

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE A - 4
170875.3	October 2017	

DATE DRILLED	10/9/17	LOGGED BY	DHC	**BORING NO.**	**B-4**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
0								SM	Silty SAND, reddish brown, moist
5		X	48	2.7	133.6				-- same, dense, few organics
10		X	11			#200			-- same, medium dense, light brown
15		X	27			#200		SW	Well graded SAND, medium dense, light brown to black to white to red, moist
16.5									Total Depth = 16.5 feet Backfilled on 10/9/2017 Groundwater not encountered. Borehole backfilled at the completion of testing with soil cuttings.
20									
25									
30									
35									

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 5

DATE DRILLED	10/9/17	LOGGED BY	DHC	BORING NO.	B-5
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES Bulk / Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
0	Bulk						SM	Silty SAND, reddish brown, moist
5	Driven	28						-- same, medium dense
10	Driven	85					SW	Well graded SAND, very dense, light brown with white spots, moist
15	Driven	45/50 for 5"					SM	Silty SAND, very dense, light brown, moist
20	Driven	24/50 for 6"	19.0					-- same
25	Driven	50						-- same, dense, some white spots
30	Driven	43					SW	Well graded SAND, dense, brown to orange to white to red, moist
35								

BORING LOG 170875.3 - UCR OUTPATIENT PAVILLION.GPJ TWINING LABS.GDT 1/20/23

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 6

DATE DRILLED	10/9/17	LOGGED BY	DHC	**BORING NO.**	**B-5**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
			26			#200			-- same, more silt
40			54					SM	Silty SAND, very dense, olive brown to brown, moist, trace gravel
45			22			#200		ML	Sandy SILT, very stiff; brown, slightly moist
50			54					ML	-- same, hard, dark brown
									Total Depth = 51.5 feet Backfilled on 10/9/2017 Groundwater not encountered. Borehole backfilled at the completion of testing with soil cuttings.
55									
60									
65									
70									

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 6

DATE DRILLED	10/9/17	LOGGED BY	DHC	**BORING NO.**	**B-6**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES Bulk / Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
5		37					SM	Silty SAND, dense, reddish brown, moist
10		11			#200		SW	Well graded SAND, medium dense, reddish brown, moist
15		34	2.6	105.4				-- same, dense
20		48					SM	Silty SAND, dense, brown with white spots, moist
25		88	8.7	130.4				-- same, very dense
30		15			#200			-- same, medium dense, reddish to olive brown
35								

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 7

DATE DRILLED	10/9/17	LOGGED BY	DHC	BORING NO.	B-6
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
		X	58	6.5	109.9				-- same, very dense
40		|	29						-- same, medium dense, brown with white spots
45		X	82	12.0	117.1				-- same, very dense, olive brown
50		|	31						-- same, dense, reddish brown
									Total Depth = 51.5 feet Backfilled on 10/9/2017 Groundwater not encountered. Borehole backfilled at the completion of testing with soil cuttings.
55									
60									
65									
70									

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE A - 7
170875.3	October 2017	

DATE DRILLED	9/29/17	LOGGED BY	SL	**BORING NO.**	**B-7**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
0	Bulk						SM	Silty SAND with mostly fine sand, brown, medium dense, dry
5	Driven	35						-- same
10	Driven	9						-- moist
15	Driven	24	9.5	125.3				-- mostly fine-medium sand, light brown, dry
20	Driven	29					ML	Sandy SILT, brown, dense, moist
25	Driven	34					SM	Silty SAND with few clay, reddish brown, medium dense, moist
30	Driven	19			#200			-- same
35								Total Depth = 31.5 feet Backfilled on 9/29/2017 Groundwater not encountered. Pipe inserted for percolation testing. Borehole backfilled at the completion of testing with soil cuttings.

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 8

DATE DRILLED	9/29/17	LOGGED BY	DHC	**BORING NO.**	**B-8**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	NE
DRILLING METHOD	8" HSA	DRILLER	2R Drilling	SURFACE ELEVATION (ft.)	N/A ±(MSL)

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
								2.5 inches of AC with no base
5			53				SM	Silty SAND with about 5% gravel, reddish brown, dense, moist
10			27					-- more silt and no gravel, medium dense
								Total Depth = 11.5 feet Backfilled on 9/29/2017 Groundwater not encountered. Pipe inserted for percolation testing. Borehole backfilled at the completion of testing with soil cuttings. Surface patched with cold-patch.
15								
20								
25								
30								
35								

BORING LOG 170875.3 - UCR OUTPATIENT PAVILLION.GPJ TWINING LABS.GDT 10/25/17

TWINING

LOG OF BORING

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE A - 9

DATE DRILLED	12/1/2022	LOGGED BY	CDD	**BORING NO.**	**B-9**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1020 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
								SM	3 inches of asphalt with no base ARTIFICIAL FILL: Silty SAND; dark reddish brown; moist; fine grain sand; fine to coarse gravel; trace mica
								SM	ALLUVIUM: Silty SAND; dark reddish brown; moist; fine grain sand; fine to coarse gravel; trace mica
1015	5			35				SM	-- same; dense; reddish brown; trace fine gravel; fine to medium grain sand
1010	10			42	6.8	112.2		SM	-- same; medium dense; moist; very fine grain sand; fine gravel
1005	15			21				SM	-- same; medium dense; moist; very fine grain sand; fine gravel
1000	20			49	6.6	126.5		SM	-- same; dense; fine to medium grain sand
995	25			35				SM	-- same; dense; light reddish brown; moist; fine to medium grain sand; fine gravel
990	30			50 for 6"	7.5	111.5		SM	-- same; very dense; reddish brown with orange and black laminations; moist; fine to medium grain sand; mostly medium gravel with some fine
985	35								Total Depth = 31.0 feet Backfilled on 12/1/2022 Backfilled with neat cement. Groundwater not encountered. Surface patched with PCC.

TWINING

LOG OF BORING

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 10

DATE DRILLED	12/1/2022	LOGGED BY	CDD	**BORING NO.**	**B-10**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1021 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk / Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
									4 inches of asphalt concrete over 10 inches of base over 3 inches of old asphalt concrete
		Bulk						SM	ARTIFICIAL FILL:
								SM	Silty SAND; reddish brown; slightly moist; mostly fine grain sand with some medium
									ALLUVIUM:
								SM	Silty SAND; reddish brown; moist; mostly fine grain sand with some medium
1016	5	Driven	25	6.2	112.6	C			-- same; medium dense
1011	10	Driven	13					SM	-- same; medium dense; brown; slightly moist; mostly fine sand with some medium
1006	15	Driven	39	4.6	109.9	#200, DS		SM	-- same; medium dense; brown; slightly moist; fine to medium grain sand with less silt
1001	20	Driven	26					SM	--same; medium dense
996	25	Driven	47	2.8	109.2	#200		SW-SM	Well graded SAND with silt; dense; reddish yellow; slightly moist; fine to coarse grain sand; some organics/rootlets
991	30	Driven	30					SM	Silty SAND; dense; dark brown; moist; very fine sand; trace mica
986	35								

TWINING

LOG OF BORING

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 11

DATE DRILLED	12/1/2022	LOGGED BY	CDD	BORING NO.	B-10
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1021 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
			X	50 for 5"	11.0	123.0			SM SM	Silty SAND; dense; dark brown; moist; very fine sand; trace mica *(continued)* -- same; very dense; reddish brown
981	40		I	57					SM	-- same; very dense; fine to medium grain sand
976	45		X	22/50 for 6"	9.3	124.1			SP-SM	Poorly graded SAND with silt; very dense; reddish brown; moist; fine to medium grain sand; micaceous
971	50		I	40					SM	Silty SAND; dense; reddish brown; moist; fine to medium grain sand
										Total Depth = 51.5 feet Backfilled on 12/1/2022 Backfilled with neat cement. Groundwater not encountered. Surface patched with PCC.
966	55									
961	60									
956	65									
951	70									

TWINING

LOG OF BORING

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 11

DATE DRILLED	12/1/2022	LOGGED BY	CDD	**BORING NO.**	**B-11**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1019 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
										5 inches of asphalt concrete with no base
									SM	ARTIFICIAL FILL: Silty SAND; reddish brown; slightly moist; fine to medium grain sand; fine gravel
									SM	ALLUVIUM: Silty SAND; reddish brown; slightly moist; fine to medium grain sand; fine gravel
1014	5		X	24	5.3	119.2	DS		SM	-- same; medium dense
1009	10			20					SM	-- same; medium dense; brown; fine grain sand
1004	15		X	29	10.4	105.9	C		SM	-- same; medium dense; reddish brown to yellowish brown; slightly moist; fine to medium grain sand
999	20			27					SM	-- same; medium dense; brown; fine grain sand
994	25		X	38	1.9	105.6			SP-SM	Poorly graded SAND with silt; medium dense; light yellowish brown; dry
989	30			27					SM	Silty SAND; medium dense; yellowish brown; slightly moist; fine grain sand
984	35									Total Depth = 31.0 feet Backfilled on 12/1/2022 Backfilled with neat cement. Groundwater not encountered. Surface patched with PCC.

BORING LOG 220759.3 - UCR OASIS GEOTECH.GPJ TWINING LABS.GDT 6/24/23

TWINING

LOG OF BORING

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 12

DATE DRILLED	12/1/2022	LOGGED BY	CDD	**BORING NO.**	**B-12**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1014 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
										4 inches of asphalt over 6 inches of base
		X					CORR, EI, RV		SM	ARTIFICIAL FILL: Silty SAND; reddish brown; dry; fine grain sand; fine to medium gravel
									SM	ALLUVIUM: Silty SAND; reddish brown; dry; fine grain sand; fine to medium gravel
1009	5		X	31	3.0	114.8	C		SM	-- same; medium dense; slightly moist; fine grain sand
1004	10		X	25			#200		SP-SM	Poorly graded SAND with silt; medium dense; light yellowish brown; slightly moist; fine to medium grain sand
999	15		X	48	4.5	106.7	DS		SP-SM	-- same; dense
994	20		X	35			#200		SM	Silty SAND; dense; light yellowish brown; slightly moist; some silt layers
989	25		X	56	2.4	116.7	C		SP-SM	Poorly graded SAND with silt; dense; reddish brown; slightly moist; fine to medium grain sand
984	30		X	45					SM	Silty SAND; dense; reddish brown; slightly moist; mostly fine sand with some medium
979	35									

TWINING

LOG OF BORING

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 13

DATE DRILLED	12/1/2022	LOGGED BY	CDD	**BORING NO.**	**B-12**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1014 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
			X	77	5.3	112.9	DS		SM SM	Silty SAND; dense; reddish brown; slightly moist; mostly fine sand with some medium *(continued)* -- same; very dense
974	40		I	64					SM	-- same; very dense; light reddish brown; slightly moist; mostly fine grain sand
969	45		X	50 for 6"	5.1	110.9			SM	-- same; very dense; fine to medium sand
964	50		I	55					SM	-- same; very dense
										Total Depth = 51.5 feet Backfilled on 12/1/2022 Backfilled with neat cement. Groundwater not encountered. Surface patched with PCC.
959	55									
954	60									
949	65									
944	70									

TWINING

LOG OF BORING

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE A - 13
220759.3	June 2023	

DATE DRILLED	12/2/2022	LOGGED BY	CDD	**BORING NO.**	**B-13**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1013 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
										5 inches of asphalt concrete with no base
		X			10.8		DS, MAX		SM	ARTIFICIAL FILL: Silty SAND; brown; moist; fine grain sand; fine gravel -- gets looser; yellowish brown
1008	5		X	20					SM	ALLUVIUM: Silty SAND; medium dense; yellowish brown; slightly moist; fine grain sand; fine gravel
1003	10		X	33	0.7	95.5	#200		SP	Poorly graded SAND; medium dense; yellowish brown; dry; fine to coarse grain sand; sample disturbed
998	15		X	40					SP	-- same; dense; light yellowish brown; fine to medium grain sand
993	20		X	52	1.6	109.5			SM	Silty SAND; dense; light yellowish brown; dry; mostly fine sand; fine gravel
988	25		X	34					SP-SM	Poorly graded SAND with silt; dense; light yellowish brown; slightly moist; fine to medium grain sand
983	30		X	40/50 for 6"	0.9	112.5	#200		SP-SM	Poorly graded SAND with silt; very dense; brown; dry; fine grain sand; fine gravel
										Total Depth = 31.0 feet Backfilled on 12/2/2022 Backfilled with neat cement. Groundwater not encountered. Surface patched with PCC.
978	35									

TWINING

LOG OF BORING

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 14

DATE DRILLED	12/2/2022	LOGGED BY	CDD	**BORING NO.**	**B-14**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1013 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
										5 inches of asphalt concrete with no base
							CORR, EI		SM	ARTIFICIAL FILL: Silty SAND; brown; slightly moist; fine grain sand; fine gravel -- @1' some debris and brick pieces
1008	5			38	6.5	116.2	DS			-- same; medium dense; very dark brown; slightly moist; medium to coarse grain sand; fine gravel
									SP-SM	ALLUVIUM: Poorly graded SAND with silt; reddish brown; slightly moist; fine grain sand
1003	10			19			#200		SP-SM	-- same; medium dense; yellowish brown; slightly moist; fine to medium grain sand
998	15			37	2.2	106.2	C		SP-SM	-- same; medium dense
993	20			47			#200		SM	Silty SAND; dense; brown; slightly moist; fine to medium sand
988	25			62	2.6	108.4	DS		SP-SM	Poorly graded SAND with silt; dense; yellowish brown; slightly moist; fine to medium grain sand
983	30			29			#200		SM	Silty SAND; medium dense; yellowish brown; slightly moist
978	35									

LOG OF BORING

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 15

DATE DRILLED	12/2/2022	LOGGED BY	CDD	**BORING NO.**	**B-14**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1013 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
			X	52	8.3	124.5			SM SM	Silty SAND; medium dense; yellowish brown; slightly moist *(continued)* -- same; dense; reddish brown; moist; fine to medium grain sand
973	40		I	34			#200		SM	-- same; dense; brown; moist; fine grain sand
968	45		X	46	12.2	112.1			SM	-- same; medium dense; some mica
963	50		I	19					SM	-- same; medium dense; reddish brown; moist; fine to medium grain sand; trace fine gravel; some mica
										Total Depth = 51.5 feet Backfilled on 12/2/2022 Backfilled with neat cement. Groundwater not encountered. Surface patched with PCC.
958	55									
953	60									
948	65									
943	70									

DATE DRILLED	12/2/2022	LOGGED BY	CDD	**BORING NO.**	**P-1**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1012 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
										7 inches of asphalt concrete with no base
							#200		SM	ARTIFICIAL FILL: Silty SAND; brown; slightly moist; fine grain sand; trace fine gravel -- @ 1' changes to light reddish brown; trace subangular medium to coarse gravel
									SM	ALLUVIUM: Silty SAND; reddish brown; slightly moist; fine grain sand; trace fine gravel -- @3' some caliche veins -- @4' becomes denser
1007	5									Total Depth = 5.0 feet Backfilled on 12/2/2022 Backfilled with cuttings. Groundwater not encountered. Surface patched with PCC.
1002	10									
997	15									
992	20									
987	25									
982	30									
977	35									

TWINING

LOG OF BORING

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 16

DATE DRILLED	12/2/2022	LOGGED BY	CDD	**BORING NO.**	**P-2**
DRIVE WEIGHT	140 lbs.	DROP	30 inches	DEPTH TO GROUNDWATER (ft.)	N/E
DRILLING METHOD	8" HSA	DRILLER	Baja Exploration	SURFACE ELEVATION (ft.)	1015 ±(MSL)

ELEVATION (feet)	DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS / FOOT	MOISTURE (%)	DRY DENSITY (pcf)	ADDITIONAL TESTS	GRAPHIC LOG	U.S.C.S. CLASSIFICATION	DESCRIPTION
										5 inches of asphalt with no base
									SM	<u>ARTIFICIAL FILL</u>: Silty SAND; brown; slightly moist; medium grain sand; fine gravel -- @1.5' asphalt and brick debris -- @2' layer of 5" thick asphalt
							#200		SM	<u>ALLUVIUM</u>: Silty SAND; reddish brown; slightly moist; fine grain sand; some fine gravel; some organics/rootlets
1010	5									Total Depth = 5.0 feet Backfilled on 12/2/2022 Backfilled with cuttings. Groundwater not encountered. Surface patched with PCC.
1005	10									
1000	15									
995	20									
990	25									
985	30									
980	35									

BORING LOG 220759.3 - UCR OASIS GEOTECH.GPJ TWINING LABS.GDT 6/24/23

TWINING

LOG OF BORING

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE A - 17

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APPENDIX B
LABORATORY TESTING

TWINING

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Appendix B
Laboratory Testing

Laboratory Moisture Content and Density Tests

The moisture content and dry densities of selected driven samples obtained from the exploratory borings were evaluated in general accordance with the latest version of ASTM D2937. The results are shown on the boring logs in Appendix A and summarized in Table B-1.

No. 200 Wash Sieve

The amount of fines passing the No. 200 sieve was evaluated in accordance with ASTM D1140. The results are presented in Table B-2.

Resistance Value (R-value)

R-value testing was performed on a select bulk sample of the near-surface soils encountered at the site. The test was performed in general accordance with ASTM D2844. The result is summarized in Table B-3.

Maximum Dry Density-Optimum Moisture Content

One selected bulk sample was tested to evaluate the maximum dry density and its optimum moisture content. The test was performed in general accordance with ASTM test method D1557. The result is presented on Figure B-1.

Expansion Index

The expansion index of a select soil sample was evaluated in general accordance with ASTM D4829. The specimen was molded under a specified compactive energy at approximately 50 percent saturation. The prepared 1-inch thick by 4-inch diameter specimen was loaded with a surcharge of 144 pounds per square foot and was inundated with tap water. Readings of volumetric swell were made for a period of 24 hours. The result of expansion index test is presented in Table B-4.

Consolidation

Consolidation tests were performed on selected modified-California soil samples in general accordance with the latest version of ASTM D2435. The samples were inundated during testing to represent adverse field conditions. The percent consolidation for each load cycle was recorded as a ratio of the amount of vertical compression to the original height of the sample. Test results are presented on Figures B-2 through B-3 and the results from Hushmand are attached below.

Direct Shear

Direct shear tests were performed on a remolded sample and representative modified-California soil samples in general accordance with the latest version of ASTM D3080 to evaluate the shear strength characteristics of the selected materials. The samples were inundated during shearing to represent adverse field conditions. Test results are presented on Figures B-4 through B-10.

Corrosivity

Soil pH and resistivity tests were performed by Anaheim Test Lab, Inc. (ATLI) of Anaheim, California on a representative soil sample. The resistivity of the soil assumes saturated soil

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conditions. The chloride and sulfate contents of the selected samples were evaluated in general accordance with the latest versions of Caltrans test methods CT417, CT422, and CT 643. The test results are presented on Table B-6 and the ATLI report included in this appendix.

Table B-1 - Moisture Content and Dry Density

Boring No.	Depth (feet)	Moisture Content (%)	Dry Density (pcf)
B-9	10	6.8	112.2
B-9	20	6.6	126.5
B-9	30	7.5	111.5
B-10	5	6.2	112.6
B-10	15	4.6	109.9
B-10	25	2.8	109.2
B-10	35	11.0	123.0
B-10	45	9.3	124.1
B-11	5	5.3	119.2
B-11	15	10.4	105.9
B-11	25	1.9	105.6
B-12	5	3.0	114.8
B-12	15	4.5	106.7
B-12	25	2.4	116.7
B-12	35	5.3	112.9
B-12	45	5.1	110.9
B-13	10	0.7	95.5
B-13	20	1.6	109.5
B-13	30	0.9	112.5
B-14	5	6.5	116.2
B-14	15	2.2	106.2
B-14	25	2.6	108.4
B-14	35	8.3	124.5
B-14	45	12.2	112.1

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Table B-2 - No. 200 Wash Sieve

Boring No.	Depth (feet)	Percent Passing No. 200 Sieve
B-10	15	14.2
B-10	25	8.0
B-12	10	12.0
B-12	20	31.8
B-13	10	4.3
B-13	30	10.2
B-14	10	10.4
B-14	20	30.1
B-14	30	15.7
B-14	40	46.7
P-1	1-5’ BULK	42.4
P-2	3-5’ BULK	44.4

Table B-3 Resistance Value (R-value)

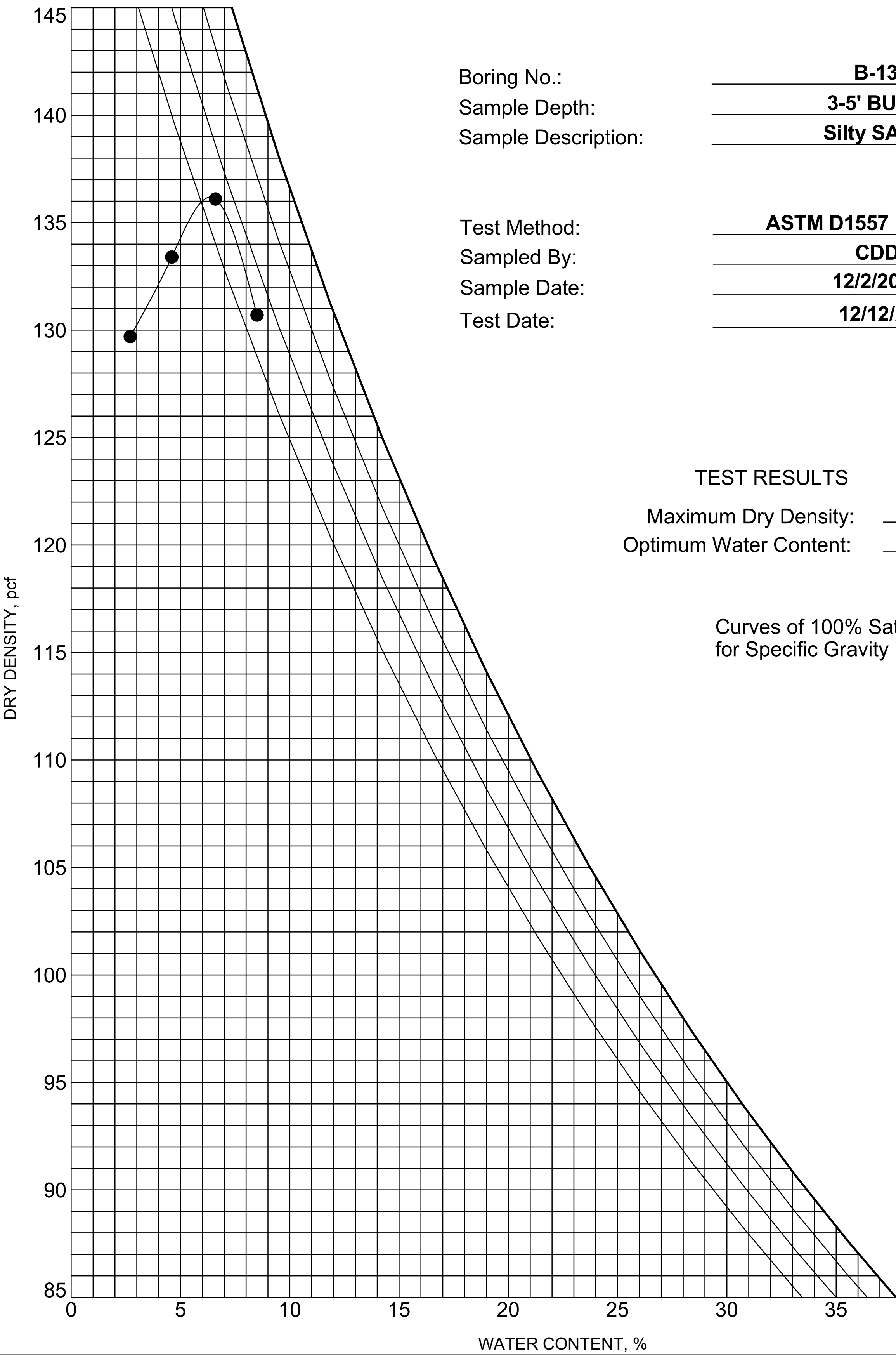
Boring No.	Depth (feet)	R Value
B-12	1 - 5	40

Table B-4 - Expansion Index

Boring No.	Depth (feet)	Expansion Index	Expansion Potential
B-12	1 - 5	0	Very low
B-14	1 - 5	4	Very low

Table B-5 - Corrosivity Test Results

Boring No.	Depth (feet)	pH	Minimum Resistivity (ohm-cm)	Water Soluble Sulfate (ppm)	Water Soluble Chloride (ppm)
B-12	1-5	7.4	6,500	86	18
B-14	1-5	7.2	4,300	139	28



Boring No.:	**B-13**
Sample Depth:	**3-5' BULK**
Sample Description:	**Silty SAND**

Test Method:	**ASTM D1557 Method A**
Sampled By:	**CDD**
Sample Date:	**12/2/2022**
Test Date:	**12/12/22**

TEST RESULTS

Maximum Dry Density:	**136.0**	**pcf**
Optimum Water Content:	**6.5**	**%**

Curves of 100% Saturation
for Specific Gravity Equal to:

2.80

2.70

2.60

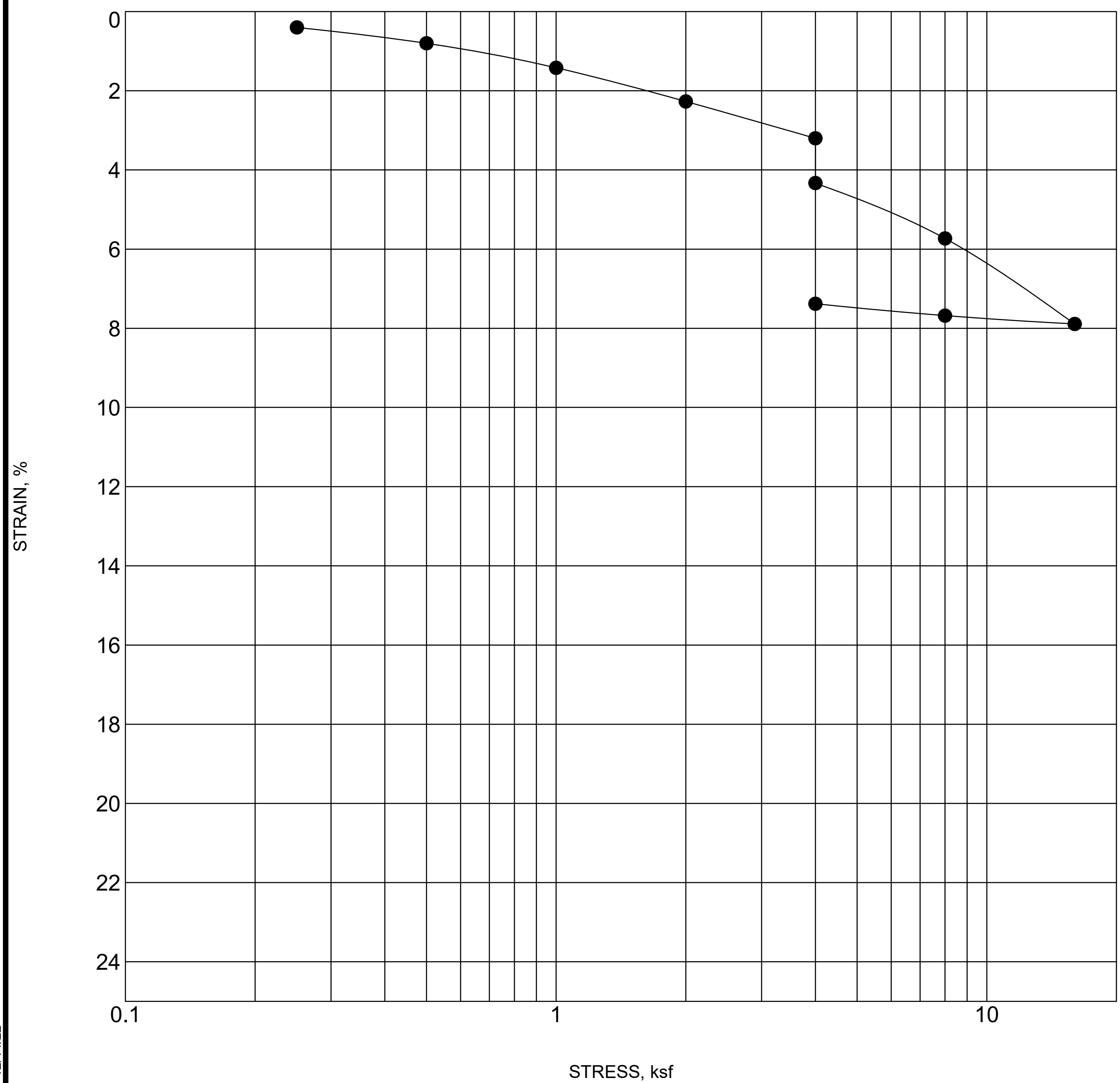
2.50

TWINING

MOISTURE-DENSITY RELATIONSHIP

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE B-1
220759.3	June 2023	



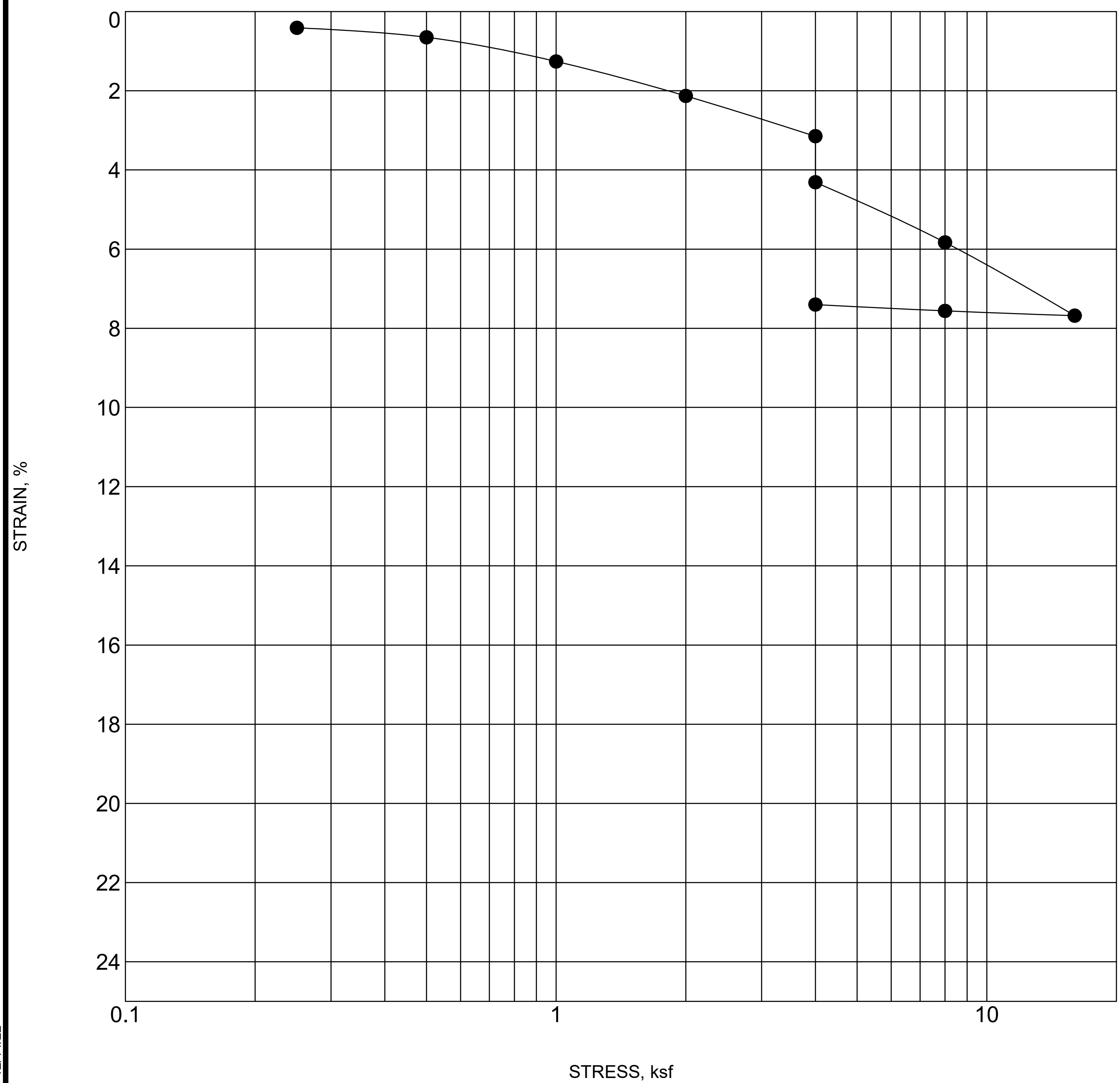
	Sample Location	Soil Description	Dry Density (pcf)	Moisture Content (%)
●	**B-11 at 15 ft**	**Silty SAND**	**105.9**	**10.4**

TWINING

CONSOLIDATION TEST

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE B-2



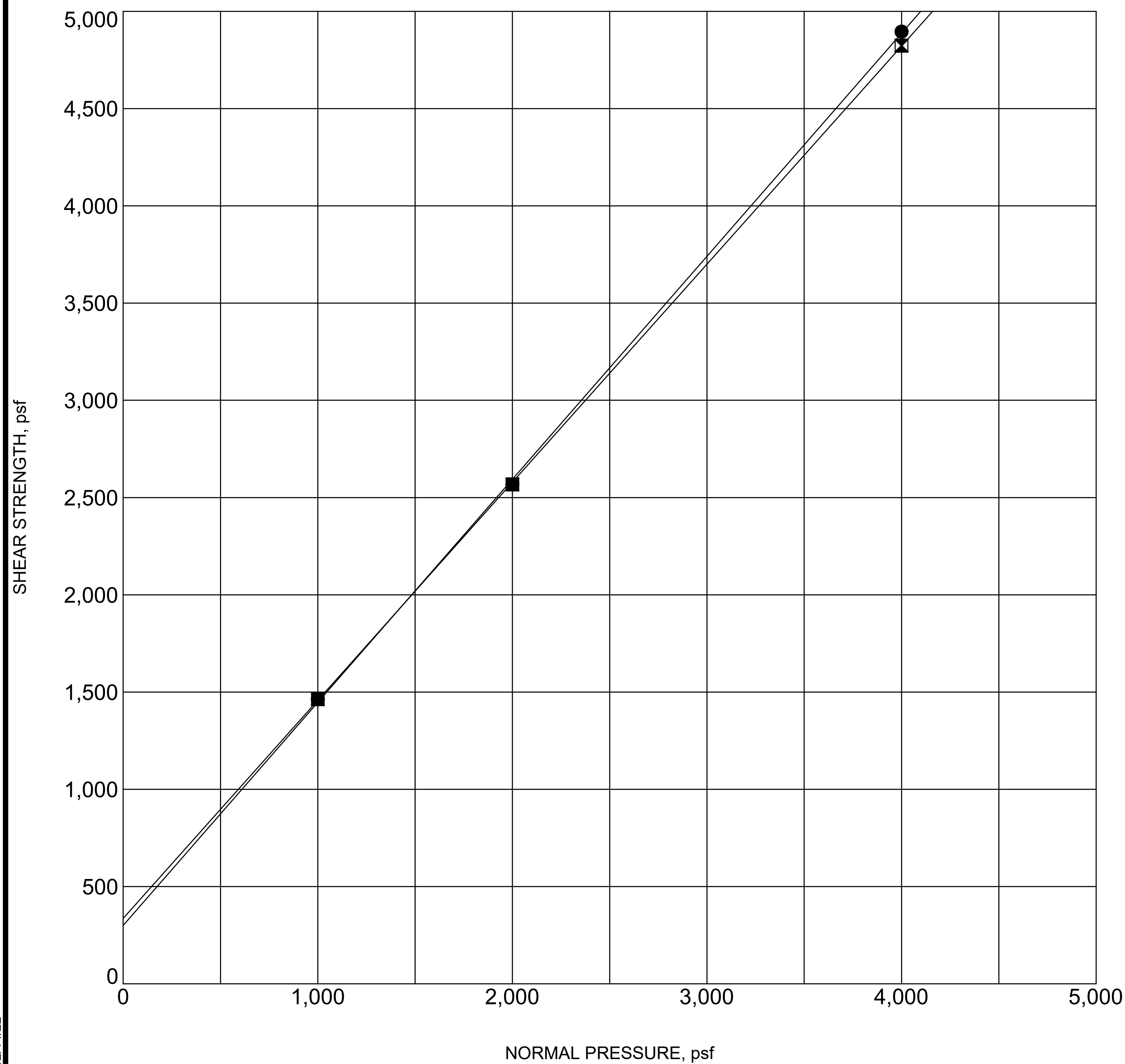
	Sample Location	Soil Description	Dry Density (pcf)	Moisture Content (%)
●	**B-14 at 15 ft**	**Poorly graded SAND with silt**	**106.2**	**2.2**

TWINING

CONSOLIDATION TEST

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE B-3



Boring No.:	B-10
Sample Depth (ft):	15
Sample Description:	Silty SAND
Strain Rate (in./min):	0.005
Dry Density (pcf):	109.9

Shear Strength Parameters

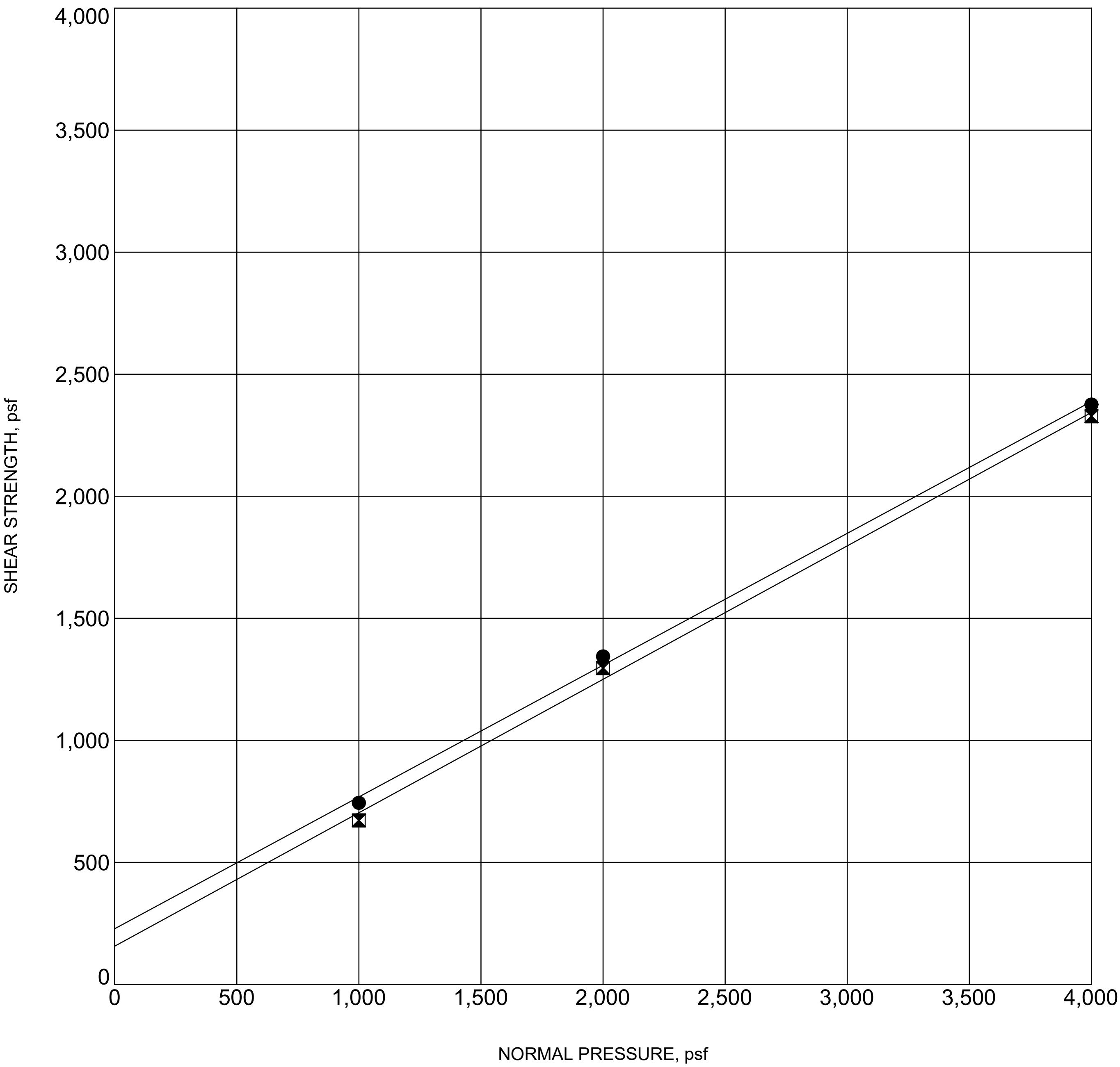
	Peak	Ultimate
Cohesion, C (psf):	300	336
Friction Angle, Ø (deg):	49	48
Initial Moisture (%):	4.6	
Final Moisture (%):	12.7	

TWINING

DIRECT SHEAR TEST

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE B-4



Shear Strength Parameters

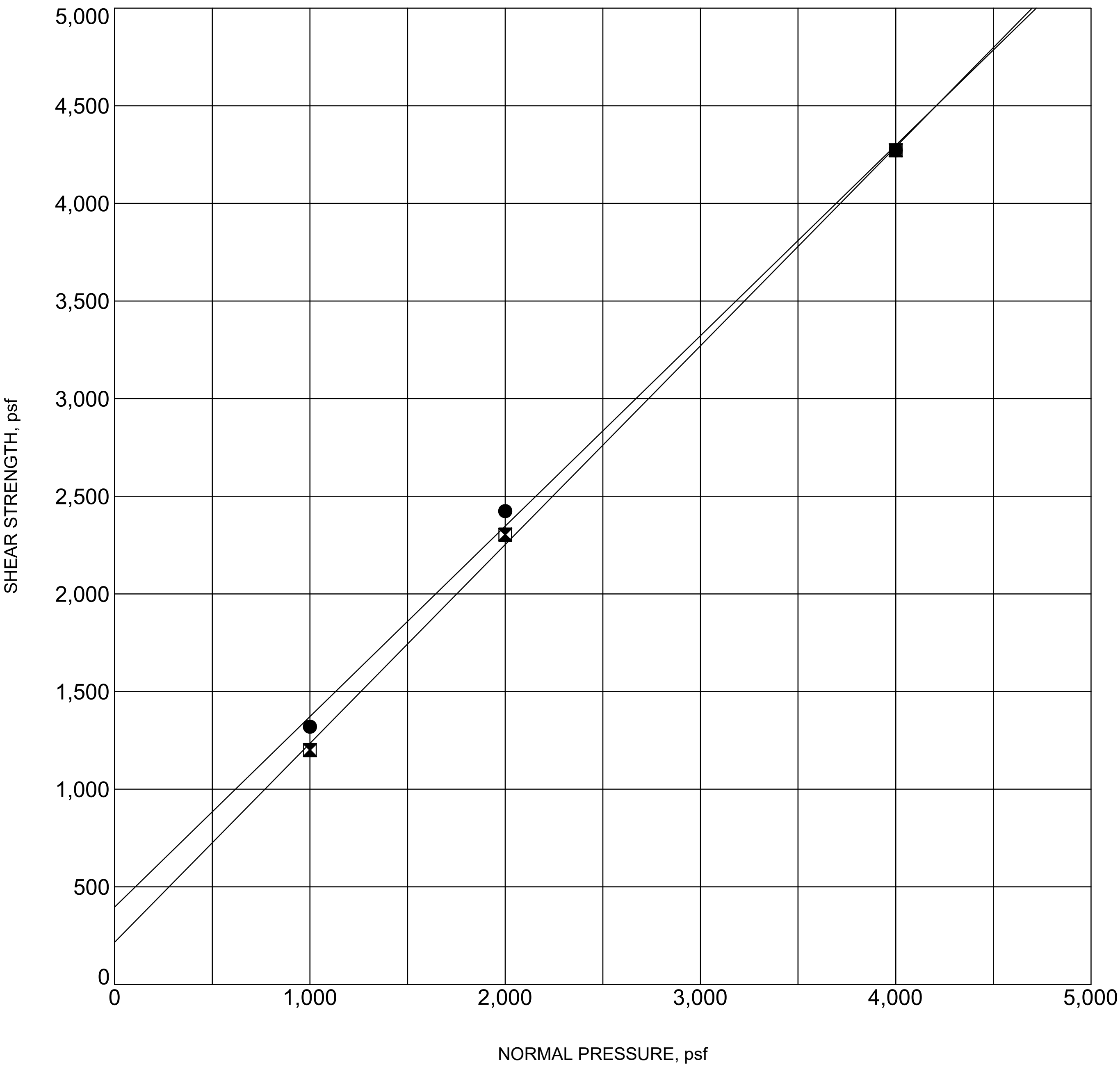
		Peak	**Ultimate**
Boring No.:	B-11		
Sample Depth (ft):	5		
Sample Description:	Silty SAND		
Strain Rate (in./min):	0.005		
Dry Density (pcf):	119.2		
Cohesion, C (psf):		228	156
Friction Angle, Ø (deg):		28	29
Initial Moisture (%):		5.3	
Final Moisture (%):		10.1	

TWINING

DIRECT SHEAR TEST

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE B-5



Boring No.: B-12
Sample Depth (ft): 15
Sample Description: Poorly graded SAND with silt
Strain Rate (in./min): 0.005
Dry Density (pcf): 106.7

Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	396	216
Friction Angle, Ø (deg):	44	46

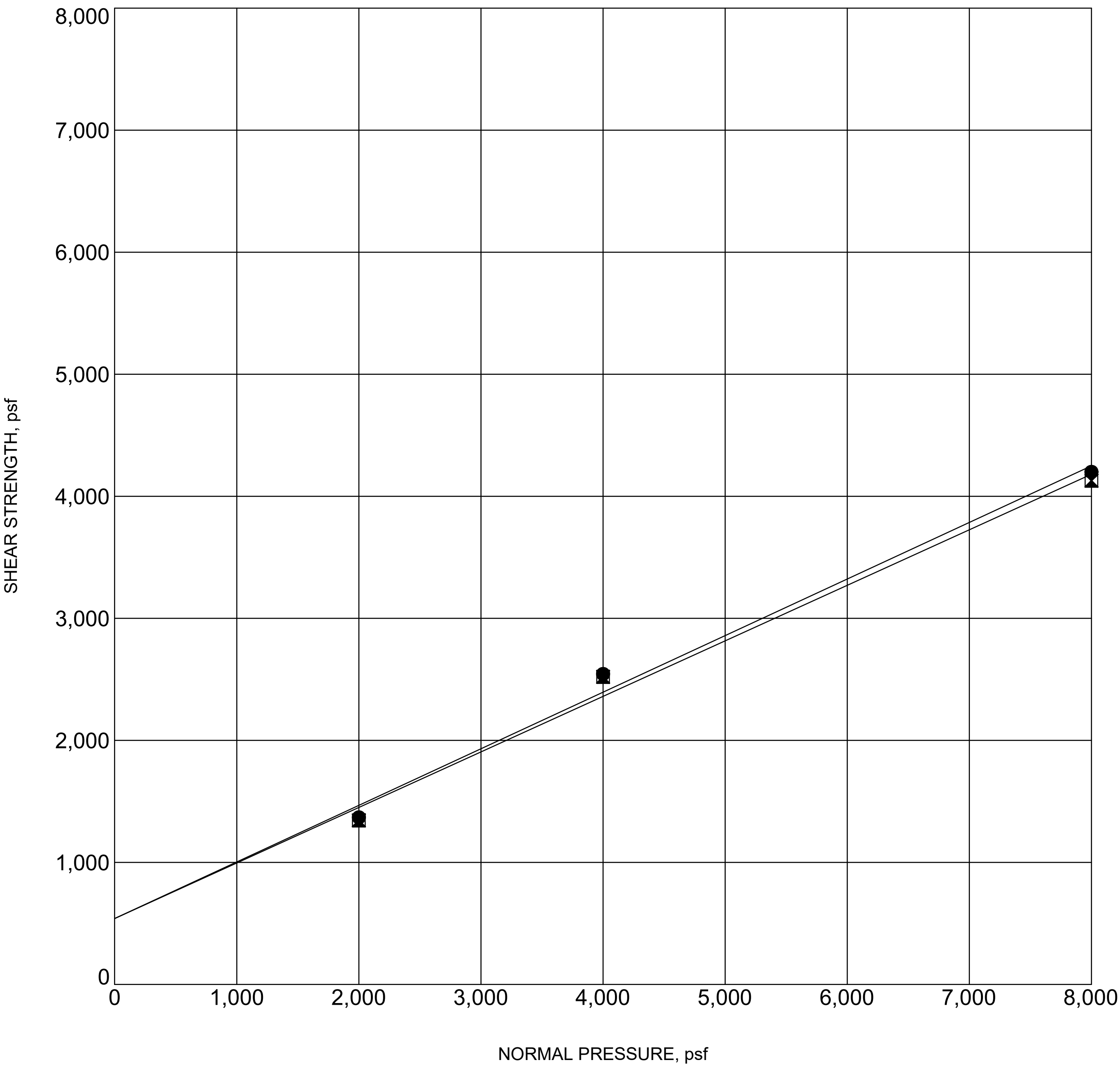
Initial Moisture (%): 4.5
Final Moisture (%): 15.7

TWINING

DIRECT SHEAR TEST

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE B-6
220759.3	June 2023	



Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	540	540
Friction Angle, Ø (deg):	25	24

Initial Moisture (%): 5.3
Final Moisture (%): 11.4

Boring No.: B-12
Sample Depth (ft): 35
Sample Description: Silty SAND
Strain Rate (in./min): 0.005
Dry Density (pcf): 112.9

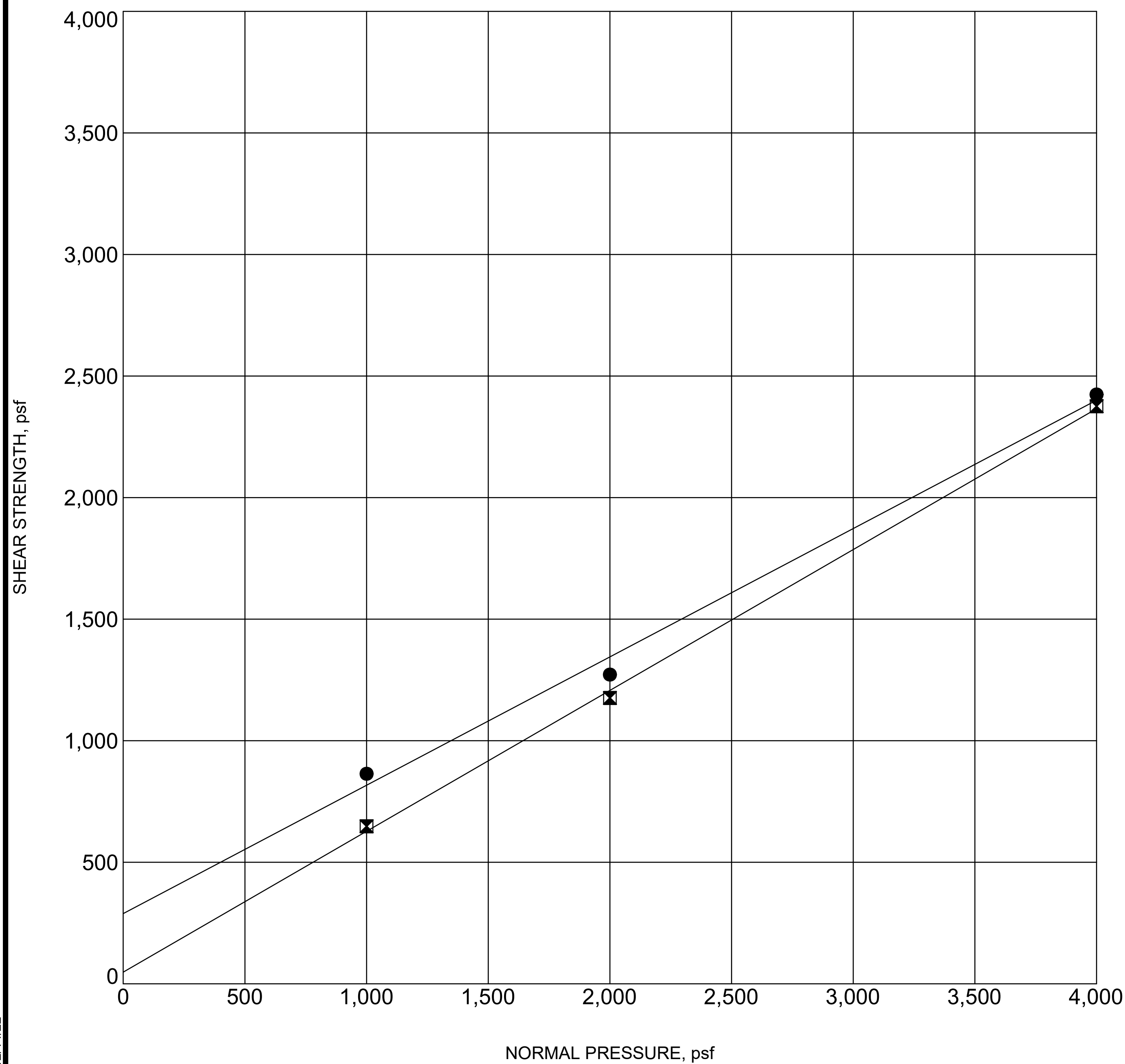
DIRECT SHEAR 220759.3 - UCR OASIS GEOTECH.GPJ TWINING LABS.GDT 12/14/22

TWINING

DIRECT SHEAR TEST

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE B-7
220759.3	June 2023	



Boring No.: B-13
Sample Depth (ft): 3-5' BULK
Sample Description: Silty SAND
Strain Rate (in./min): 0.005
Dry Density (pcf): 122.6

Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	288	48
Friction Angle, Ø (deg):	28	30

Initial Moisture (%): 6.4
Final Moisture (%): 10.8

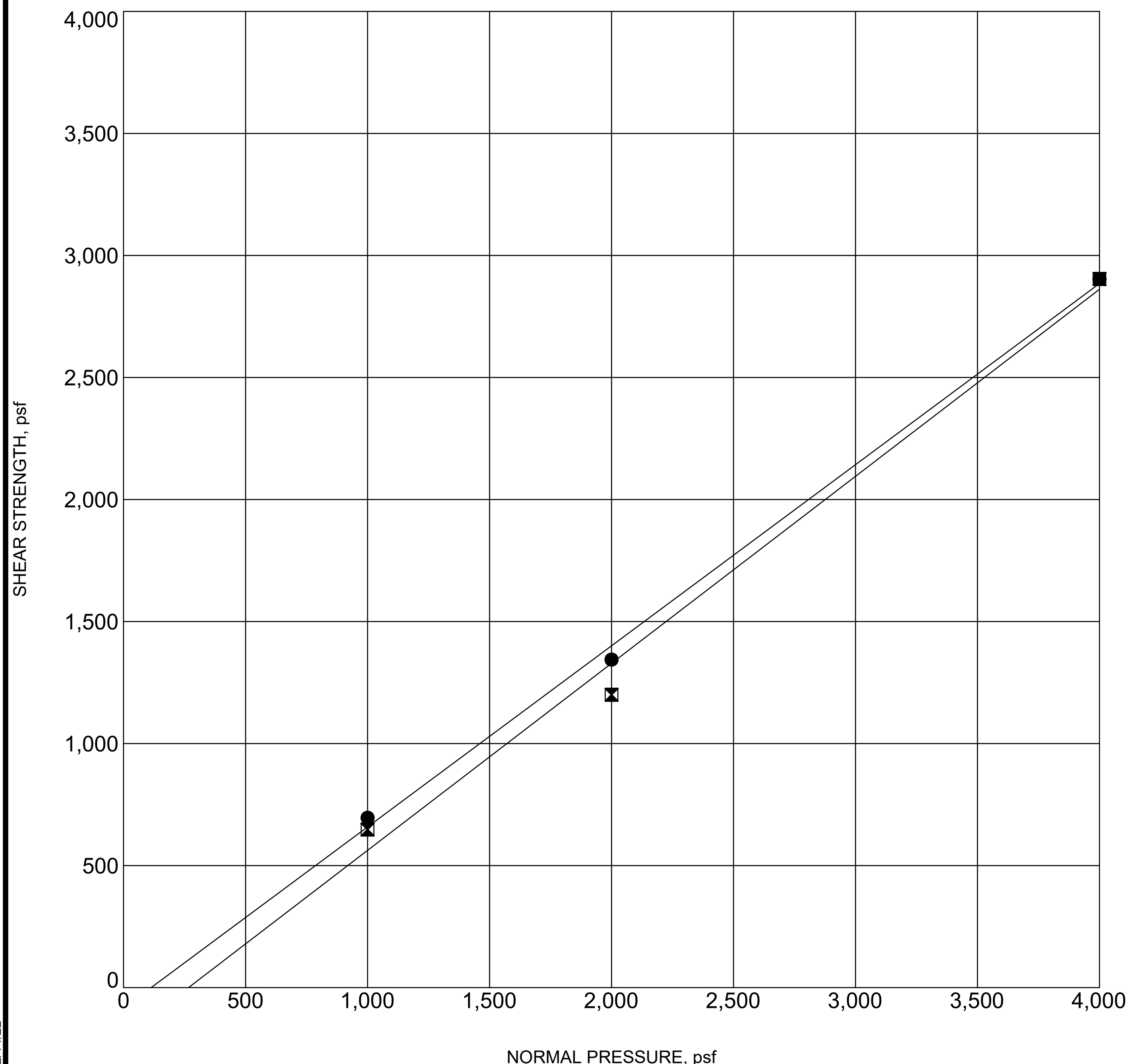
Remolded to 90% relative compaction

TWINING

DIRECT SHEAR TEST

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE B-8
220759.3	June 2023	



Boring No.: B-14
Sample Depth (ft): 5
Sample Description: Silty SAND
Strain Rate (in./min): 0.005
Dry Density (pcf): 116.2

Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	0	0
Friction Angle, Ø (deg):	36	37

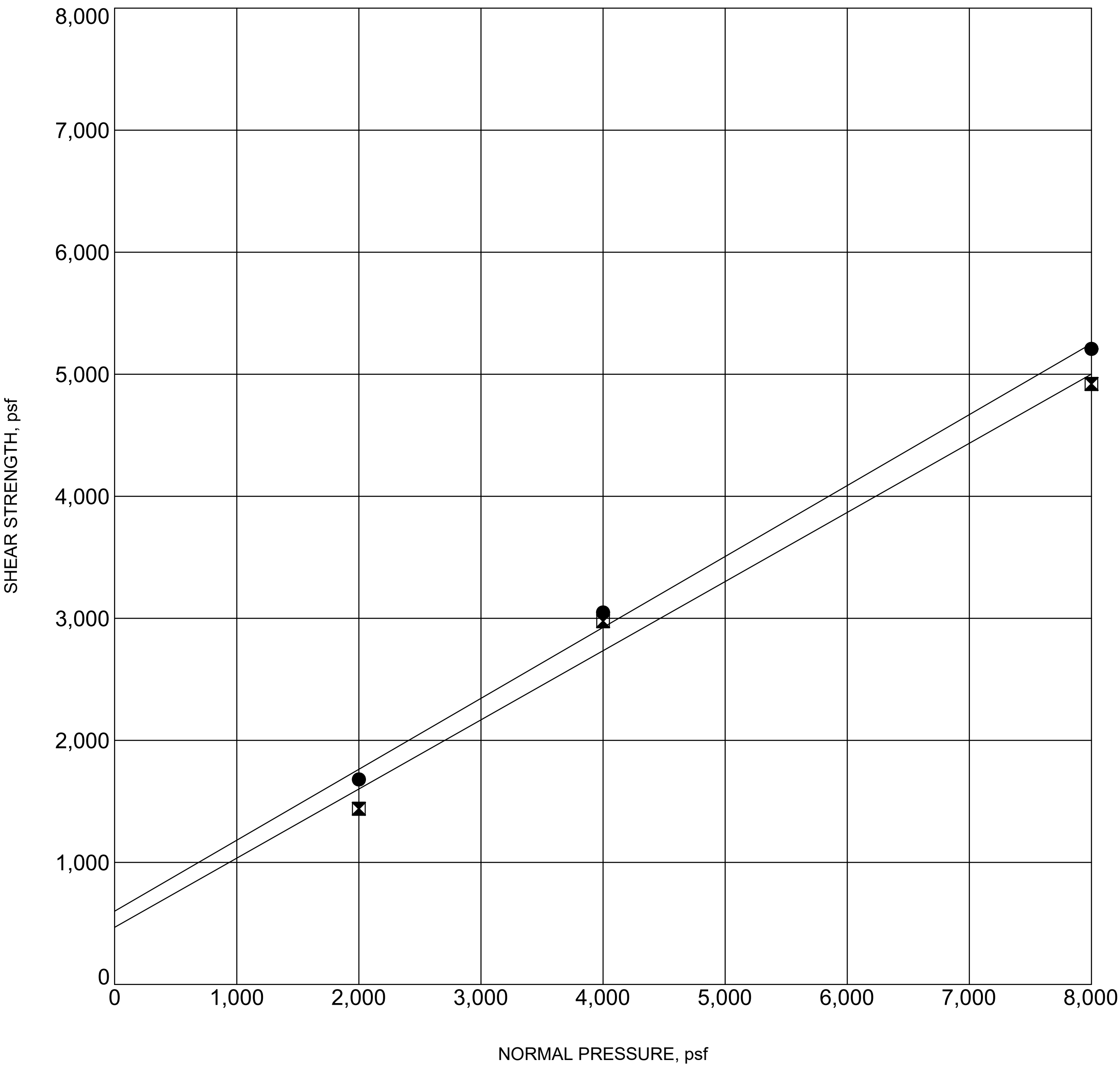
Initial Moisture (%): 6.5
Final Moisture (%): 11.6

TWINING

DIRECT SHEAR TEST

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	
220759.3	June 2023	FIGURE B-9



Shear Strength Parameters

		Peak	Ultimate
Boring No.:	B-14		
Sample Depth (ft):	25		
Sample Description:	Silty SAND		
Strain Rate (in./min):	0.005		
Dry Density (pcf):	108.4		
Cohesion, C (psf):		600	468
Friction Angle, Ø (deg):		30	30
Initial Moisture (%):		2.6	
Final Moisture (%):		14.8	

DIRECT SHEAR 220759.3 - UCR OASIS GEOTECH.GPJ TWINING LABS.GDT 12/14/22

TWINING

DIRECT SHEAR TEST

OASIS Park
University of California, Riverside
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE B-10
220759.3	June 2023	

HUSHMAND ASSOCIATES, INC.
Geotechnical and Earthquake Engineers

Hushmand Associates, Inc.
250 Goddard, Irvine,
CA 92618

p. (949) 777-1274
w. haieng.com
e. hai@haieng.com

January 16, 2023

Twining Inc.
2883 East Spring Street,
Long Beach, CA 90805

Attention: Mr. Doug Crayton

SUBJECT: Laboratory Test Result
Project Name: UCR Oasis
Project No.: 220759.3
HAI Project No.: TWI-23-001

Dear Mr. Crayton:

Enclosed is the result of the laboratory testing program conducted on samples from the above referenced project. The testing performed for this program was conducted in general accordance with the following test procedure:

Type of Test	Test Procedure
Consolidation	ASTM D2435

Attached are: three (3) Consolidation test results.

We appreciate the opportunity to provide our testing services to Twining Inc. If you have any questions regarding the test results, please contact us.

Sincerely,

Kang C. Lin, BS, EIT
Laboratory Manager

M. Varsei

Maryam Varsei, M.Sc.
Senior Staff Engineer

CONSOLIDATION TEST

ASTM D2435

Client :	Twining Inc.	*HAI Project No.:*	TWI-23-001
Project Name:	UCR Oasis	*Tested by:*	KL
Project Number:	220579.3	*Checked by:*	SD
Boring No.:	B-10	*Date:*	01/26/23
Sample No.:	R		
Type of Sample:	Undisturbed Ring		
Depth (ft):	5		
Soil Description:	Brown, Silty Sand (SM)		

Initial Total Weight	Final Total Weight	Final Dry Weight
(g)	(g)	(g)
150.48	159.18	141.11

			Initial Conditions	Final Conditions
Height	H	(in)	1.024	0.935
Height of Solids	H_s	(in)	0.693	0.693
Height of Water	H_w	(in)	0.125	0.241
Height of Air	H_a	(in)	0.206	0.001
Dry Density		**(pcf)**	**114.5**	**134.0**
Water Content		**(%)**	**6.6**	**12.8**
Saturation		**(%)**	**37.7**	**99.4**

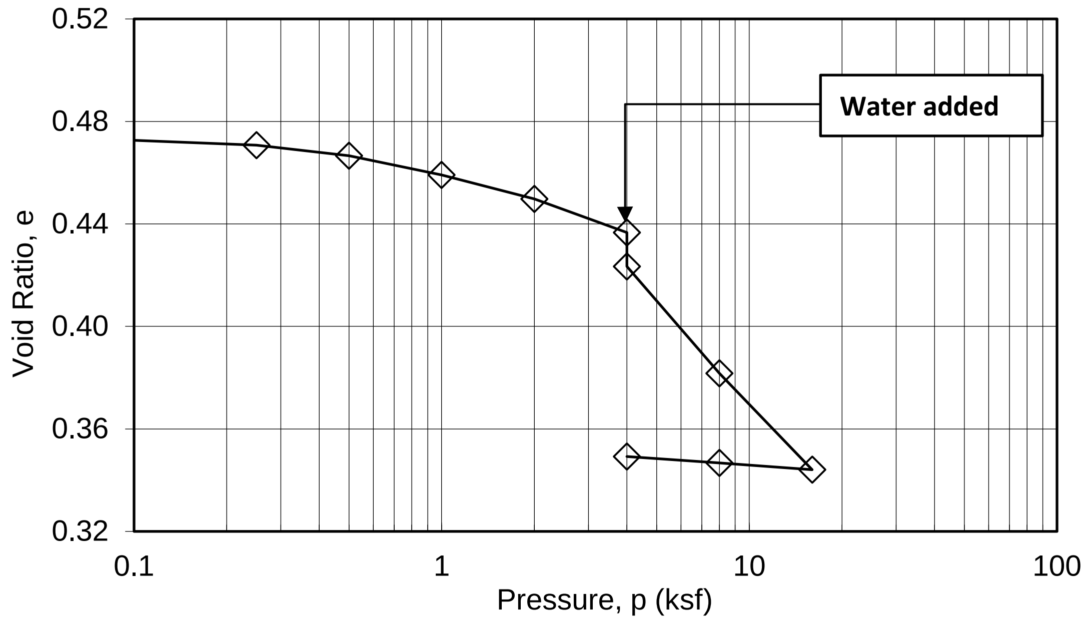
* Saturation is calcualted based on Gs= 2.71

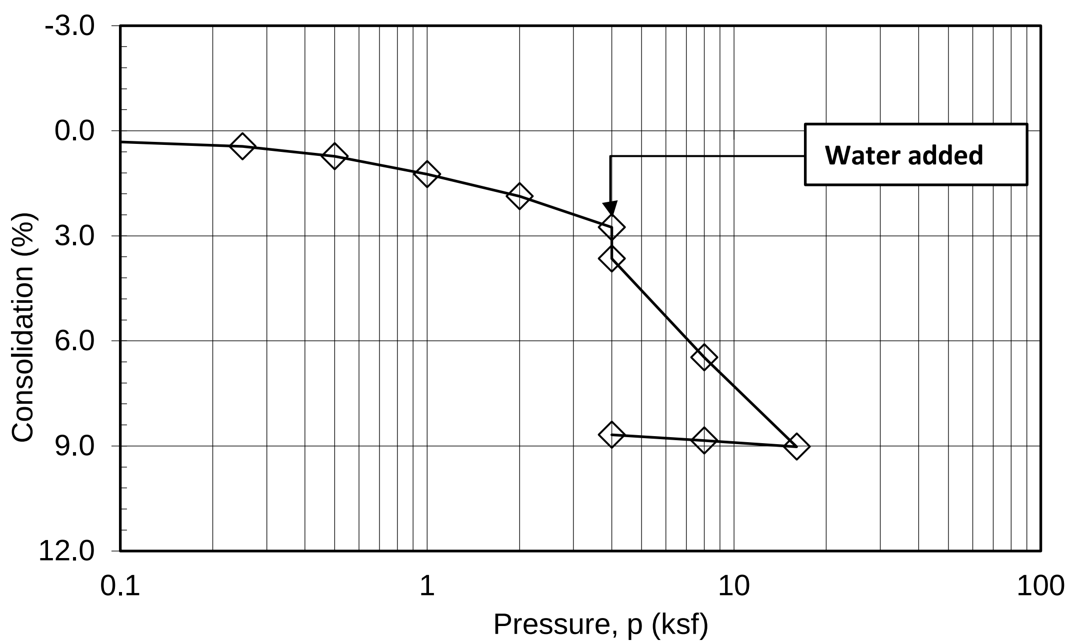
Load (ksf)	**δH (in)**	**H (in)**	**Voids (in)**	**e**	**Consol. (%)**	**a_v (ksf^{-1})**	**M_v (ksf^{-1})**	**Comment**
0.01	-------	1.0240	0.331	0.477	0			
0.25	0.0046	1.0194	0.326	0.471	0.4	2.8E-02	1.9E-02	
0.5	0.0075	1.0165	0.323	0.467	0.7	1.7E-02	1.1E-02	
1	0.0127	1.0113	0.318	0.459	1.2	1.5E-02	1.0E-02	
2	0.0191	1.0049	0.312	0.450	1.9	9.3E-03	6.4E-03	
4	0.0283	0.9957	0.303	0.437	2.8	6.6E-03	4.6E-03	
4	0.0374	0.9866	0.293	0.423	3.7	Water Added		
8	0.0663	0.9577	0.265	0.382	6.5	1.0E-02	7.5E-03	
16	0.0924	0.9316	0.238	0.344	9.0	4.7E-03	3.5E-03	
8	0.0906	0.9334	0.240	0.347	8.8	Unloaded		
4	0.0889	0.9351	0.242	0.349	8.7			

CONSOLIDATION TEST

ASTM D2435

Client :	Twining Inc.	*HAI Project No.:*	TWI-23-001
Project Name:	UCR Oasis	*Tested by:*	KL
Project Number:	220579.3	*Checked by:*	SD
Boring No.:	B-10	*Date:*	01/26/23
Sample No.:	R		
Type of Sample:	Undisturbed Ring		
Depth (ft):	5		
Soil Description:	Brown, Silty Sand (SM)		





CONSOLIDATION TEST

ASTM D2435

Client :	Twining Inc.
Project Name:	UCR Oasis
Project Number:	220579.3
Boring No.:	B-12
Sample No.:	R
Type of Sample:	Undisturbed Ring
Depth (ft):	5
Soil Description:	Brown, Silty Sand (SM)

HAI Project No.:	TWI-23-001
Tested by:	KL
Checked by:	SD
Date:	01/26/23

Initial Total Weight	Final Total Weight	Final Dry Weight
(g)	(g)	(g)
140.69	153.04	136.92

			Initial Conditions	Final Conditions
Height	H	(in)	1.000	0.925
Height of Solids	H_s	(in)	0.673	0.673
Height of Water	H_w	(in)	0.050	0.215
Height of Air	H_a	(in)	0.277	0.038
Dry Density		**(pcf)**	**113.7**	**132.8**
Water Content		**(%)**	**2.8**	**11.8**
Saturation		**(%)**	**15.3**	**84.9**

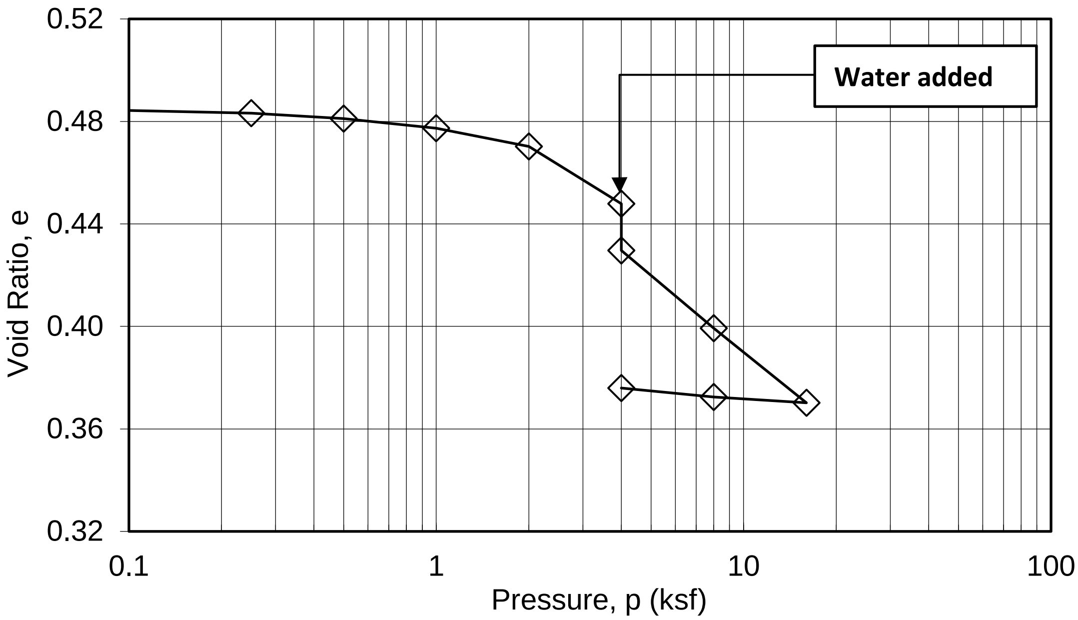
* Saturation is calcualted based on Gs= 2.71

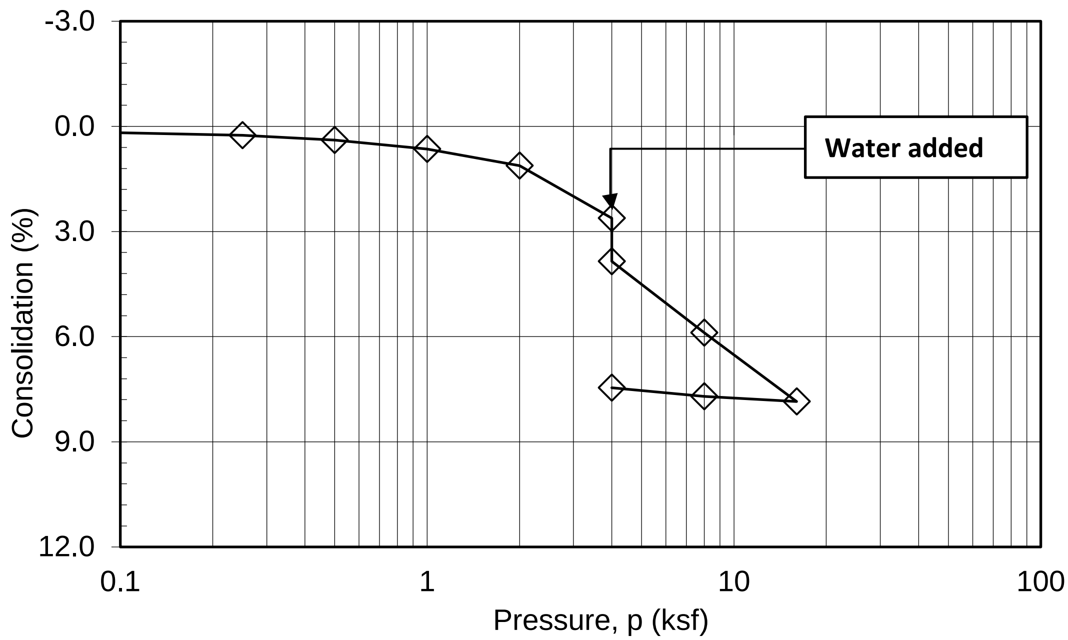
Load (ksf)	δH (in)	H (in)	Voids (in)	e	Consol. (%)	a_v (ksf^{-1})	M_v (ksf^{-1})	Comment
0.01	-------	1.0000	0.327	0.487	0			
0.25	0.0025	0.9975	0.325	0.483	0.3	1.5E-02	1.0E-02	
0.5	0.0039	0.9961	0.324	0.481	0.4	8.3E-03	5.6E-03	
1	0.0065	0.9935	0.321	0.477	0.6	7.6E-03	5.2E-03	
2	0.0112	0.9888	0.316	0.470	1.1	7.0E-03	4.8E-03	
4	0.0262	0.9738	0.301	0.448	2.6	1.1E-02	7.7E-03	
4	0.0385	0.9615	0.289	0.430	3.8	Water Added		
8	0.0589	0.9411	0.269	0.399	5.9	7.6E-03	5.4E-03	
16	0.0785	0.9215	0.249	0.370	7.8	3.6E-03	2.7E-03	
8	0.0770	0.9230	0.250	0.372	7.7	Unloaded		
4	0.0746	0.9254	0.253	0.376	7.5			

CONSOLIDATION TEST

ASTM D2435

Client :	Twining Inc.	*HAI Project No.:*	TWI-23-001
Project Name:	UCR Oasis	*Tested by:*	KL
Project Number:	220579.3	*Checked by:*	SD
Boring No.:	B-12	*Date:*	01/26/23
Sample No.:	R		
Type of Sample:	Undisturbed Ring		
Depth (ft):	5		
Soil Description:	Brown, Silty Sand (SM)		





CONSOLIDATION TEST

ASTM D2435

Client :	Twining Inc.	*HAI Project No.:*	TWI-23-001
Project Name:	UCR Oasis	*Tested by:*	KL
Project Number:	220579.3	*Checked by:*	SD
Boring No.:	B-12	*Date:*	01/26/23
Sample No.:	R		
Type of Sample:	Undisturbed Ring		
Depth (ft):	25		
Soil Description:	Brown, Silty Sand (SM)		

Initial Total Weight	Final Total Weight	Final Dry Weight
(g)	(g)	(g)
141.21	148.33	130.72

			Initial Conditions	**Final Conditions**
Height	H	(in)	1.000	0.883
Height of Solids	H_s	(in)	0.642	0.642
Height of Water	H_w	(in)	0.140	0.234
Height of Air	H_a	(in)	0.218	0.006
Dry Density		**(pcf)**	**108.6**	**139.4**
Water Content		**(%)**	**8.0**	**13.5**
Saturation		**(%)**	**39.0**	**97.5**

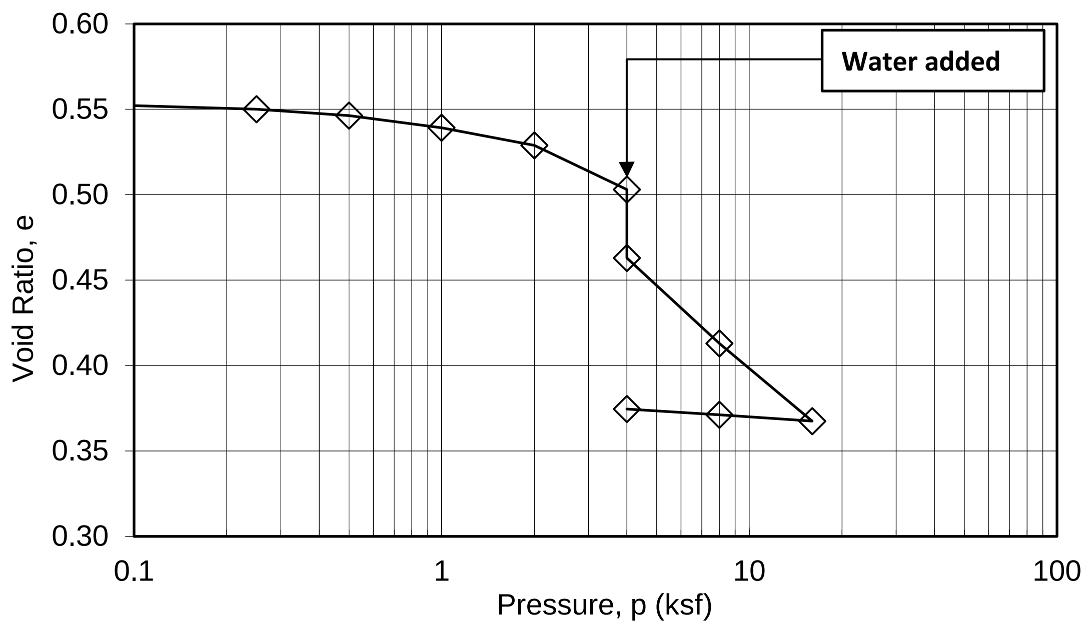
* Saturation is calcualted based on Gs= 2.71

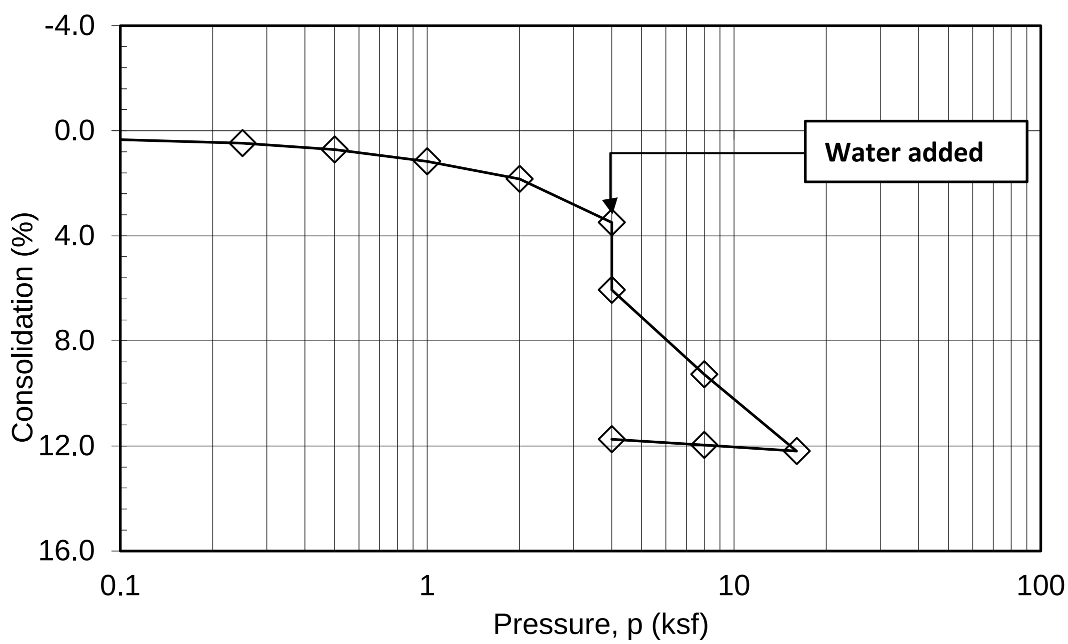
Load (ksf)	**δH (in)**	**H (in)**	**Voids (in)**	**e**	**Consol. (%)**	**a_v (ksf^{-1})**	**M_v (ksf^{-1})**	**Comment**
0.01	-------	1.0000	0.358	0.557	0			
0.25	0.0047	0.9953	0.353	0.550	0.5	3.0E-02	2.0E-02	
0.5	0.0072	0.9928	0.351	0.546	0.7	1.5E-02	1.0E-02	
1	0.0117	0.9883	0.346	0.539	1.2	1.4E-02	9.1E-03	
2	0.0184	0.9817	0.340	0.529	1.8	1.0E-02	6.8E-03	
4	0.0349	0.9651	0.323	0.503	3.5	1.3E-02	8.6E-03	
4	0.0606	0.9394	0.297	0.463	6.1	Water Added		
8	0.0927	0.9073	0.265	0.413	9.3	1.3E-02	8.9E-03	
16	0.1220	0.8781	0.236	0.368	12.2	5.7E-03	4.2E-03	
8	0.1196	0.8804	0.238	0.371	12.0	Unloaded		
4	0.1175	0.8825	0.240	0.374	11.7			

CONSOLIDATION TEST

ASTM D2435

Client :	Twining Inc.	*HAI Project No.:*	TWI-23-001
Project Name:	UCR Oasis	*Tested by:*	KL
Project Number:	220579.3	*Checked by:*	SD
Boring No.:	B-12	*Date:*	01/26/23
Sample No.:	R		
Type of Sample:	Undisturbed Ring		
Depth (ft):	25		
Soil Description:	Brown, Silty Sand (SM)		





ANAHEIM TEST LAB, INC

196 Technology Drive, Unit D
Irvine, CA 92618
Phone (949) 336-6544

DATE: 12/13/2022

TWINING LABS
3310 AIRPORT WAY
LONG BEACH, CA 90806

P.O. NO.: Soils120722

LAB NO.: C-6627, 1-2

SPECIFICATION: CT-643/417/422

MATERIAL: Soil

Project No.: 220759.3
Project: UCR Oasis
WO No.: W01-22-36016
Sample Date: 12/2/2022

ANALYTICAL REPORT

CORROSION SERIES

SUMMARY OF DATA

	pH	MIN RESISTIVITY per CT. 643 ohm-cm	SOLUBLE SULFATES per CT. 417 ppm	SOLUBLE CHLORIDES per CT. 422 ppm
1) B-12 Bulk	7.4	6,500	86	18
2) B-14 Bulk	7.2	4,300	139	28

RESPECTFULLY SUBMITTED

WES BRIDGER LAB MANAGER

TWINING

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APPENDIX C
PREVIOUS LABORATORY TESTING

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Appendix B
Laboratory Testing

Laboratory Moisture Content and Density Tests

The moisture content and dry densities of selected driven samples obtained from the exploratory borings were evaluated in general accordance with the latest version of ASTM D 2937. The test results are presented on the logs of the exploratory borings in Appendix A. A Modified Proctor test was also performed on near-surface soils to determine the maximum dry density and optimum water content for compaction. The tests were performed in accordance with ASTM D 1557 Method A. The results are summarized below in Table B-1 and a copy of the curve is attached to this appendix as Figures B-1 and B-2.

Wash Sieve

The amount of fines passing the No. 200 sieve was evaluated by the wash sieve. The test procedure was in general accordance with ASTM D 1140. The results are presented in Table B-2.

Expansion Index Test

The expansion index was evaluated in general accordance with ASTM D 4829. The specimen was molded under a specified compactive energy at approximately 50 percent saturation. The prepared 1-inch thick by 4-inch diameter specimen was loaded with a surcharge of 144 pounds per square foot and was inundated with tap water. Readings of volumetric swell were made for a period of 24 hours. The result of the Expansion Index test is presented on Table B-4.

Consolidation Test

Consolidation tests were performed on a selected driven soil sample by in general accordance with the latest version of ASTM D2435. The sample was inundated during testing to represent adverse field conditions. The percent consolidation for each load cycle was recorded as a ratio of the amount of vertical compression to the original height of the sample. The results of the test are attached to this appendix as Figures B-3 through B-6.

Direct Shear Tests

Direct shear tests were performed on selected remolded and relatively undisturbed soil samples in general accordance with ASTM D 3080 to evaluate the shear strength characteristics of the materials. The samples were inundated during shearing to represent adverse field conditions. The results are summarized in Table B-5. Plots can be found in Figures B-7 through B-12.

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Corrosivity

Soil pH and resistivity tests were performed by Anaheim Test Lab on a representative soil sample in general accordance with the latest version of California Test Method 643. The chloride content of the selected sample was evaluated in general accordance with the latest version of California Test Method 422. The sulfate content of the selected samples was evaluated in general accordance with the latest version of California Test Method 417. The test results are presented on Table B-6.

Resistance Value (R-Value)

R-value testing was performed on a select bulk sample of the near-surface soils encountered at the site. The test was performed in general accordance with ASTM D 28444. The results are summarized in Table B-7.

Table B-1
Moisture-Density Relationship Testing

ASTM D 1557 Method A

Boring No.	Depth (feet)	Maximum Dry Density (pcf)	Optimum Water Content (%)
B-1	0 – 5	136.0	5.5
B-3	0 – 5	130.0	8.0

Table B-2
No. 200 Wash Sieve Results

Boring No.	Depth (feet)	Percent Passing #200
B-1	40	19.1
B-3	15	27.5
B-3	25	38.4
B-4	10	10.6
B-4	15	11.4
B-5	35	7.1
B-5	45	54
B-6	10	9.7
B-6	30	21.7
B-7	30	38.8

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Table B-4
Expansion Index Test Result

Boring No.	Depth (feet)	Expansion Index
B-8	0 – 5	9

Table B-5
Direct Shear Tests

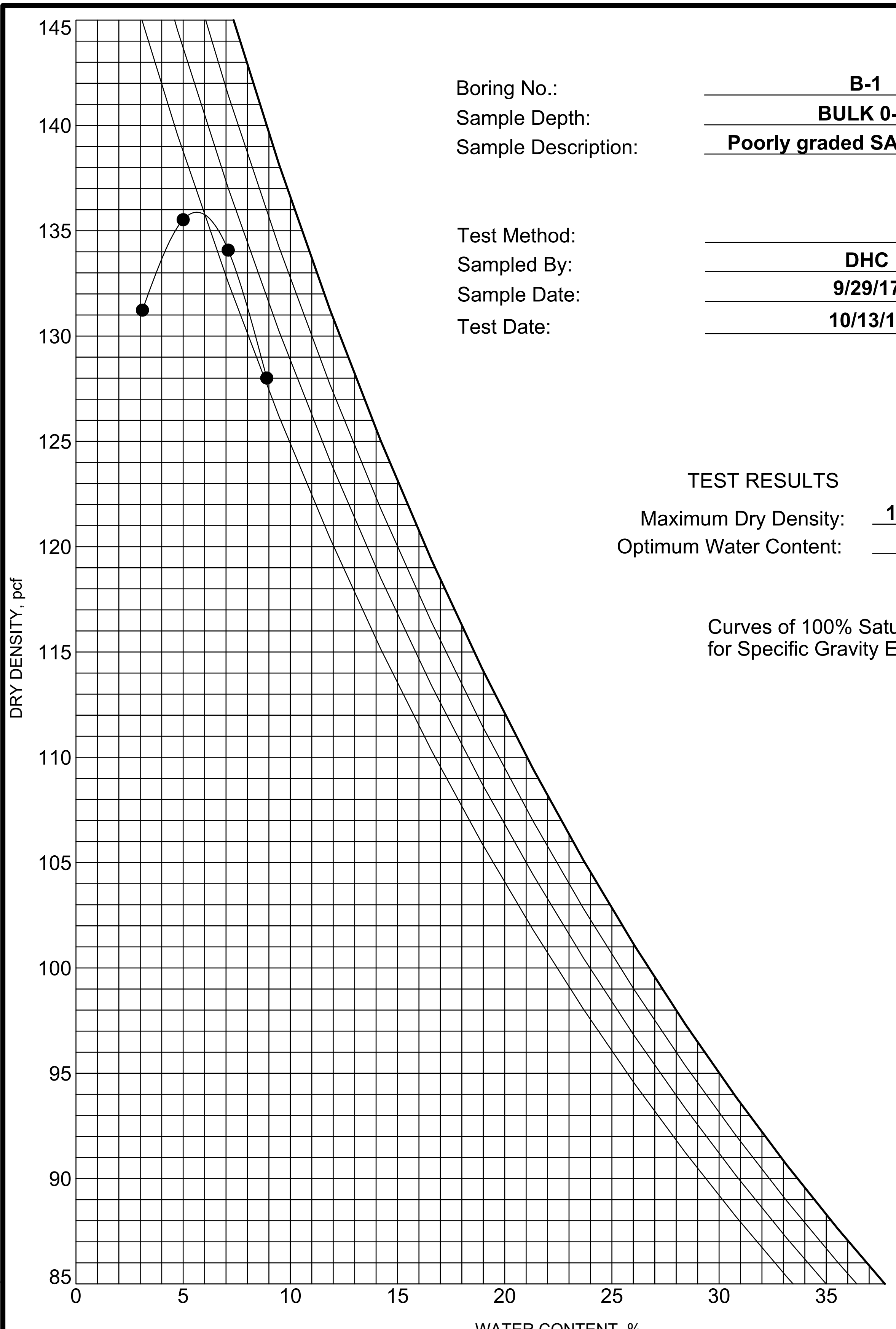
Boring No.	Depth (feet)	Remolded	Peak		Ultimate	
			C (psf)	ϕ (deg)	C (psf)	ϕ (deg)
B-1	15	No	245	38	190	37
B-1	25	No	248	36	190	35
B-3	30	No	275	36	100	36
B-3	40	No	300	36	100	35
B-5	20	No	262	35	50	35
B-6	25	No	840	31	505	32

Table B-6
Soil Corrosivity Test Results

Boring No.	Depth (feet)	pH	Water Soluble Sulfate (ppm)	Water Soluble Chloride (ppm)	Minimum Resistivity (ohm-cm)
B-1	0-5	6.9	161	73	2,800

Table B-7
R-Value Test Results

Boring No.	Depth (feet)	R-Value
B-4	0 – 5	41



Boring No.: **B-1**
Sample Depth: **BULK 0-5'**
Sample Description: **Poorly graded SAND with silt**

Test Method:
Sampled By: **DHC**
Sample Date: **9/29/17**
Test Date: **10/13/17**

TEST RESULTS

Maximum Dry Density: **136.0 pcf**
Optimum Water Content: **5.5 %**

Curves of 100% Saturation
for Specific Gravity Equal to:

2.80

2.70

2.60

2.50

COMPACTION (MODIFIED BY PAUL) 170875.3 - UCR OUTPATIENT PAVILLION.GPJ TWINING LABS.GDT 10/25/17

TWINING

MOISTURE-DENSITY RELATIONSHIP

UC Riverside, Outpatient Pavillion
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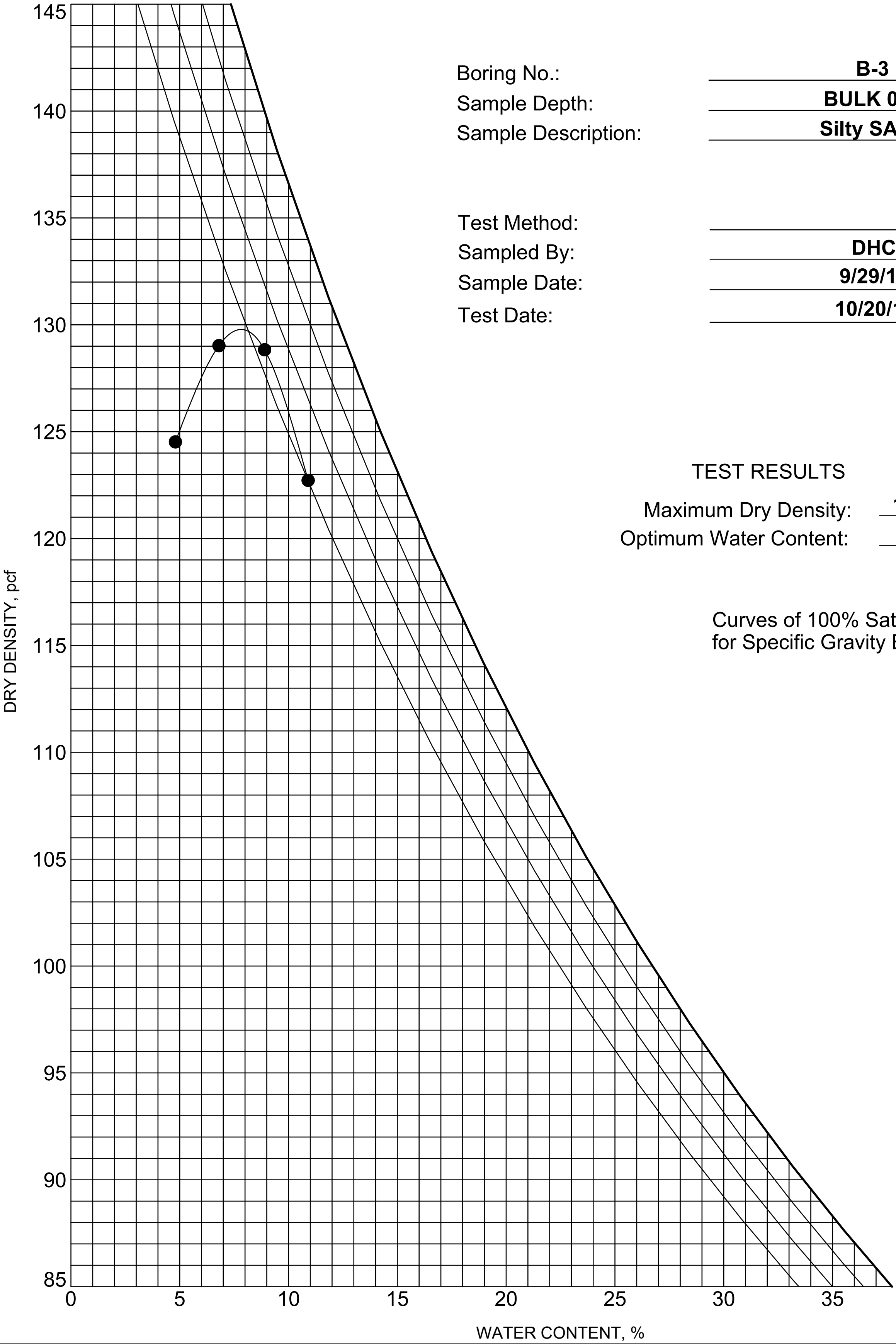
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE B-1
170875.3	October 2017	



Boring No.:	**B-3**
Sample Depth:	**BULK 0-5'**
Sample Description:	**Silty SAND**
Test Method:	
Sampled By:	**DHC**
Sample Date:	**9/29/17**
Test Date:	**10/20/13**

TEST RESULTS

Maximum Dry Density: **130.0 pcf**

Optimum Water Content: **8.0 %**

Curves of 100% Saturation
for Specific Gravity Equal to:

2.80

2.70

2.60

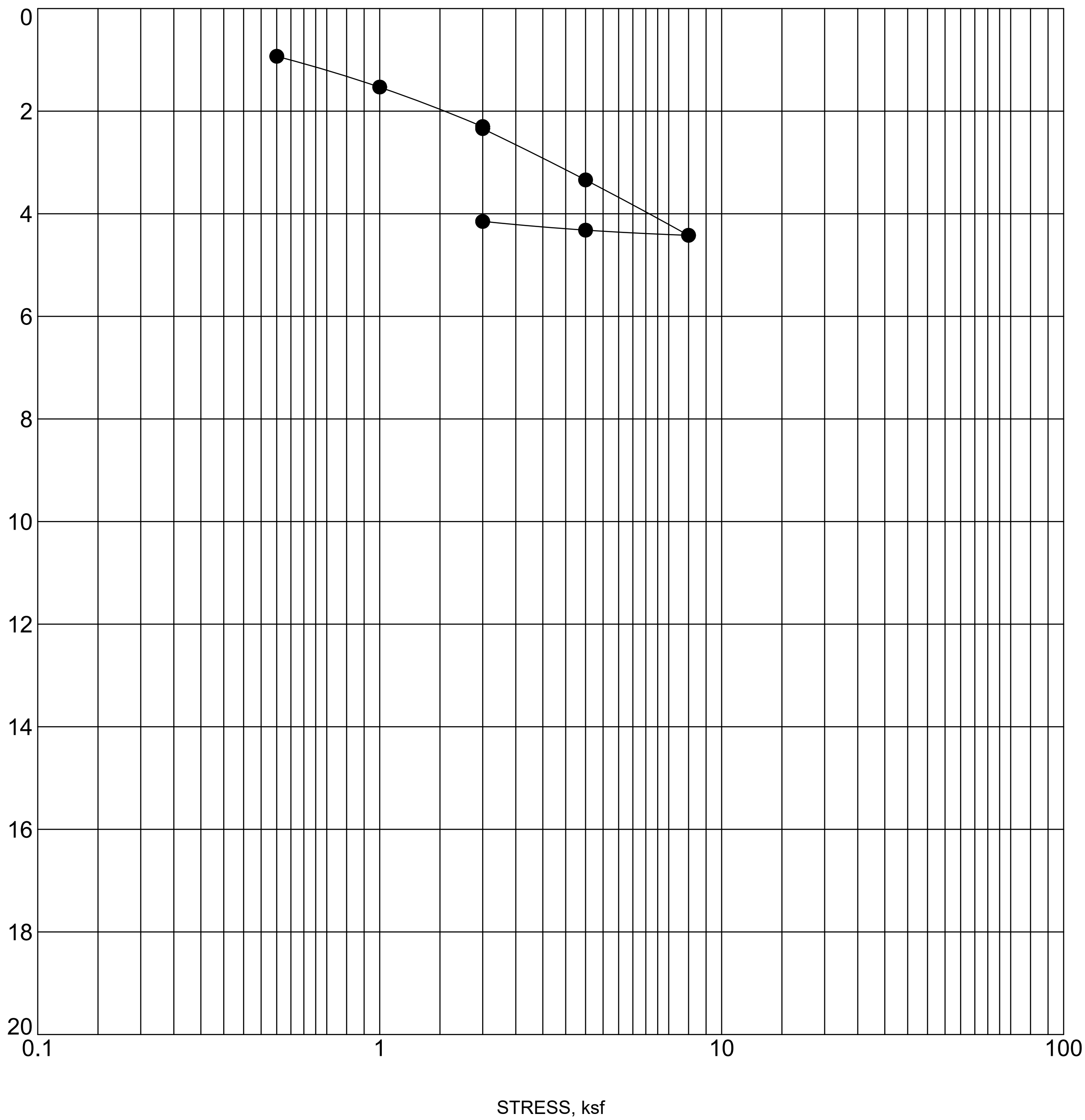
2.50

TWINING

MOISTURE-DENSITY RELATIONSHIP

UC Riverside, Outpatient Pavillion
1150 University Avenue
Riverside, California

PROJECT NO.	REPORT DATE	FIGURE B-2
170875.3	October 2017	



	Sample Location	Soil Description	Dry Density (pcf)	Moisture Content (%)
●	**B-1 at 35 ft**	**Silty SAND**	**109.4**	**6.2**

CONSOLIDATION TEST

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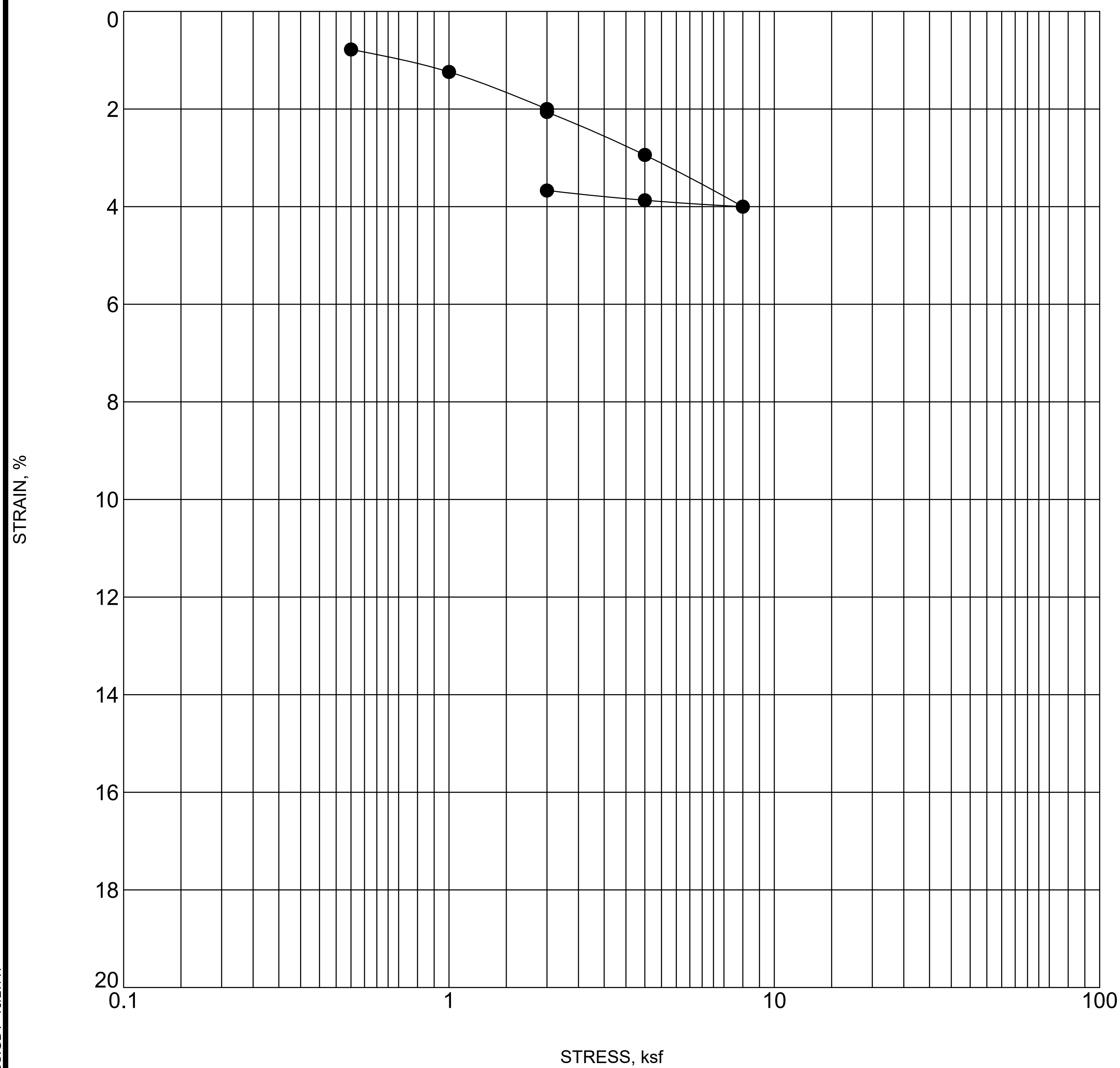
Riverside, California

PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE B-3



	Sample Location	Soil Description	Dry Density (pcf)	Moisture Content (%)
●	**B-2 at 10 ft**	**Silty SAND**	**9.0**	**121.0**

TWINING

CONSOLIDATION TEST

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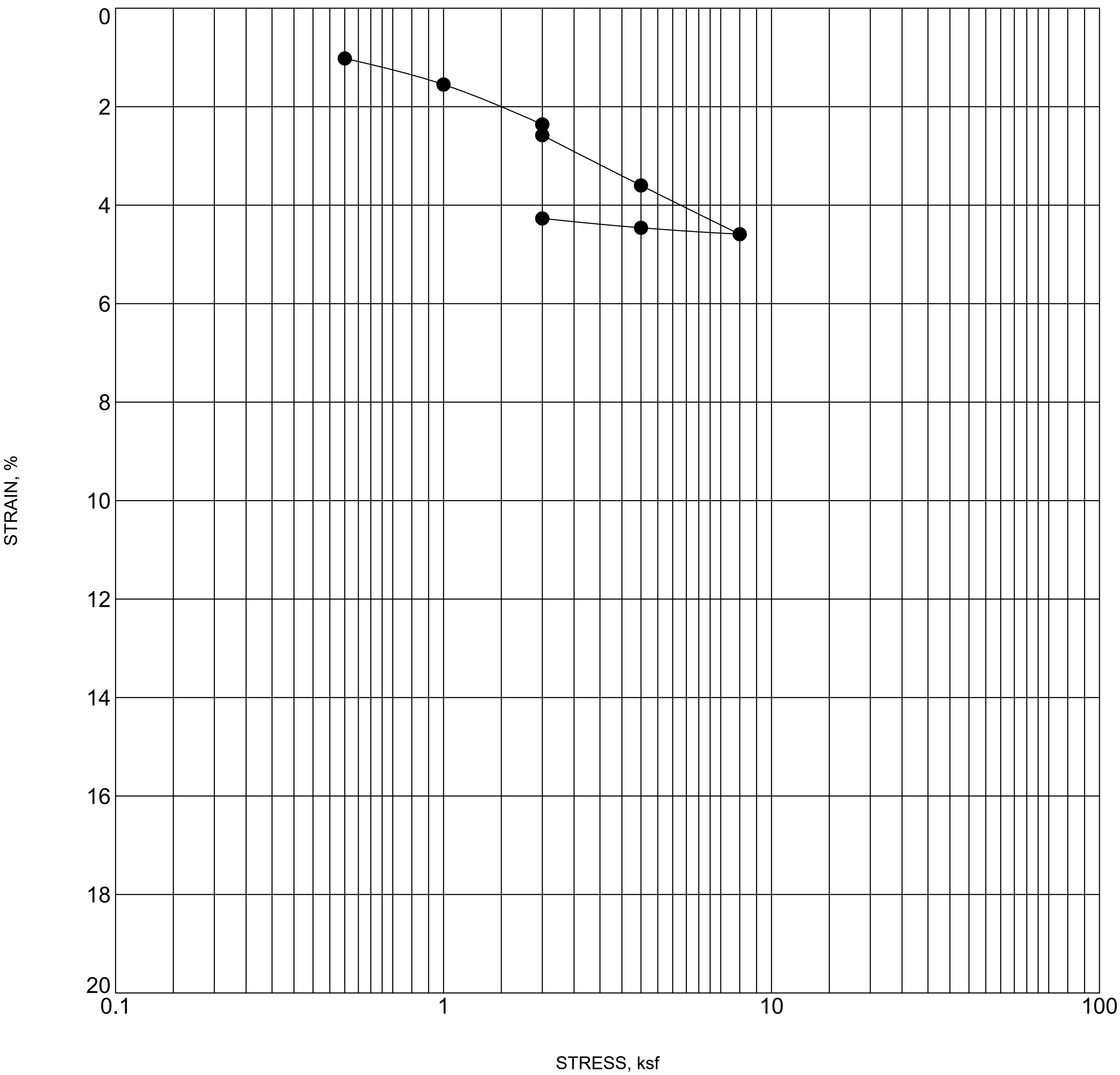
PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE B-4



	Sample Location	Soil Description	Dry Density (pcf)	Moisture Content (%)
●	**B-3 at 10 ft**	**Silty SAND**	**119.0**	**3.6**

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CONSOLIDATION TEST

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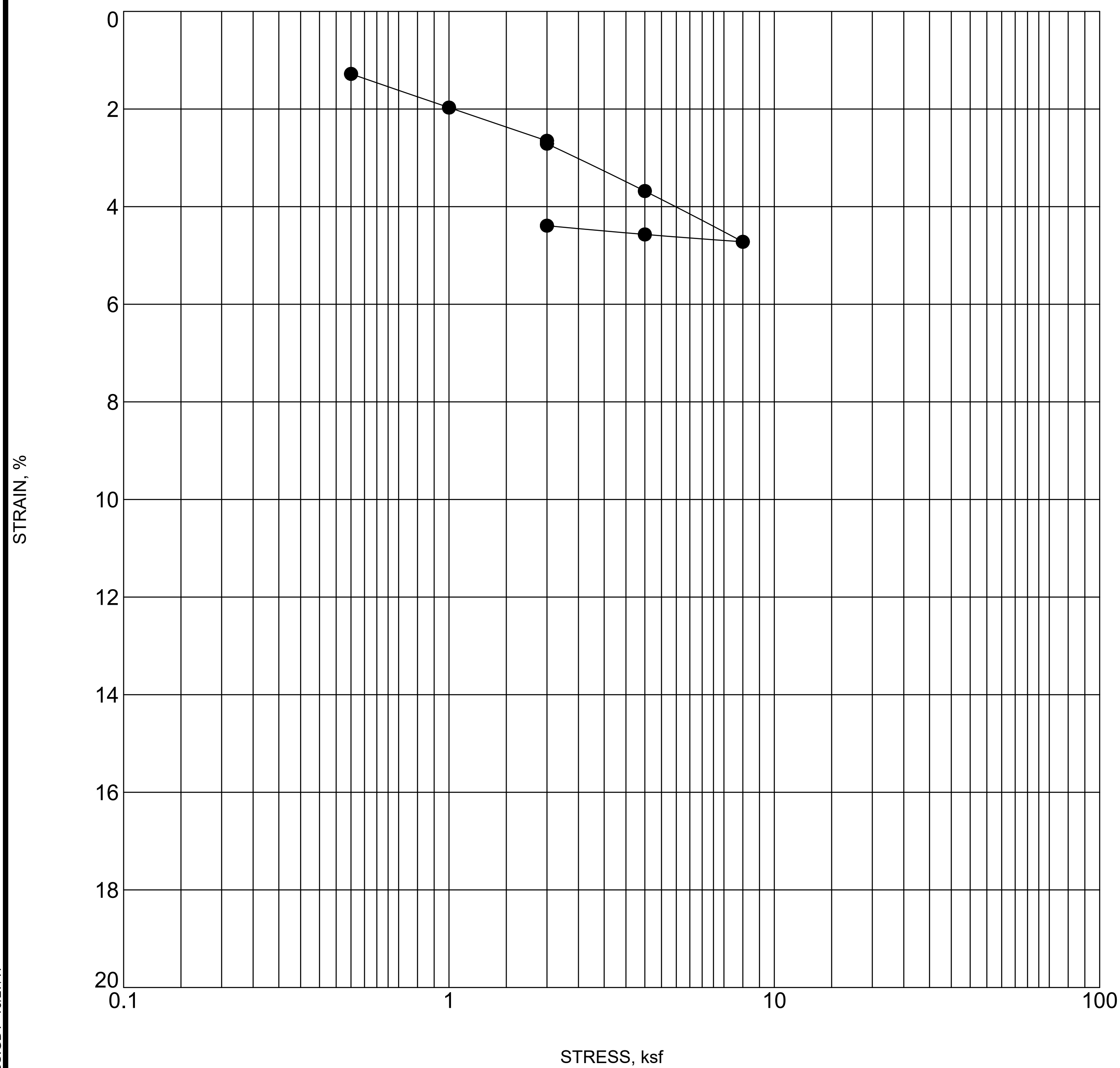
PROJECT NO.	REPORT DATE	FIGURE B-5
170875.3	October 2017	



	Sample Location	Soil Description	Dry Density (pcf)	Moisture Content (%)
●	**B-3 at 20 ft**	**Silty SAND**		

TWINING

CONSOLIDATION TEST

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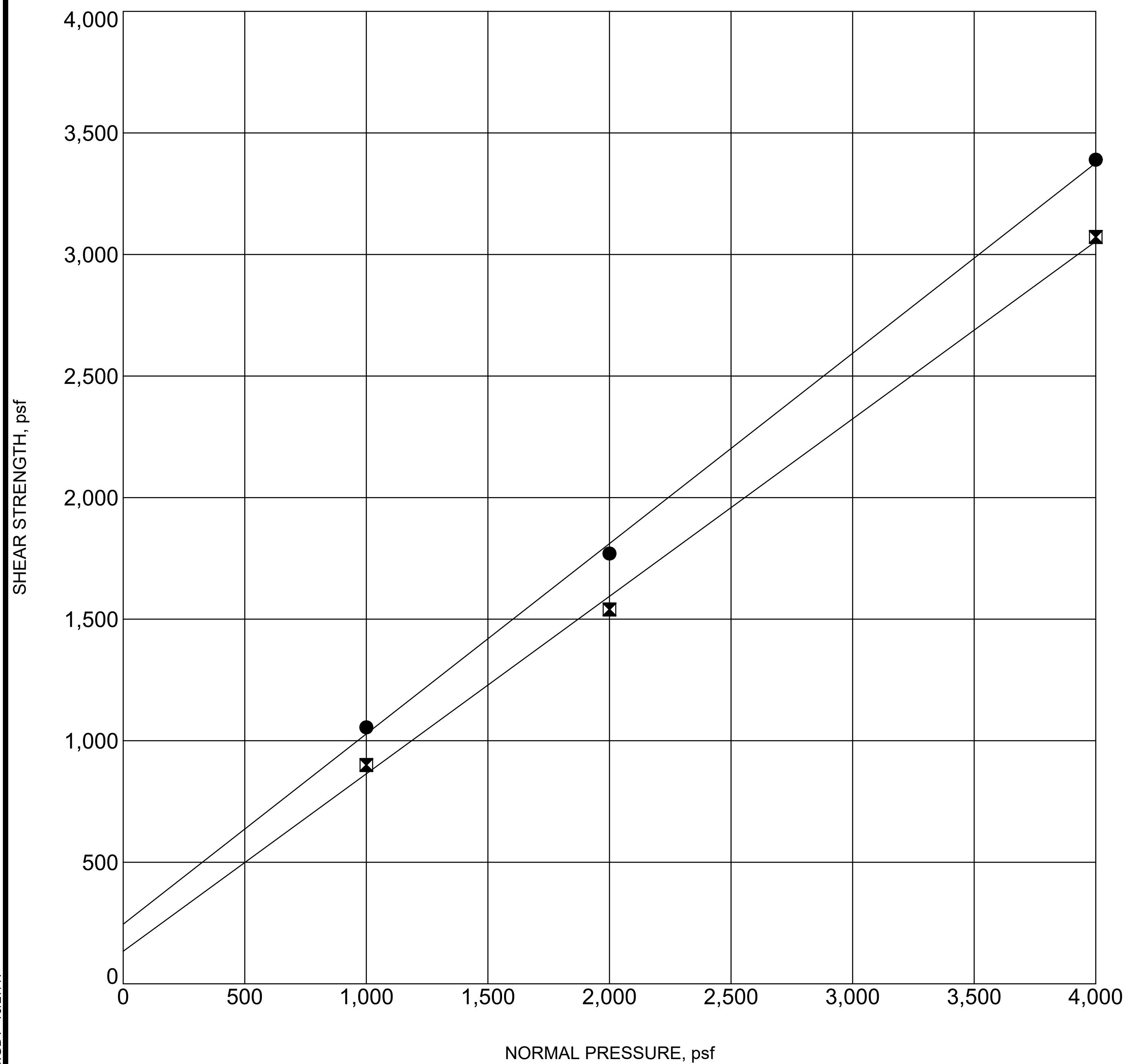
PROJECT NO.	REPORT DATE	FIGURE B-6
170875.3	October 2017	

CONSOL STRAIN 170875.3 - UCR OUTPATIENT PAVILLION.GPJ TWINING LABS.GDT 10/27/17



Boring No.: B-1
Sample Depth (ft): 15
Sample Description: Silty SAND
Strain Rate (in./min): 0.005
Dry Density (pcf): 117.7

Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	245	190
Friction Angle, Ø (deg):	38	37

Initial Moisture (%): 9.2
Final Moisture (%): 17.0

DIRECT SHEAR 170875.3 - UCR OUTPATIENT PAVILLION.GPJ TWINING LABS.GDT 10/27/17

TWINING

DIRECT SHEAR TEST

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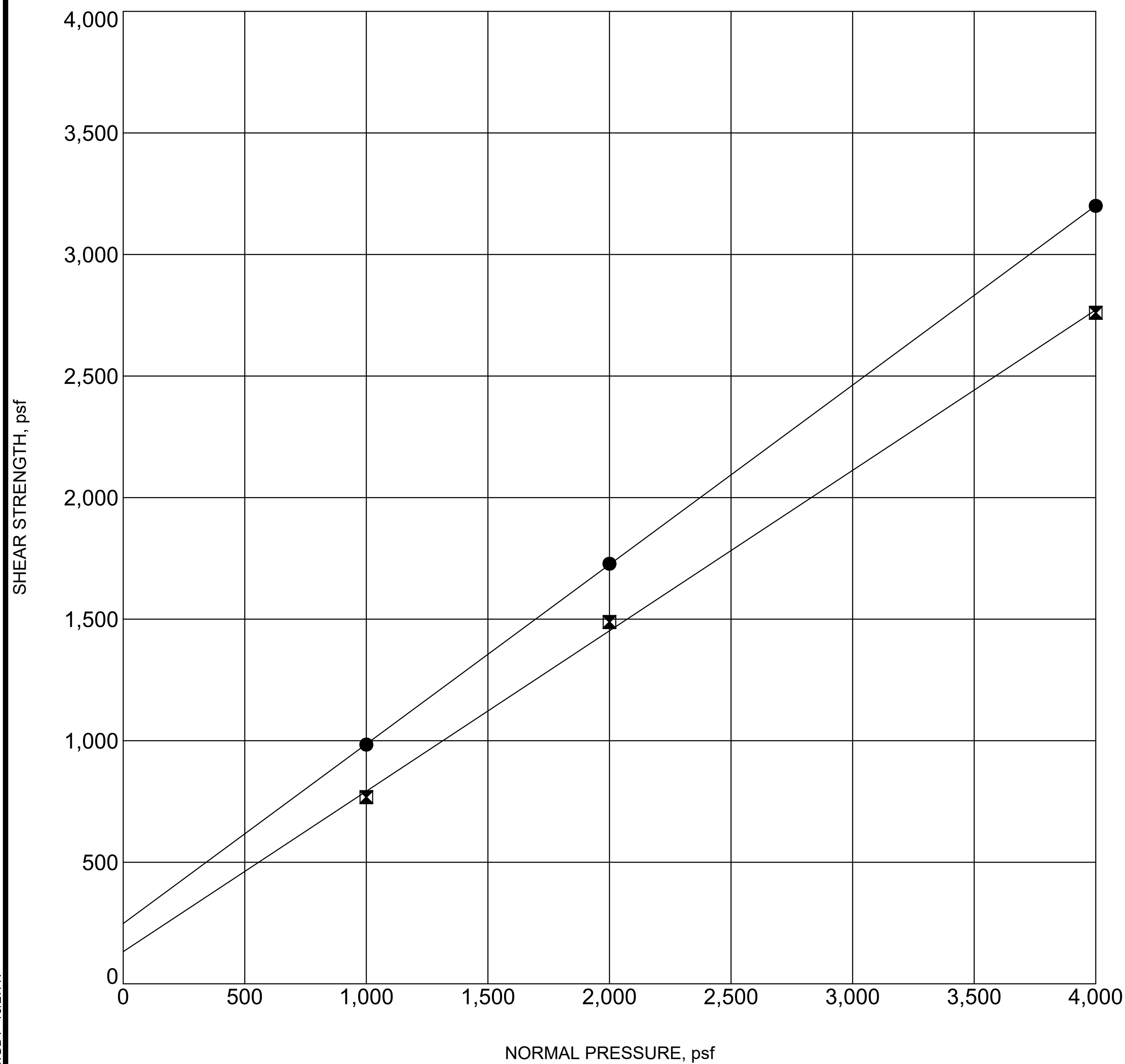
PROJECT NO.	REPORT DATE	FIGURE B-7
170875.3	October 2017	



Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	248	190
Friction Angle, Ø (deg):	36	35

Boring No.: B-1
Sample Depth (ft): 25
Sample Description: Silty SAND
Strain Rate (in./min): 0.005
Dry Density (pcf): 107.4

Initial Moisture (%): 14.3
Final Moisture (%): 14.9

TWINING

DIRECT SHEAR TEST

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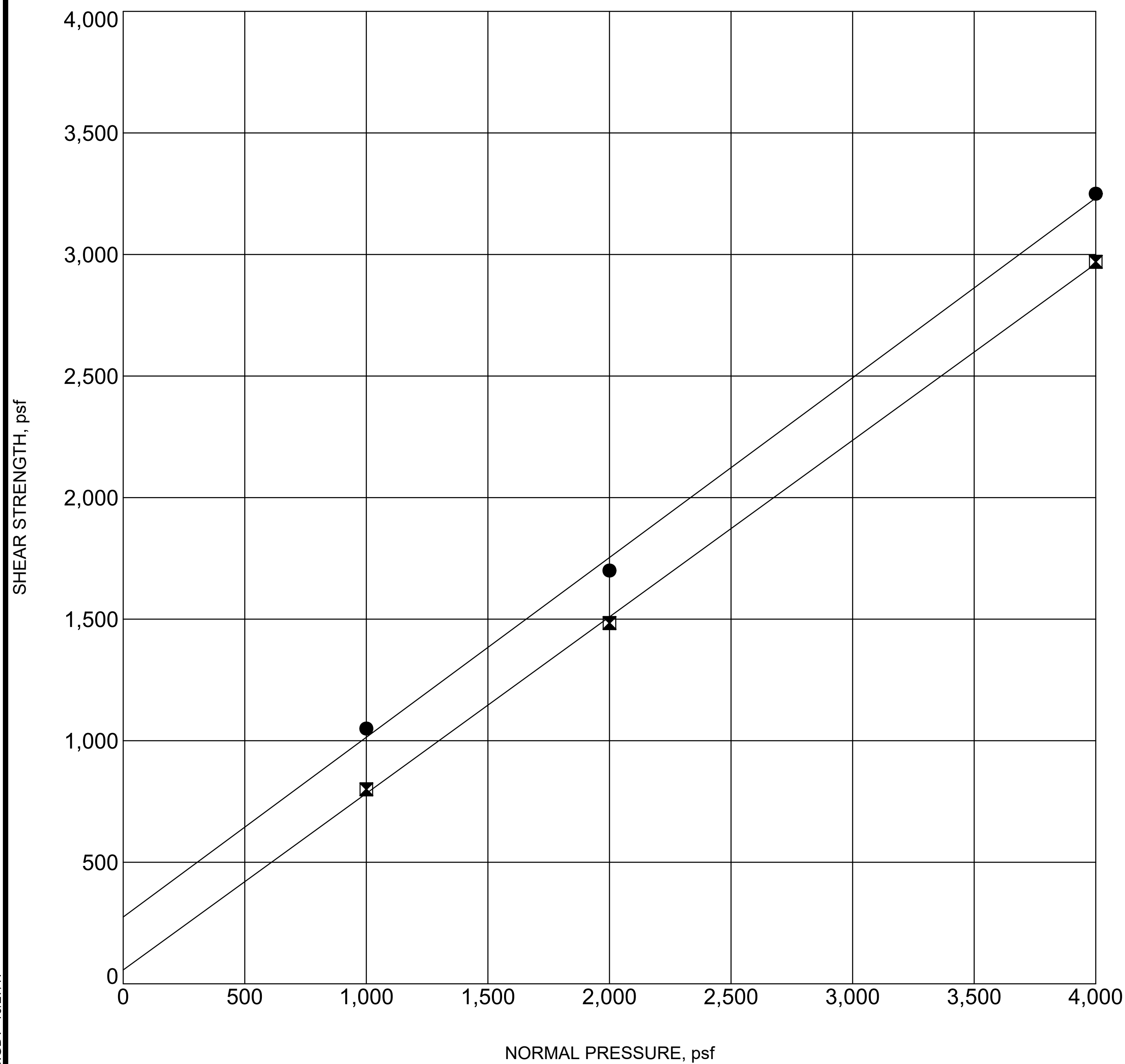
PROJECT NO.	REPORT DATE	FIGURE B-8
170875.3	October 2017	



Boring No.: B-3
Sample Depth (ft): 30
Sample Description:
Strain Rate (in./min): 0.005
Dry Density (pcf): 121.7

Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	275	100
Friction Angle, Ø (deg):	36	36

Initial Moisture (%): 7.0
Final Moisture (%): 11.8

TWINING

DIRECT SHEAR TEST

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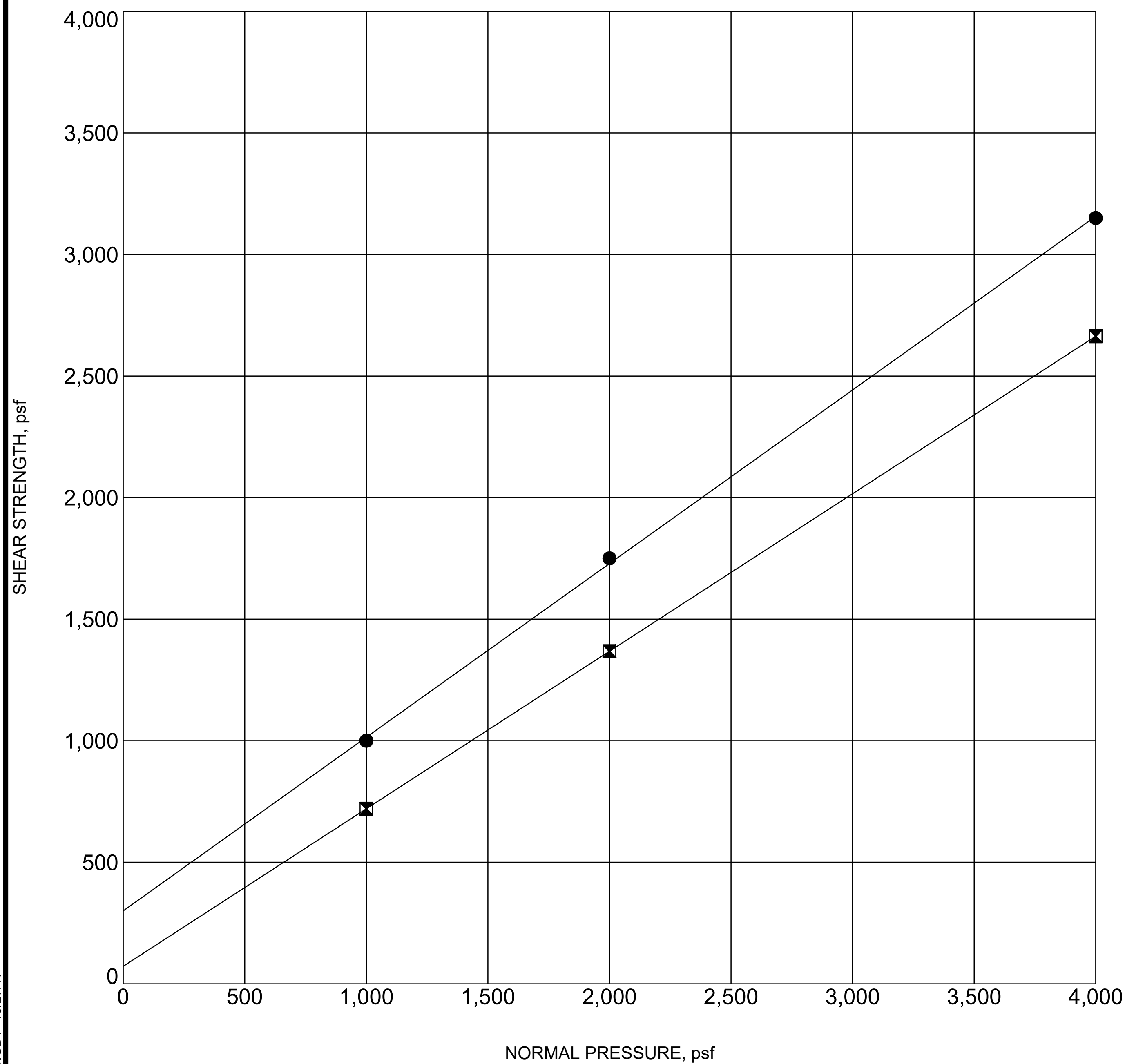
PROJECT NO.	REPORT DATE	FIGURE B-9
170875.3	October 2017	



Shear Strength Parameters

Boring No.:	B-3	
Sample Depth (ft):	40	
Sample Description:		
Strain Rate (in./min):	0.005	
Dry Density (pcf):	127.6	

	Peak	**Ultimate**
Cohesion, C (psf):	300	100
Friction Angle, Ø (deg):	36	35
Initial Moisture (%):	8.9	
Final Moisture (%):	12.7	

TWINING

DIRECT SHEAR TEST

UC Riverside, Outpatient Pavillion
1150 University Avenue
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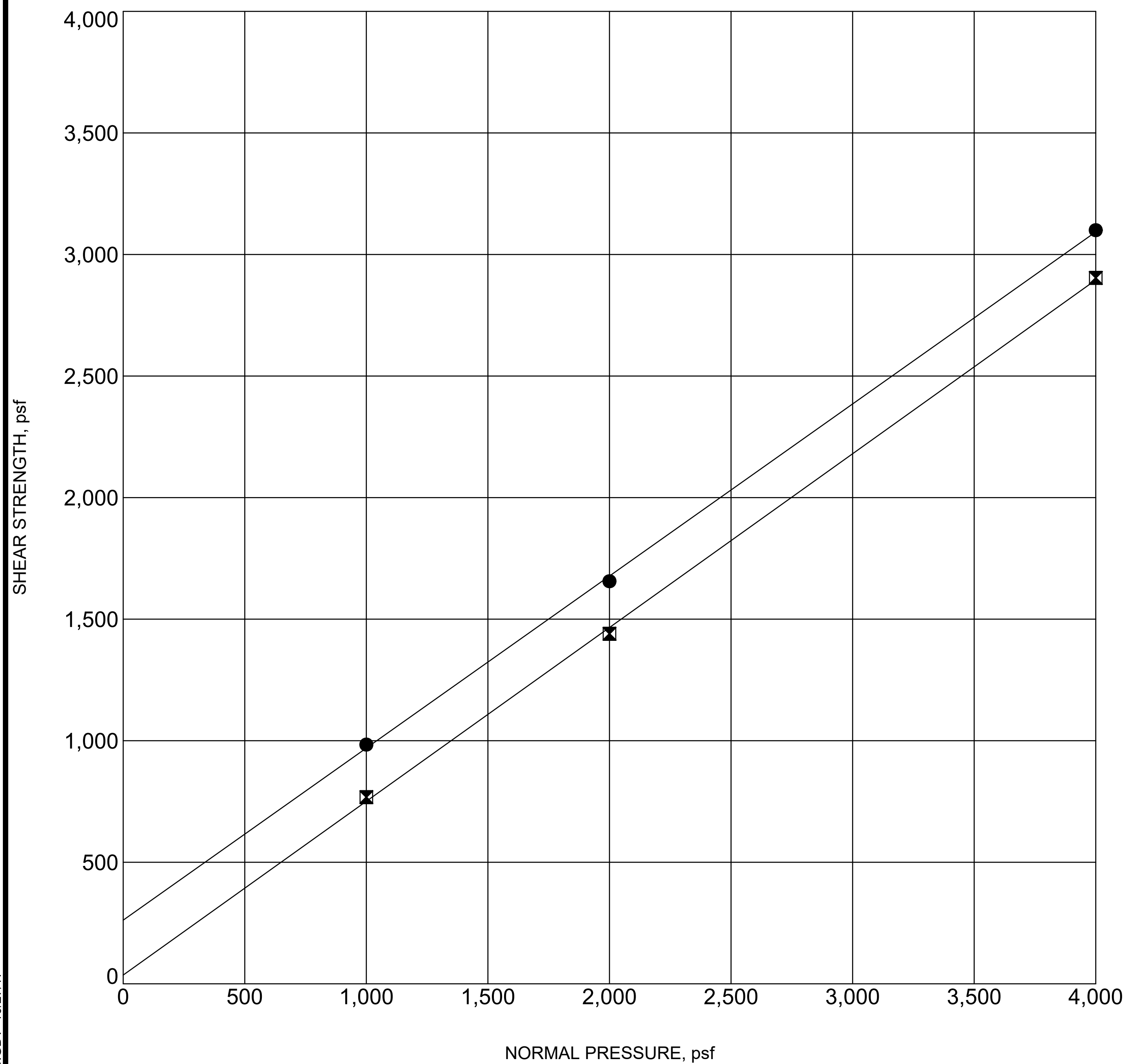
PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE B-10



Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	262	50
Friction Angle, Ø (deg):	35	35

Boring No.: B-5
Sample Depth (ft): 20
Sample Description: Silty SAND
Strain Rate (in./min): 0.005
Dry Density (pcf):

Initial Moisture (%):
Final Moisture (%): 19.0

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TWINING

DIRECT SHEAR TEST

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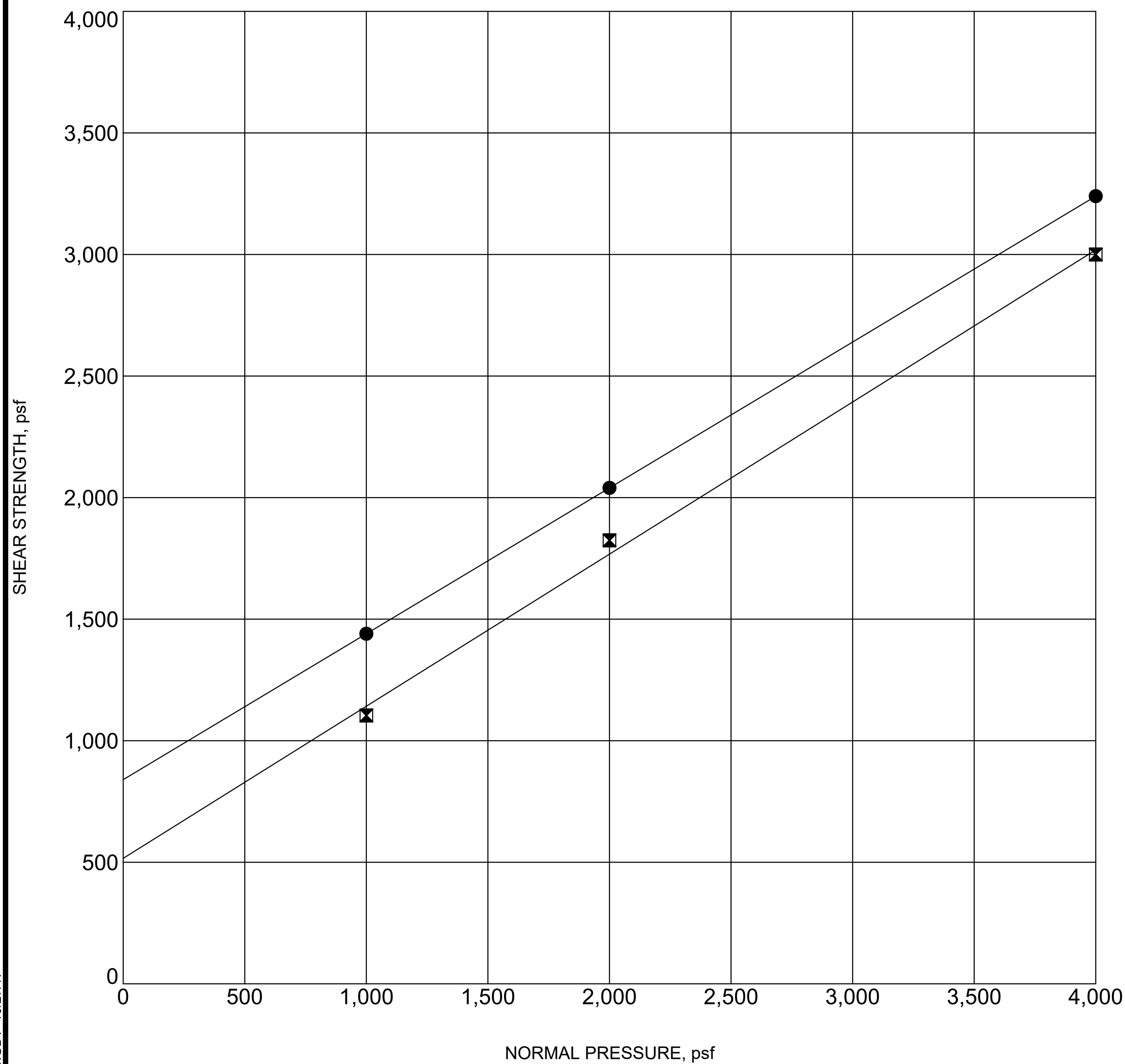
PROJECT NO.	REPORT DATE	
170875.3	October 2017	FIGURE B-11



Boring No.: B-6
Sample Depth (ft): 25
Sample Description: Silty SAND
Strain Rate (in./min): 0.005
Dry Density (pcf): 130.4

Shear Strength Parameters

	Peak	Ultimate
Cohesion, C (psf):	840	505
Friction Angle, Ø (deg):	31	32

Initial Moisture (%): 8.7
Final Moisture (%): 13.4

DIRECT SHEAR 170875.3 - UCR OUTPATIENT PAVILLION.GPJ TWINING LABS.GDT 10/27/17

TWINING

DIRECT SHEAR TEST

UC Riverside, Outpatient Pavillion
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PROJECT NO.	REPORT DATE	FIGURE B-12
170875.3	October 2017	

TWINING

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APPENDIX D
PERCOLATION TESTING

Infiltration Rate Calculation Sheet

Project :	UCR Oasis Hub	Project No. :	220759.3	Date :	12/2/2022
Test Hole No.:	P-1	Tested by :	AB/CDD		
Depth of Test Hole, D_T (in):	60	USCS Soil Classification :	Silty SAND		

Test Hole Dimension (inches)			Length	Width	
Diameter (if round) (inches) =	8.00	Sides (if rectangular) =			

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6" ? (Y/N)
1	7:38 AM	8:03 AM	25	15.8	22.2	6.4	Y
2	9:19 AM	9:44 AM	25	18.6	22.2	3.6	N

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

			Δt	H_o	H_f	ΔH	
Trial No.	**Start Time**	**Stop Time**	**Time Interval (min.)**	**Initial Water Height (inches)**	**Final Water Height (inches)**	**Change in Water Level (inches)**	**Tested Infiltration Rate**
1	9:53 AM	10:23 AM	30	42.96	38.40	4.56	0.43
2	10:23 AM	10:53 AM	30	44.40	39.36	5.04	0.46
3	10:53 AM	11:23 AM	30	44.16	39.60	4.56	0.42
4	11:23 AM	11:53 AM	30	43.20	38.64	4.56	0.42
5	11:53 AM	12:23 PM	30	43.80	39.48	4.32	0.40
6	12:24 PM	12:54 PM	30	43.08	38.76	4.32	0.40
7	12:54 PM	1:24 PM	30	43.20	38.64	4.56	0.42

Infiltration Rate with a factor of safety of 3 = 0.1 inch /hr

Infiltration Rate Calculation Sheet

Project :	UCR Clean Technology Park		Project No. :	220759.3		Date :	12/2/2022
	Test Hole No.:	P-2	Tested by :	AB/CDD			
Depth of Test Hole, D_T (in):		60	USCS Soil Classification :		Silty SAND		
Test Hole Dimension (inches)					Length	Width	
Diameter (if round) (inches) =		8.00	Sides (if rectangular) =				

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6" ? (Y/N)
1	7:38 AM	8:03 AM	25	30.0	38.4	8.4	Y
2	8:10 AM	8:35 PM	745	25.2	36.2	11.0	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

			Δt	H_o	H_f	ΔH	
Trial No.	**Start Time**	**Stop Time**	**Time Interval (min.)**	**Initial Water Height (inches)**	**Final Water Height (inches)**	**Change in Water Level (inches)**	**Tested Infiltration Rate**
1	8:37 AM	8:47 AM	10	40.20	33.36	6.84	2.12
2	8:48 AM	8:58 AM	10	36.48	32.40	4.08	1.34
3	9:09 AM	9:19 AM	10	36.84	32.28	4.56	1.50
4	9:21 AM	9:31 AM	10	36.00	32.04	3.96	1.32
5	9:32 AM	9:42 AM	10	36.24	32.52	3.72	1.23
6	1:18 PM	1:28 PM	10	38.40	34.44	3.96	1.24

Infiltration Rate with a factor of safety of 3 = 0.4 inch /hr

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APPENDIX E
PREVIOUS PERCOLATION TESTING

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Appendix C
Percolation Testing

Two percolation tests were performed at the project site as shown on Figure 2 – Site Location and Exploration Location Map. Percolation testing was on September 29, 2017 in general conformance with the County of Riverside requirements.

The purpose of the tests was to evaluate the infiltration rates of subgrade soils. At the completion of the boring excavation, a 3-inch diameter slotted PVC pipe was inserted in the borehole. The borehole was presoaked prior to testing. After the completion of presoaking, the borings were filled with water to a minimum depth of 12 inches above the bottom of excavation. Upon completion of the borings and testing, the boreholes were backfilled with soil from the cuttings as noted in the Log of Borings.

The lowest reading was used to determine the infiltration rate. A summary of test results is presented in Table C-1 and the detailed test data is attached to this appendix.

Table C-1 - Summary of Percolation Test Results

Test Location	Depth of Test Hole (ft.)	Design Infiltration Rate (in/hr)
B-7	+/- 30	0.1
B-8	+/- 10	0.9

It is our opinion that an infiltration BMP facility may be feasible at this site. Once the location and depth of the proposed system is determined by the civil engineer, we will review and provide our updated recommendations. At the minimum, any infiltration system should be located at least 15 feet away from any existing and proposed building foundations.

Infiltration Rate Calculation Sheet

Project :	UCR - Outpatient Pavillion		Project No. :	170875.3		Date :	9/29/2017
Test Hole No.:		B-7	Tested by :	SL			
Depth of Test Hole, D_T (in):		360	USCS Soil Classification :		SM		
Test Hole Dimension (inches)					Length	Width	
Diameter (if round) (inches) =		8	Sides (if rectangular) =				

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6" ? (Y/N)
1	7:51 AM	8:51 AM	60	248.4	360.0	111.6	Y
2	8:51 AM	9:51 AM	60	252.0	360.0	108.0	Y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

			Δt	H_o	H_f	ΔH	
Trial No.	**Start Time**	**Stop Time**	**Time Interval (min.)**	**Initial Water Height (inches)**	**Final Water Height (inches)**	**Change in Water Level (inches)**	**Tested Infiltration Rate**
1	9:48 AM	9:58 AM	10	123.60	121.20	2.40	0.2
2	9:58 AM	10:08 AM	10	121.20	114.00	7.20	0.7
3	10:08 AM	10:18 AM	10	114.00	109.20	4.80	0.5
4	10:18 AM	10:28 AM	10	109.20	105.60	3.60	0.4
5	10:28 AM	10:38 AM	10	105.60	104.28	1.32	0.1
6	10:38 AM	10:48 AM	10	104.28	102.12	2.16	0.2
7	10:48 AM	10:58 AM	10	102.12	100.32	1.80	0.2
8	10:58 AM	11:08 AM	10	109.20	106.32	2.88	0.3
9							
10							
11							
12							
13							
14							
15							

Recommended Infiltration Rate = Min. Tested Rate/2 = 0.1 inch /hr

Infiltration Rate Calculation Sheet

Project :	UCR - Outpatient Pavillion		Project No. :	170875.3		Date :	9/29/2017
	Test Hole No.:	B-8	Tested by :	SL			
Depth of Test Hole, D_T (in):		120	USCS Soil Classification :		SM		
Test Hole Dimension (inches)					Length	Width	
Diameter (if round) (inches) =		8	Sides (if rectangular) =				

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6" ? (Y/N)
1	9:04 AM	10:04 AM	60	48.6	105.6	57.0	Y
2	10:05 AM	11:05 AM	60	96.0	105.6	9.6	Y

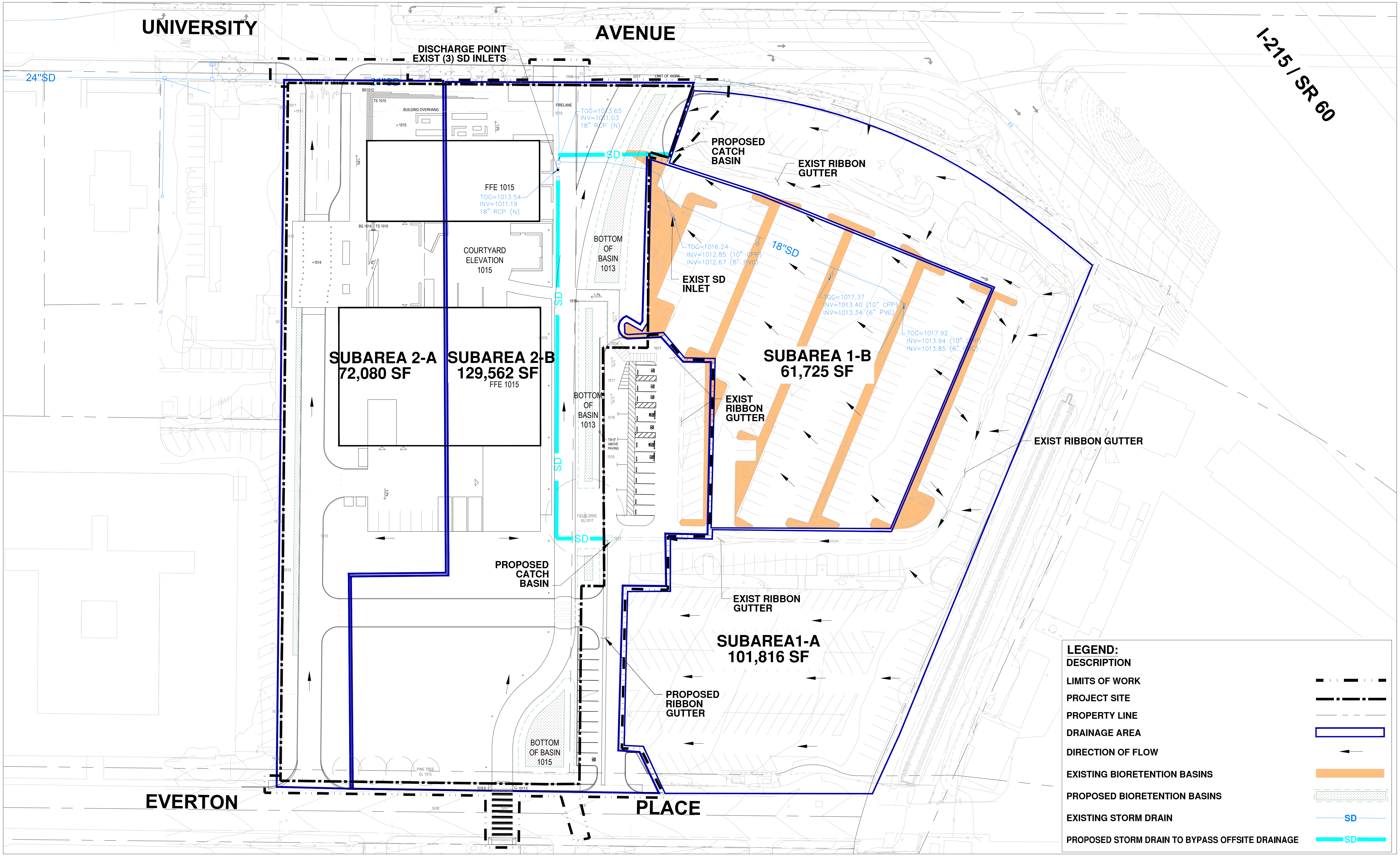
*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

			Δt	H_o	H_f	ΔH	
Trial No.	**Start Time**	**Stop Time**	**Time Interval (min.)**	**Initial Water Height (inches)**	**Final Water Height (inches)**	**Change in Water Level (inches)**	**Tested Infiltration Rate**
1	11:07 AM	11:47 AM	40	24.00	8.16	15.84	2.6
2	11:50 AM	12:20 PM	30	24.60	15.00	9.60	1.8
3	12:22 PM	12:52 PM	30	28.20	16.68	11.52	1.9
4	12:54 PM	1:24 PM	30	31.80	19.20	12.60	1.8
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

Recommended Infiltration Rate = Min. Tested Rate/2 = 0.9 inch /hr

APPENDIX C

Exhibits



PWQMP EXHIBIT

0' 40' 80' 160'

APPENDIX D

BMP Design Details

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries
	DMA 2-A		Calculated Cells

Company Name:	Psomas	Date:	6/8/2023
Designed by:	A.P.	County/City Case No.:	

Design Volume

Enter the area tributary to this feature	A_T=	1.65	acres
Enter V_{BMP} determined from Section 2.1 of this Handbook	V_{BMP}=	1,681	ft^3

Type of Bioretention Facility Design

○ Side slopes required (parallel to parking spaces or adjacent to walkways)

◉ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer	d_S =	2.0	ft
Top Width of Bioretention Facility, excluding curb	w_T =	4.5	ft

Total Effective Depth, d_E

$$d_E = [(0.3) \times d_S + (0.4) \times 1] + 0.5$$

d_E = 1.50 ft

Minimum Surface Area, A_m

$$A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$$

A_M = 1,121 ft^2

Proposed Surface Area	A=	1,865	ft^2
Minimum Required Length of Bioretention Facility, L	L =	249.1	ft

Bioretention Facility Properties

Side Slopes in Bioretention Facility	z =		:1
Diameter of Underdrain			inches
Longitudinal Slope of Site (3% maximum)			%
6" Check Dam Spacing			feet

Describe Vegetation:

Notes:

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries
	DMA 2-B		Calculated Cells

Company Name: Psomas — Date: 6/8/2023

Designed by: A.P. — County/City Case No.:

Design Volume

Enter the area tributary to this feature — A_T= 2.97 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook — V_{BMP}= 3,734 ft^3

Type of Bioretention Facility Design

- (●) Side slopes required (parallel to parking spaces or adjacent to walkways)
- ( ) No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer — d_S = 2.0 ft

Top Width of Bioretention Facility, excluding curb — w_T = 10.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ — d_E = 1.43 ft

Minimum Surface Area, A_m

$$A_M\,(ft^2) = \frac{V_{BMP}\,(ft^3)}{d_E\,(ft)}$$

A_M = 2,612 ft^2

Proposed Surface Area — A= 5,100 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility — z = :1

Diameter of Underdrain — inches

Longitudinal Slope of Site (3% maximum) — %

6" Check Dam Spacing — feet

Describe Vegetation:

Notes:

Bioretention Facility - Design Procedure	BMP ID	Legend:	Required Entries
	DMA 2-B + 1-A		Calculated Cells

Company Name:	Psomas	Date:	6/8/2023
Designed by:	A.P.	County/City Case No.:	

Design Volume

Enter the area tributary to this feature — A_T= 5.12 acres

Enter V_{BMP} determined from Section 2.1 of this Handbook — V_{BMP}= 8,275 ft^3

Type of Bioretention Facility Design

◉ Side slopes required (parallel to parking spaces or adjacent to walkways)

○ No side slopes required (perpendicular to parking space or Planter Boxes)

Bioretention Facility Surface Area

Depth of Soil Filter Media Layer — d_S = 2.0 ft

Top Width of Bioretention Facility, excluding curb — w_T = 10.0 ft

Total Effective Depth, d_E

$d_E = (0.3) \times d_S + (0.4) \times 1 - (0.7/w_T) + 0.5$ — d_E = 1.43 ft

Minimum Surface Area, A_m

$$A_M\ (ft^2) = \frac{V_{BMP}\ (ft^3)}{d_E\ (ft)}$$ — A_M = 5,787 ft^2

Proposed Surface Area — A= 6,965 ft^2

Bioretention Facility Properties

Side Slopes in Bioretention Facility — z = :1

Diameter of Underdrain — inches

Longitudinal Slope of Site (3% maximum) — %

6" Check Dam Spacing — feet

Describe Vegetation:

Notes:

Permeable Pavement - Design Procedure	BMP ID	Legend:	Required Entries
	DMA 2-A		Calculated Cells

Company Name: Psomas — Date: 6/13/2023

Designed by: A.P. — County/City Case No.:

Design Volume

Enter the area tributary to this feature — A_T= 1.65 acres

Enter V_{BMP} determines from Section 2.1 of this Handbook — V_{BMP}= 1,681 ft^3

Permeable Pavement Surface Area

Reservoir Layer Depth, b_{TH} — b_{TH}= 12 inches

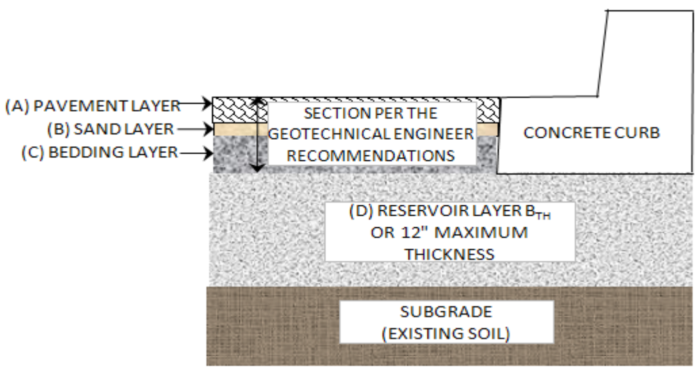
Minimum Surface Area Required, A_S

$$A_{S\,(ft)} = \frac{V_{BMP}\,(ft^3)}{(0.4 \times b_{TH}\,(in)) / 12(in/ft)}$$

A_S= 4,203 ft^2

Proposed Surface Area = 5,814 ft^2

Permeable Pavement Cross Section



Per the Geotechnical	(A)		in
Engineer's	(B)		in
Recommendations	(C)		in
Reservoir Layer	(D)	12	in
Total Permeable Pavement Section			in
Slope of Permeable Pavement			%

Sediment Control Provided? (Use pulldown)

Geotechnical report attached? (Use pulldown)

Describe Surrounding Vegetation:

Notes:

If the permeable pavement has been designed correctly, there should be no error messages on the spreadsheet.

3.3 Permeable Pavement

Type of BMP	LID - Infiltration
Treatment Mechanisms	Infiltration, Evaporation
Maximum Drainage Area	10 acres
Other Names	porous pavement, pervious concrete, pervious asphalt, pervious gravel pavement, cobblestone block, modular block, modular pavement

Description

Permeable pavements can be either pervious asphalt and concrete surfaces, or permeable modular block. Unlike traditional pavements that are impermeable, permeable pavements reduce the volume and peak of stormwater runoff as well as mitigate pollutants from stormwater runoff, provided that the underlying soils can accept infiltration. Permeable pavement surfaces work best when they are designed to be flat or with gentle slopes. This factsheet discusses criteria that apply to infiltration designs.

The permeable surface is placed on top of a reservoir layer that holds the water quality stormwater volume, $V_{BMP.}$ The water infiltrates from the reservoir layer into the native subsoil. Tests must be performed according to the Infiltration Testing Section in Appendix A to be able to use this design procedure.

In some circumstances, permeable pavement may be implemented on a project as a source control feature. Where implemented as a source control feature (sometimes referred to as a 'self-retaining' area), the pavement is not considered a 'BMP' that would be required to be designed and sized per this manual. Where permeable pavement receives runoff from adjacent tributary areas, the permeable pavement *may* be considered a BMP that must be sized according to this manual. Consult the Engineering Authority and the WQMP for any applicable requirements for designing and sizing permeable pavement installations.

Siting Considerations

The WQMP applicable to the project location should be consulted, as it may include criteria for determining the applicability of this and other Infiltration-based BMPs to the project.

Permeable pavements can be used in the same manner as concrete or asphalt in low traffic parking lots, playgrounds, walkways, bike trails, and sports courts. Most types of permeable pavement can be designed to meet Americans with Disabilities Act (ADA) requirements. Permeable pavements **should not** be used in the following conditions:

- Downstream of erodible areas
- Downstream of areas with a high likelihood of pollutant spills
- Industrial or high vehicular traffic areas (25,000 or greater average daily traffic)
- Areas where geotechnical concerns, such as soils with low infiltration rates, would preclude the use of this BMP.

Sites with Impermeable Fire Lanes

Oftentimes, Fire Departments do not allow alternative pavement types including permeable pavement. They require traditional impermeable surfaces for fire lanes. In this situation, it is acceptable to use an impermeable surface for the fire lane drive aisles and permeable pavement for the remainder of the parking lot.

Where impermeable fire lanes are used in the design, the impermeable surface must slope towards the permeable pavement, and the base layers shall remain continuous underneath the two pavement types, as shown in Figure 1. This continuous reservoir layer helps to maintain infiltration throughout the pervious pavement site, and can still be considered as part of the total required storage area.

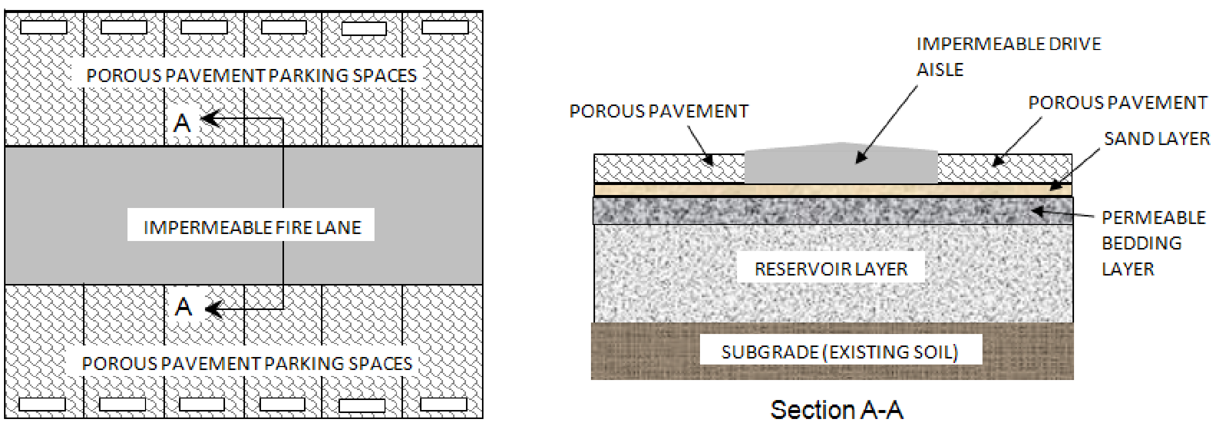


Figure 1: Impermeable Fire Lanes

Also, while a seal coat treatment may be used on the impermeable fire land, traditional seal coat treatments **shall not** be used on permeable pavement.

Setbacks

Always consult your geotechnical engineer for site specific recommendations regarding setbacks for permeable pavement. Recommended setbacks are needed to protect buildings, walls, onsite wells, streams and tanks.

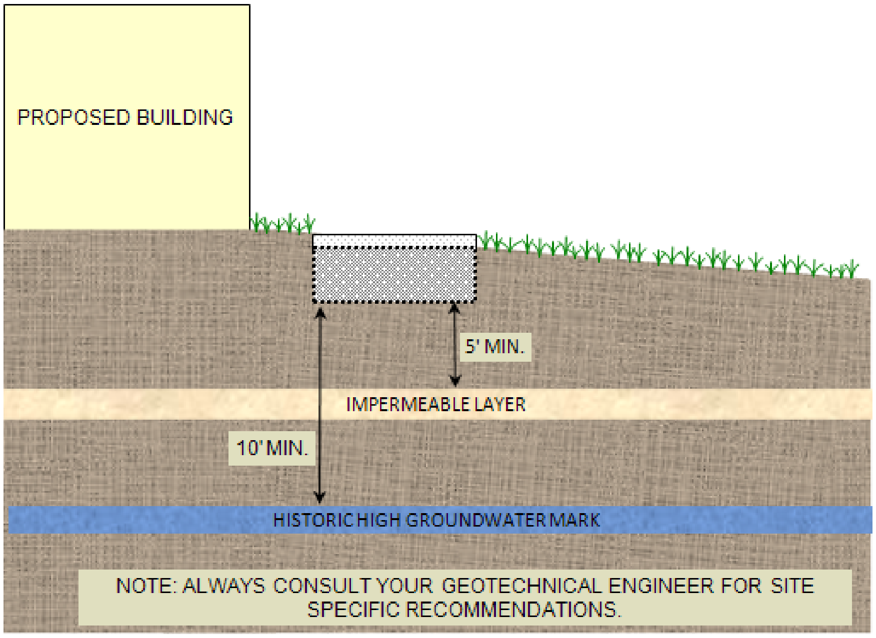


Figure 2: Permeable Pavement Setback Requirements

A minimum vertical separation of 10 feet is required from the bottom of the reservoir layer to the historic high groundwater mark, see Figure 2. A minimum vertical separation of 5 feet is required from the bottom of the reservoir layer to any impermeable layer in the soil. If the historic high groundwater mark is less than 10 feet below the reservoir layer section, or less than 5 feet from an impermeable layer, the infiltration design is not feasible.

Design and Sizing Criteria

To ensure that the pavement structural section is not compromised, a 24-hour drawdown time is utilized for this BMP instead of the longer drawdown time used for most volume based BMPs.

Reservoir Layer Considerations
Even with proper maintenance, sediment will begin to clog the soil below the permeable pavement. Since the soil cannot be scarified or replaced, this will result in slower infiltration rates over the life of the permeable pavement. Therefore, the reservoir layer is limited to a maximum of 12 inches in depth to ensure that over the life of the BMP, the reservoir layer will drain in an adequate time.

***Note**: All permeable pavement BMP installations (not including Permeable Pavement as a source control BMP i.e. a self-retaining area) must be tested by the geotechnical engineer to ensure that the soils drain at a minimum allowable rate to ensure drainage.. See the Infiltration Testing Section of this manual for specific details for the required testing and applied factors of safety.*

Sloping Permeable Pavement

Ideally permeable pavement would be level, however most sites will have a mild slope. If the tributary drainage area is too steep, the water may be flowing too fast when it approaches the permeable pavement, which may cause water to pass over the pavement instead of percolating and entering the reservoir layer. If the maximum slopes shown in Table 1 are complied with, it should address these concerns.

Table 1: Design Parameters for Permeable Pavement

Design Parameter	Permeable Pavement
Maximum slope of permeable pavement	3%
Maximum contributing area slope	5%

Regardless of the slope of the pavement surface design, the bottom of the reservoir layers **shall be flat and level** as shown in Figure 3. The design shown ensures that the water quality volume will be contained in the reservoir layer. A terraced design utilizing non-permeable check dams may be a useful option when the depth of gravel becomes too great as shown in Figure 3.

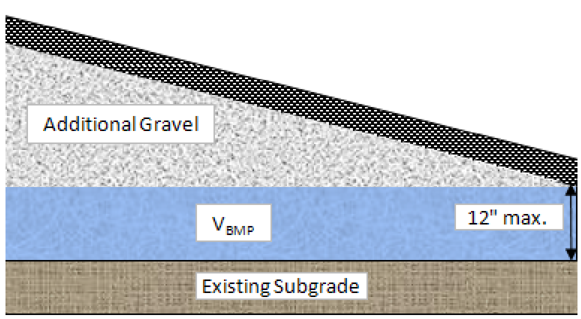


Figure 3: Sloped Cross Sections for Permeable Pavement

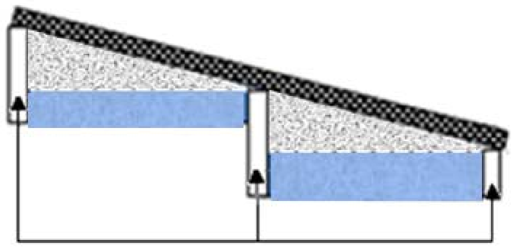


Figure 4: Permeable Pavement with Non-permeable Check Dams

In Figure 4, the bottom of the gravel reservoir layer is incorrectly sloped parallel to the pavement surface. Water would only be allowed to pond up to the lowest point of the BMP. Additional flows would simply discharge from the pavement. Since only a portion of the gravel layer can store water, this design would result in insufficient capacity. This is not acceptable.

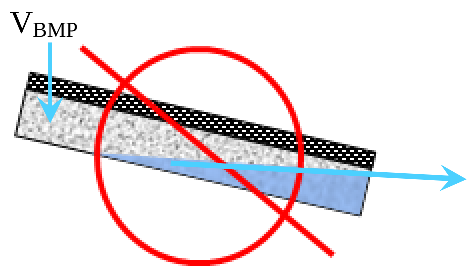


Figure 5: Incorrect Sloping of Permeable Pavement

To assure that the subgrade will empty within the 24 hour drawdown time, it is important that the maximum depth of 12 inches for the reservoir layer discussed in the design procedure is not exceeded. The value should be measured from the lowest elevation of the slope (Figure 4).

Minimum Surface Area

The minimum surface area required, A_S, is calculated by dividing the water quality volume, V_{BMP}, by the depth of water stored in the reservoir layer. The depth of water is found by multiplying the void ratio of the reservoir aggregate by the depth of the layer, b_{TH}. The void ratio of the reservoir aggregate is typically 40%; the maximum reservoir layer depth is 12”.

Sediment Control

A pretreatment BMP should be used for sediment control. This pretreatment BMP will reduce the amount of sediment that enters the system and reduce clogging. The pretreatment BMP will also help to spread runoff flows, which allows the system to infiltrate more evenly. The pretreatment BMP must discharge to the surface of the pavement and not the subgrade. Grass swales may also be used as part of a treatment train with permeable pavements.

Liners and Filter Fabric

Always consult your geotechnical engineer for site specific recommendations regarding liners and filter fabrics. Filter fabric may be used around the edges of the permeable pavement; this will help keep fine sediments from entering the system. Unless recommended for the site, impermeable liners are not to be used below the subdrain gravel layer.

Overflow

An overflow route is needed in the permeable pavement design to bypass storm flows larger than the V_{BMP} or in the event of clogging. Overflow systems must connect to an acceptable discharge point such as a downstream conveyance system.

Roof Runoff

Permeable pavement can be used to treat roof runoff. However, the runoff cannot be discharged beneath the surface of the pavement directly into the subgrade, as shown in Figure 6. Instead the pipe should empty on the surface of the permeable pavement as shown in Figure 7. A filter on the drainpipe should be used to help reduce the amount of sediment that enters the permeable pavement.

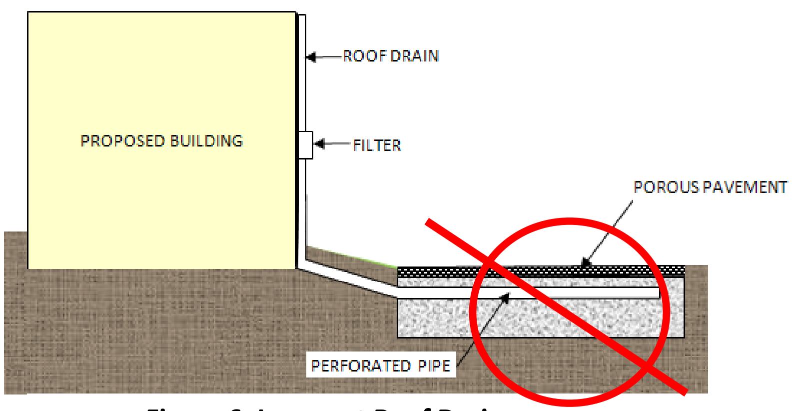


Figure 6: Incorrect Roof Drainage

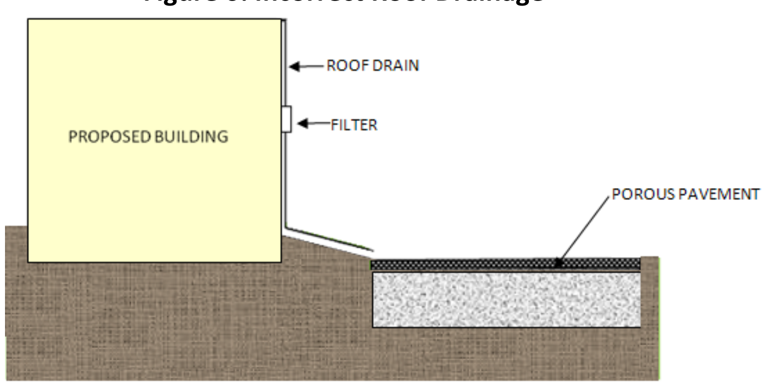


Figure 7: Correct Roof Runoff Drainage

Infiltration

Refer to the Infiltration Testing Section (Appendix A) in this manual for recommendations on testing for this BMP.

Pavement Section

The cross section necessary for infiltration design of permeable pavement includes:

- The thickness of the layers of permeable pavement, sand and bedding layers depends on whether it is permeable modular block or pervious pavement. A licensed geotechnical or civil engineer is required to determine the thickness of these upper layers appropriate for the pavement type and expected traffic loads.
- A 12” maximum reservoir layer consisting of AASHTO #57 gravel vibrated in place or equivalent with a minimum of 40% void ratio.

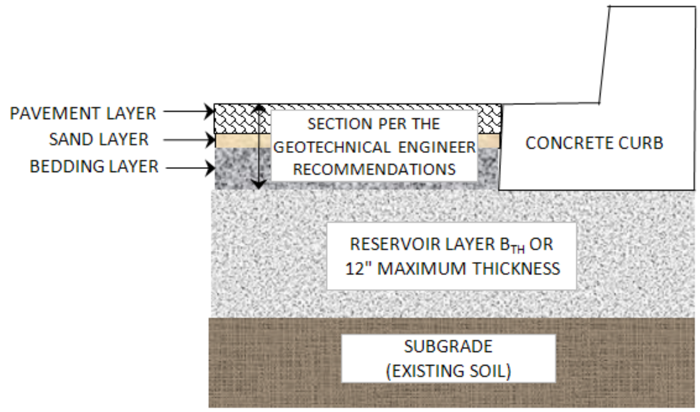


Figure 8: Infiltration Cross Section

Inspection and Maintenance Schedule –Modular Block

Schedule	Activity
Ongoing	• Keep adjacent landscape areas maintained. Remove clippings from landscape maintenance activities. • Remove trash and debris
Utility Trenching and other pavement repairs	• Remove and reset modular blocks, structural section and reservoir layer as needed. Replace damaged blocks in-kind. • Do not pave repaired areas with impermeable surfaces.
After storm events	• Inspect areas for ponding
2-3 times per year	• Sweep to reduce the chance of clogging
As needed	• Sand between pavers may need to be replaced if infiltration capacity is lost

Inspection and Maintenance Schedule –Pervious Concrete/Asphalt

Schedule	Activity
Ongoing	• Keep adjacent landscape areas maintained. Remove clippings from landscape maintenance activities. • Remove trash and debris
Utility Trenching other pavement repairs	• Replace structural section and reservoir layer in kind. • Re-pave using pervious concrete/asphalt. Do not pave repaired areas with impermeable surfaces.
After storm events	• Inspect areas for ponding
2-3 times per year	• Vacuum the permeable pavement to reduce the chance of clogging
As needed	• Remove and replace damaged or destroyed permeable pavement

Design Procedure Permeable Pavement

1. Enter the Tributary Area, A_T.

2. Enter the Design Volume, $V_{BMP,}$ determined from Section 2.1 of this Handbook.

3. Enter the reservoir layer depth, b_{TH} for the proposed permeable pavement. The reservoir layer maximum depth is 12 inches.

4. Calculate the Minimum Surface Area, A_S, required.

$$A_S(\mathrm{ft}) = \frac{V_{BMP}\ (\mathrm{ft}^3)}{(0.4 \times b_{TH}\ (\mathrm{in}))/12(\mathrm{in/ft})}$$

   Where, the porosity of the gravel in the reservoir layer is assumed to be 40%.

5. Enter the proposed surface area and ensure that this is equal to or greater than the minimum surface area required.

6. Enter the dimensions, per the geotechnical engineer's recommendations, for the pavement cross section. The cross section includes a pavement layer, usually a sand layer and a permeable bedding layer. Then add this to the maximum thickness of the reservoir layer to find the total thickness of the BMP.

7. Enter the slope of the top of the permeable pavement. The maximum slope is 3%.

8. Enter whether sediment control was provided.

9. Enter whether the geotechnical approach is attached.

10. Describe the surfaces surrounding the permeable pavement. It is preferred that a vegetation buffer is used around the permeable pavement.
11. Check to ensure that vertical setbacks are met. There should be a minimum of 10 feet between the bottom of the BMP and the top of the high groundwater table, and a minimum of 5 feet between the reservoir layer the top of the impermeable layer.

Reference Materials Used to Develop this Fact Sheet:

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Camp Dresser and McKee Inc.; Larry Walker Associates. California Stormwater Best Management Practice Handbook for New Development and Redevelopment. California Stormwater Quality Association (CASQA), 2004.

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Taylor, Chuck. "Advanced Pavement Technology." Riverside, 2008.

Tennis, Paul D., Michael L. Leming and David J. Akers. Pervious Concrete Pavements. Silver Spring: Portland Cement Association and National Ready Mixed Concrete Association, 2004.

Urban Drainage and Flood Control District. Urban Storm Drainage Criteria Manual Volume 3 - Best Management Practices. Vol. 3. Denver, 2008. 3 vols.

Urbonas, Ben R. Stormwater Sand Filter Sizing and Design: A Unit Operations Approach. Denver: Urban Drainage and Flood Control District, 2002.

Permeable Pavement - Design Procedure	BMP ID	Legend:	Required Entries
			Calculated Cells

Company Name: Date:

Designed by: County/City Case No.:

Design Volume

Enter the area tributary to this feature A_T= ____ acres

Enter V_{BMP} determines from Section 2.1 of this Handbook V_{BMP}= ____ ft^3

Permeable Pavement Surface Area

Reservoir Layer Depth, b_{TH} b_{TH}= ____ inches

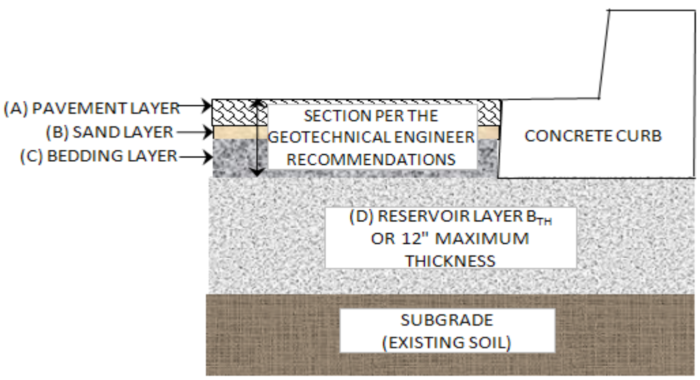
Minimum Surface Area Required, A_S

$$A_{S\ (ft)} = \frac{V_{BMP}\ (ft^3)}{(0.4 \times b_{TH}\ (in))\ /\ 12(in/ft)}$$

A_S= ____ ft^2

Proposed Surface Area = ____ ft^2

Permeable Pavement Cross Section



Per the Geotechnical Engineer's Recommendations	(A)		in
	(B)		in
	(C)		in

Reservoir Layer (D) ____ in

Total Permeable Pavement Section ____ in

Slope of Permeable Pavement ____ %

Sediment Control Provided? (Use pulldown)

Geotechnical report attached? (Use pulldown)

Describe Surrounding Vegetation:

Notes:

If the permeable pavement has been designed correctly, there should be no error messages on the spreadsheet.

3.5 Bioretention Facility

Type of BMP	LID – Bioretention
Treatment Mechanisms	Infiltration, Evapotranspiration, Evaporation, Biofiltration
Maximum Drainage Area	This BMP is intended to be integrated into a project's landscaped area in a distributed manner. Typically, contributing drainage areas to Bioretention Facilities range from less than 1 acre to a maximum of around 10 acres.
Other Names	Rain Garden, Bioretention Cell, Bioretention Basin, Biofiltration Basin, Landscaped Filter Basin, Porous Landscape Detention

Description

Bioretention Facilities are shallow, vegetated basins underlain by an engineered soil media. Healthy plant and biological activity in the root zone maintain and renew the macro-pore space in the soil and maximize plant uptake of pollutants and runoff. This keeps the Best Management Practice (BMP) from becoming clogged and allows more of the soil column to function as both a sponge (retaining water) and a highly effective and self-maintaining biofilter. In most cases, the bottom of a Bioretention Facility is unlined, which also provides an opportunity for infiltration to the extent the underlying onsite soil can accommodate. When the infiltration rate of the underlying soil is exceeded, fully biotreated flows are discharged via underdrains. Bioretention Facilities therefore will inherently achieve the maximum feasible level of infiltration and evapotranspiration and achieve the minimum feasible (but highly biotreated) discharge to the storm drain system.

Siting Considerations

These facilities work best when they are designed in a relatively level area. Unlike other BMPs, Bioretention Facilities can be used in smaller landscaped spaces on the site, such as:

- ✓ Parking islands
- ✓ Medians
- ✓ Site entrances

Landscaped areas on the site (such as may otherwise be required through minimum landscaping ordinances), can often be designed as Bioretention Facilities. This can be accomplished by:

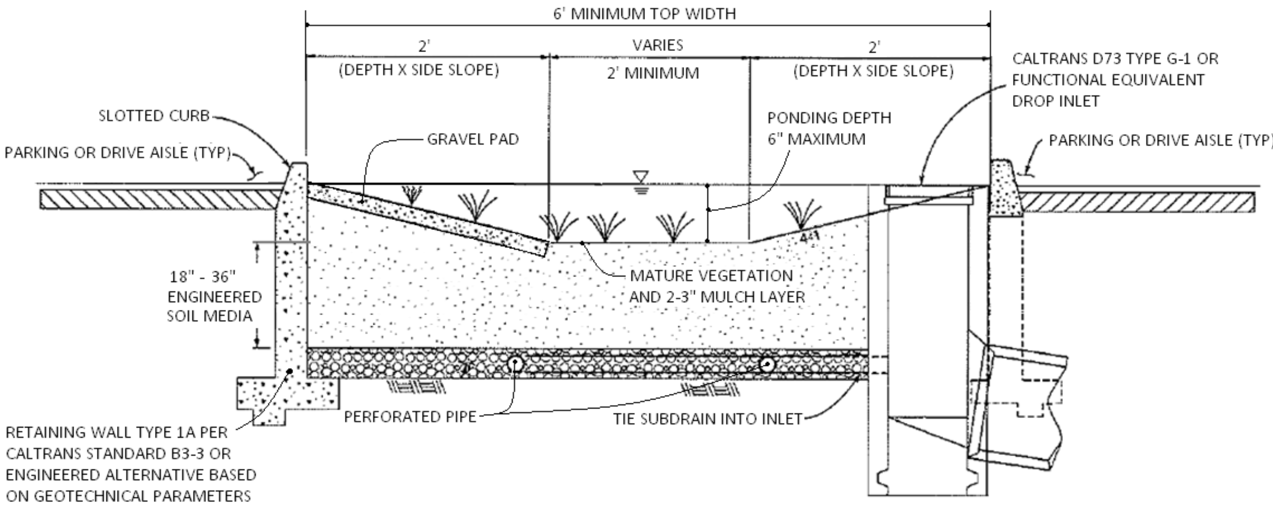
- *Depressing* landscaped areas below adjacent impervious surfaces, rather than elevating those areas
- Grading the site to direct runoff from those impervious surfaces *into* the Bioretention Facility, rather than away from the landscaping
- Sizing and designing the depressed landscaped area as a Bioretention Facility as described in this Fact Sheet

Bioretention Facilities should however not be used downstream of areas where large amounts of sediment can clog the system. Placing a Bioretention Facility at the toe of a steep slope should also be avoided due to the potential for clogging the engineered soil media with erosion from the slope, as well as the potential for damaging the vegetation.

Design and Sizing Criteria

The recommended cross section necessary for a Bioretention Facility includes:

- Vegetated area
- 18' minimum depth of engineered soil media
- 12' minimum gravel layer depth with 6' perforated pipes (added flow control features such as orifice plates may be required to mitigate for HCOC conditions)



While the 18-inch minimum engineered soil media depth can be used in some cases, it is recommended to use 24 inches or a preferred 36 inches to provide an adequate root zone for the chosen plant palate. Such a design also provides for improved removal effectiveness for nutrients. The recommended ponding depth inside of a Bioretention Facility is 6 inches; measured from the flat bottom surface to the top of the water surface as shown in Figure 1.

Because this BMP is filled with an engineered soil media, pore space in the soil and gravel layer is assumed to provide storage volume. However, several considerations must be noted:

- Surcharge storage above the soil surface (6 inches) is important to assure that design flows do not bypass the BMP when runoff exceeds the soil's absorption rate.
- In cases where the Bioretention Facility contains engineered soil media deeper than 36 inches, the pore space within the engineered soil media can only be counted to the 36-inch depth.
- A maximum of 30 percent pore space can be used for the soil media whereas a maximum of 40 percent pore space can be use for the gravel layer.

Figure 1: Standard Layout for a Bioretention Facility

Engineered Soil Media Requirements

The engineered soil media shall be comprised of 85 percent mineral component and 15 percent organic component, by volume, drum mixed prior to placement. The mineral component shall be a Class A sandy loam topsoil that meets the range specified in Table 1 below. The organic component shall be nitrogen stabilized compost[1], such that nitrogen does not leach from the media.

Table 1: Mineral Component Range Requirements

Percent Range	Component
70-80	Sand
15-20	Silt
5-10	Clay

The trip ticket, or certificate of compliance, shall be made available to the inspector to prove the engineered mix meets this specification.

Vegetation Requirements

Vegetative cover is important to minimize erosion and ensure that treatment occurs in the Bioretention Facility. The area should be designed for at least 70 percent mature coverage throughout the Bioretention Facility. To prevent the BMP from being used as walkways, Bioretention Facilities shall be planted with a combination of small trees, densely planted shrubs, and natural grasses. Grasses shall be native or ornamental; preferably ones that do not need to be mowed. The application of fertilizers and pesticides should be minimal. To maintain oxygen levels for the vegetation and promote biodegradation, it is important that vegetation not be completely submerged for any extended period of time. Therefore, a maximum of 6 inches of ponded water shall be used in the design to ensure that plants within the Bioretention Facility remain healthy.

A 2 to 3-inch layer of standard shredded aged hardwood mulch shall be placed as the top layer inside the Bioretention Facility. The 6-inch ponding depth shown in Figure 1 above shall be measured from the top surface of the 2 to 3-inch mulch layer.

Curb Cuts

To allow water to flow into the Bioretention Facility, 1-foot-wide (minimum) curb cuts should be placed approximately every 10 feet around the perimeter of the Bioretention Facility. Figure 2 shows a curb cut in a Bioretention Facility. Curb cut flow lines must be at or above the V_{BMP} water surface level.

[1] For more information on compost, visit the US Composting Council website at: http://compostingcouncil.org/

Figure 2: Curb Cut located in a Bioretention Facility

To reduce erosion, a gravel pad shall be placed at each inlet point to the Bioretention Facility. The gravel should be 1- to 1.5-inch diameter in size. The gravel should overlap the curb cut opening a minimum of 6 inches. The gravel pad inside the Bioretention Facility should be flush with the finished surface at the curb cut and extend to the bottom of the slope.

In addition, place an apron of stone or concrete, a foot square or larger, inside each inlet to prevent vegetation from growing up and blocking the inlet. See Figure 3.

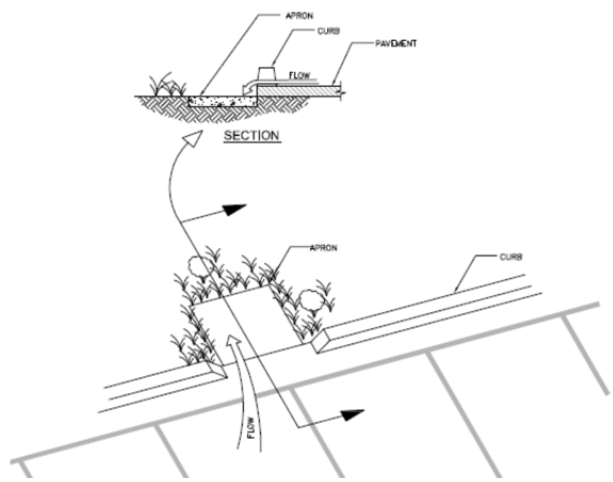


Figure 3: Apron located in a Bioretention Facility

Terracing the Landscaped Filter Basin

It is recommended that Bioretention Facilities be level. In the event the facility site slopes and lacks proper design, water would fill the lowest point of the BMP and then discharge from the basin without being treated. To ensure that the water will be held within the Bioretention Facility on sloped sites, the BMP must be terraced with nonporous check dams to provide the required storage and treatment capacity.

The terraced version of this BMP shall be used on non-flat sites with no more than a 3 percent slope. The surcharge depth cannot exceed 0.5 feet, and side slopes shall not exceed 4:1. Table 2 below shows the spacing of the check dams, and slopes shall be rounded up (i.e., 2.5 percent slope shall use 10' spacing for check dams).

Table 2: Check Dam Spacing

6” Check Dam Spacing	
Slope	**Spacing**
1%	*25'*
2%	*15'*
3%	*10'*

Roof Runoff

Roof downspouts may be directed towards Bioretention Facilities. However, the downspouts must discharge onto a concrete splash block to protect the Bioretention Facility from erosion.

Retaining Walls

It is recommended that Retaining Wall Type 1A, per Caltrans Standard B3-3 or equivalent, be constructed around the entire perimeter of the Bioretention Facility. This practice will protect the sides of the Bioretention Facility from collapsing during construction and maintenance or from high service loads adjacent to the BMP. Where such service loads would not exist adjacent to the BMP, an engineered alternative may be used if signed by a licensed civil engineer.

Side Slope Requirements

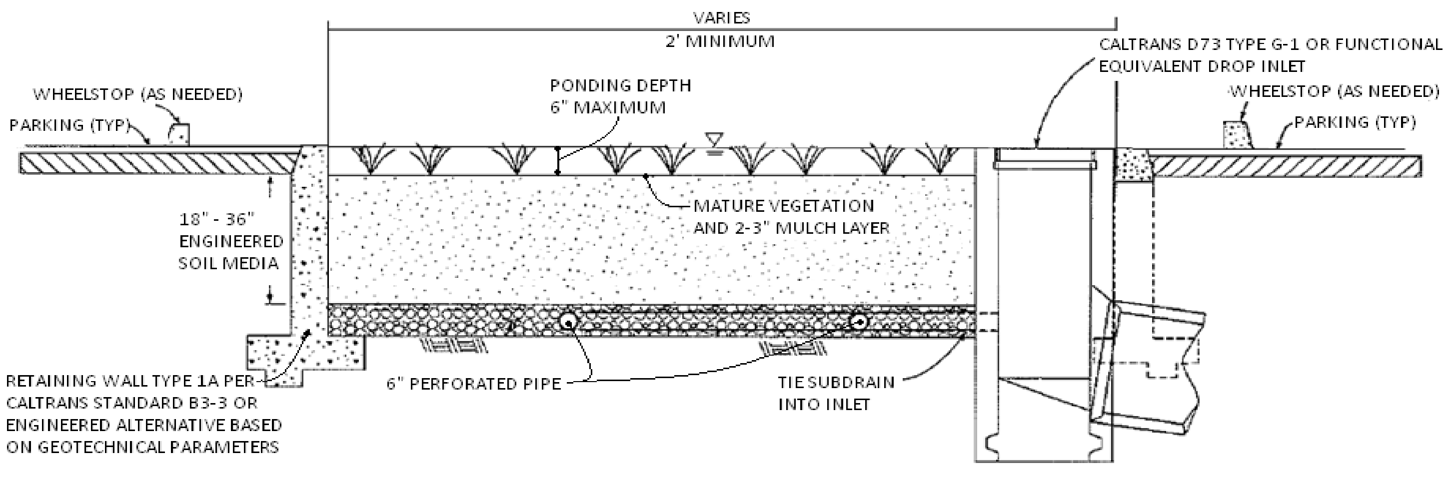
Bioretention Facilities Requiring Side Slopes

The design should assure that the Bioretention Facility does not present a tripping hazard. Bioretention Facilities proposed near pedestrian areas, such as areas parallel to parking spaces or along a walkway, must have a gentle slope to the bottom of the facility. Side slopes inside of a Bioretention Facility shall be 4:1. A typical cross section for the Bioretention Facility is shown in Figure 1.

Bioretention Facilities Not Requiring Side Slopes

Where cars park perpendicular to the Bioretention Facility, side slopes are not required. A 6-inch maximum drop may be used, and the Bioretention Facility must be planted with trees and shrubs to prevent pedestrian access. In this case, a curb is not placed around the Bioretention Facility,

but wheel stops shall be used to prevent vehicles from entering the Bioretention Facility, as shown in Figure 4.



Planter Boxes

Bioretention Facilities can also be placed above ground as planter boxes. Planter boxes must have a minimum width of 2 feet, a maximum surcharge depth of 6 inches, and no side slopes are necessary. Planter boxes must be constructed so as to ensure that the top surface of the engineered soil media will remain level. This option may be constructed of concrete, brick, stone or other stable materials that will not warp or bend. Chemically treated wood or galvanized steel, which has the ability to contaminate stormwater, should not be used. Planter boxes must be lined with an impermeable liner on all sides, including the bottom. Due to the impermeable liner, the inside bottom of the planter box shall be designed and constructed with a cross fall, directing treated flows within the subdrain layer toward the point where subdrain exits the planter box, and subdrains shall be oriented with drain holes oriented down. These provisions will help avoid excessive stagnant water within the gravel underdrain layer. Similar to the in-ground Bioretention Facility versions, this BMP benefits from healthy plants and biological activity in the root zone. Planter boxes should be planted with appropriately selected vegetation.

Figure 5: Planter Box

Source: LA Team Effort

Overflow

An overflow route is needed in the Bioretention Facility design to bypass stored runoff from storm events larger than V_{BMP} or in the event of facility or subdrain clogging. Overflow systems must connect to an acceptable discharge point, such as a downstream conveyance system as shown in Figure 1 and Figure 4. The inlet to the overflow structure shall be elevated inside the Bioretention Facility to be flush with the ponding surface for the design capture volume (V_{BMP}) as shown in Figure 4. This will allow the design capture volume to be fully treated by the Bioretention Facility, and for larger events to safely be conveyed to downstream systems. The overflow inlet shall **not** be located in the entrance of a Bioretention Facility, as shown in Figure 6.

Underdrain Gravel and Pipes
An underdrain gravel layer and pipes shall be provided in accordance with Appendix B – Underdrains.

Figure 6: Incorrect Placement of an Overflow Inlet.

Inspection and Maintenance Schedule

The Bioretention Facility area shall be inspected for erosion, dead vegetation, soggy soils, or standing water. The use of fertilizers and pesticides on the plants inside the Bioretention Facility should be minimized.

Schedule	Activity
Ongoing	• Keep adjacent landscape areas maintained. Remove clippings from landscape maintenance activities. • Remove trash and debris • Replace damaged grass and/or plants • Replace surface mulch layer as needed to maintain a 2-3 inch soil cover.
After storm events	• Inspect areas for ponding
Annually	• Inspect/clean inlets and outlets

Bioretention Facility Design Procedure

1) Enter the area tributary, A_T, to the Bioretention Facility.

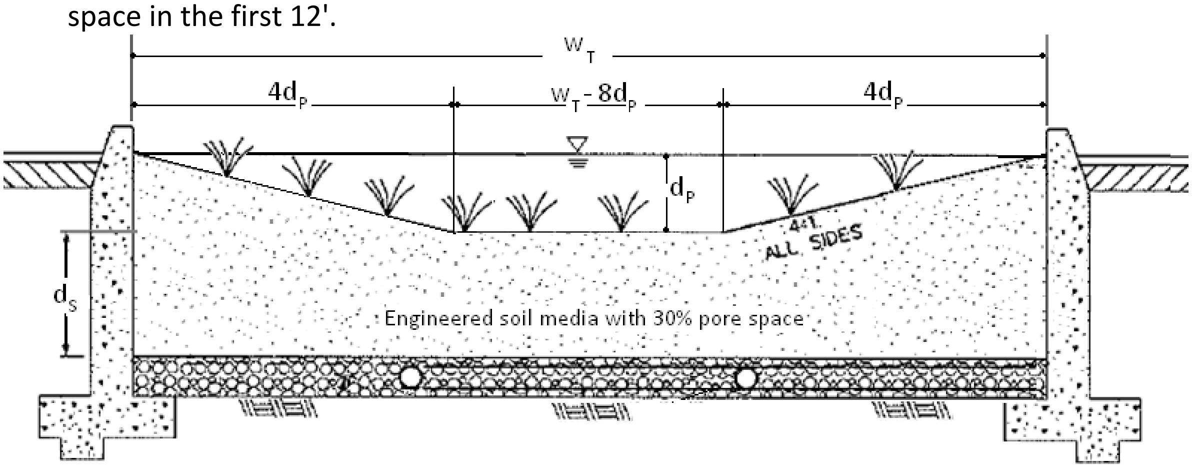
2) Enter the Design Volume, $V_{BMP,}$ determined from Section 2.1 of this Handbook.

3) Select the type of design used. There are two types of Bioretention Facility designs: the standard design used for most project sites that include side slopes, and the modified design used when the BMP is located perpendicular to the parking spaces or with planter boxes that do not use side slopes.

4) Enter the depth of the engineered soil media, d_S. The minimum depth for the engineered soil media can be 18' in limited cases, but it is recommended to use 24' or a preferred 36' to provide an adequate root zone for the chosen plant palette. Engineered soil media deeper than 36' will only get credit for the pore space in the first 36'.

5) Enter the top width of the Bioretention Facility.

6) Calculate the total effective depth, d_E, within the Bioretention Facility. The maximum allowable pore space of the soil media is 30% while the maximum allowable pore space for the gravel layer is 40%. Gravel layer deeper than 12' will only get credit for the pore space in the first 12'.



   a. For the design with side slopes the following equation shall be used to determine the total effective depth. Where, d_P is the depth of ponding within the basin.

$$d_E(\mathrm{ft}) = \frac{0.3 \times \left[\left(w_T(\mathrm{ft}) \times d_S(\mathrm{ft})\right) + 4\left(d_P(\mathrm{ft})\right)^2\right] + 0.4 \times 1(\mathrm{ft}) + d_P(\mathrm{ft})\left[4d_P(\mathrm{ft}) + \left(w_T(\mathrm{ft}) - 8d_P(\mathrm{ft})\right)\right]}{w_T(\mathrm{ft})}$$

This above equation can be simplified if the maximum ponding depth of 0.5' is used. The equation below is used on the worksheet to find the minimum area required for the Bioretention Facility:

$$d_E(\mathrm{ft}) = (0.3 \times d_S(\mathrm{ft}) + 0.4 \text{ x } 1(\mathrm{ft})) - \left(\frac{0.7\ (\mathrm{ft}^2)}{w_T(\mathrm{ft})}\right) + 0.5(\mathrm{ft})$$

b. For the design without side slopes the following equation shall be used to determine the total effective depth:

$$d_E(ft) = d_P(ft) + [(0.3) \times d_S(ft) + \ (0.4)\ \times 1(ft)]$$

The equation below, using the maximum ponding depth of 0.5', is used on the worksheet to find the minimum area required for the Bioretention Facility:

$$d_E(ft) = 0.5\ (ft) + [(0.3) \times d_S(ft) + \ (0.4)\ \times 1(ft)]$$

7) Calculate the minimum surface area, A_M, required for the Bioretention Facility. This does not include the curb surrounding the Bioretention Facility or side slopes.

$$A_M(ft^2) = \frac{V_{BMP}(ft^3)}{d_E\ (ft)}$$

8) Enter the proposed surface area. This area shall not be less than the minimum required surface area.

9) Verify that side slopes are no steeper than 4:1 in the standard design, and are not required in the modified design.

10) Provide the diameter, minimum 6 inches, of the perforated underdrain used in the Bioretention Facility. See Appendix B for specific information regarding perforated pipes.

11) Provide the slope of the site around the Bioretention Facility, if used. The maximum slope is 3 percent for a standard design.

12) Provide the check dam spacing, if the site around the Bioretention Facility is sloped.

13) Describe the vegetation used within the Bioretention Facility.

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APPENDIX E

V_{BMP} and Q_{BMP} Worksheets

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Psomas
Date: 6/8/2023
Designed by: A.P.
Case No:
Company Project Number/Name:

BMP Identification

BMP NAME / ID: DMA 2-A (Proposed Condition - West Drainage Area)

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth,
from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.60 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 2-A	*72,080*	*Mixed Surface Types*	*0.67*	*0.47*	*33624.8*			
	72080	**Total**			**33624.8**	**0.60**	**1681.2**	**2550**

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP} (Rev. 10-2011)	Legend:	Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Psomas — Date: 6/8/2023

Designed by: A.P. — Case No:

Company Project Number/Name:

BMP Identification

BMP NAME / ID: DMA 2-B (Proposed Condition - East Draiange Area)

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.60 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA 2-B	*129,562*	*Mixed Surface Types*	*0.78*	*0.58*	*74670.9*			
	129562	**Total**			**74670.9**	**0.60**	**3733.5**	**10915**

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Psomas — Date: 6/8/2023
Designed by: A.P. — Case No:
Company Project Number/Name:

BMP Identification

BMP NAME / ID: DMA 2-A (Proposed Condition - West Drainage Area)

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMA 2-A	*72,080*	*Mixed Surface Types*	*0.67*	*0.47*	*33624.8*			
	72080	**Total**			**33624.8**	**0.20**	**0.2**	**1.54**

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

(Rev. 10-2011)

Legend: Required Entries | Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Psomas
Date: 6/8/2023
Designed by: A.P.
Case No:
Company Project Number/Name:

BMP Identification

BMP NAME / ID: DMA 2-B (Proposed Condition - East Draiange Area)

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

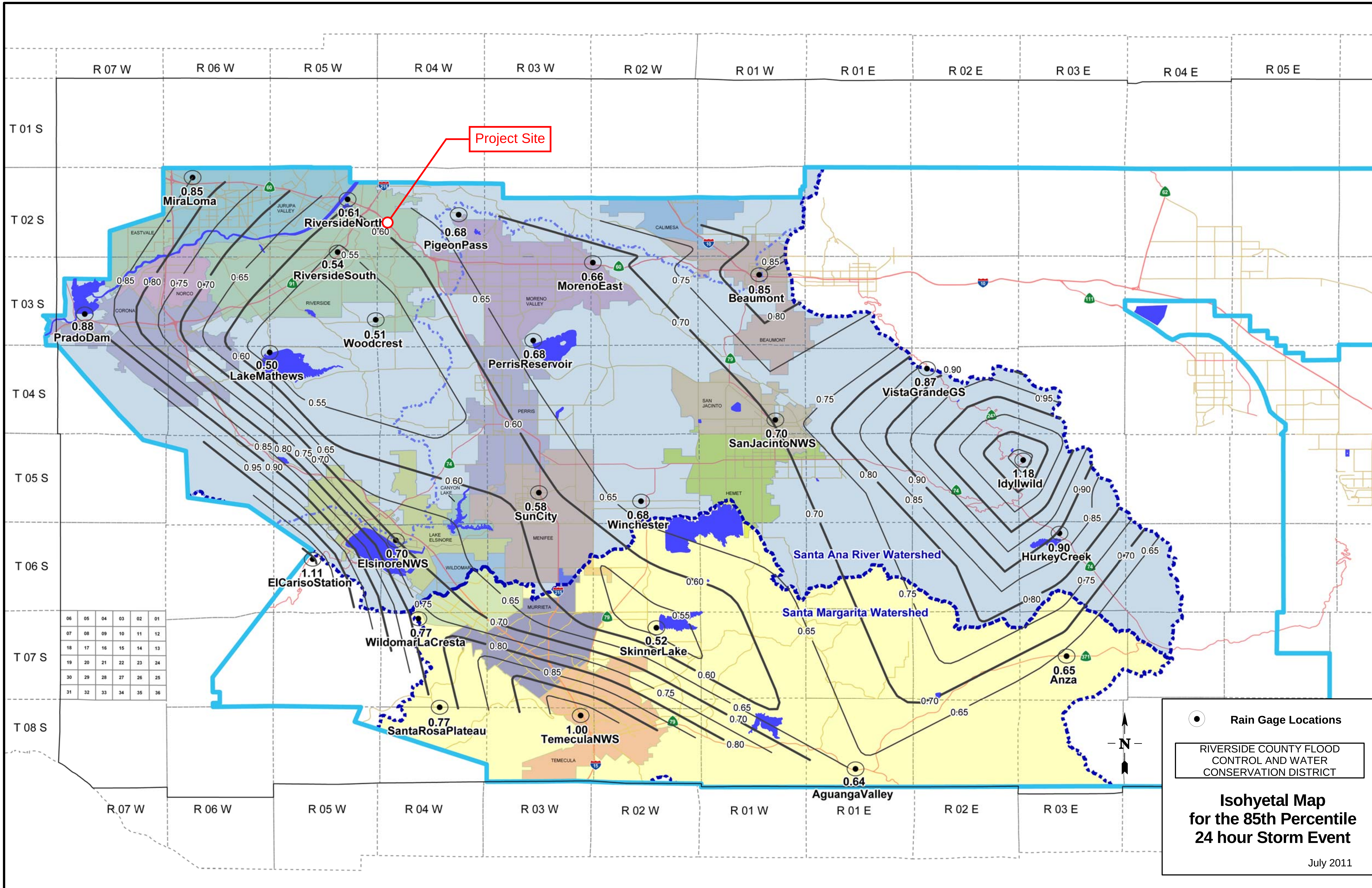
DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMA 2-B	*129,562*	*Mixed Surface Types*	*0.78*	*0.58*	*74670.9*			
	129562	**Total**			**74670.9**	**0.20**	**0.3**	**2.78**

DMAs

Notes:

APPENDIX F

Isohyetal Map



Project Site
R 07 W
R 06 W
R 05 W
R 04 W
R 03 W
R 02 W
R 01 W
R 01 E
R 02 E
R 03 E
R 04 E
R 05 E
T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S
0.85 MiraLoma
0.61 RiversideNorth
0.68 PigeonPass
0.54 RiversideSouth
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.68 PerrisReservoir
0.50 LakeMathews
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.90 HurkeyCreek
Santa Ana River Watershed
Santa Margarita Watershed
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley
Rain Gage Locations
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
Isohyetal Map for the 85th Percentile 24 hour Storm Event
July 2011
N

Appendix E

Preliminary Hydrology Study

September 5, 2023

UCR OASIS Park
Psomas Project No. 5MIL130100

PRELIMINARY HYDROLOGY STUDY

For
University of California, Riverside – OASIS Park
APN 253-050-005, 006, 007, & 008

PREPARED FOR:
University of California, Riverside
Planning, Design & Construction
1223 University Avenue Suite 240
Riverside, CA 92507

PREPARED BY:
Psomas
401 B Street, Suite 1600
San Diego, CA 92101

DATE:
September 5, 2023

REGISTERED PROFESSIONAL ENGINEER
SARAH K. CURRAN
No. C69620
CIVIL
STATE OF CALIFORNIA

9/5/2023

Sarah Curran, RCE C69620 Date

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2.0 Design Criteria and Methodology **1**
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5.0 Summary **6**

APPENDICES

Appendix A: Calculations

Appendix B: Record Information

Appendix C: Exhibits

1.0 Project Background

The University of California, Riverside ("UCR" or "University") is developing an Opportunities to Advance Sustainability, Innovation and Social Inclusion (OASIS) Park ("Project") on the University property located at 1200 University Avenue and a portion of 1150 and 1160 University Avenue (Assessor Parcel Number [APN] 253-050-005 and a portion of APNs 253-050-006, 253-050-007, and 253-050-008), south of University Avenue, north of Everton Place, and west of the Gage Canal, a Caltrans yard and Interstate 215/State Route 60 (I-215/SR 60) freeway, in the City of Riverside, California. The property comprises approximately 8 acres, approximately 4 of which will be improved as part of the Project ("Project site"). The scope of the Project includes the design and construction of one to two new buildings, a gathering space, open spaces, a work yard, and stormwater treatment facilities. The eastern portion of the site may also be improved with surface-level adjustments to parking spaces/restriping and new landscaping.

Vicinity Map

This study has been prepared to determine the peak runoff rates and velocities for the pre-development and post-development conditions in support of determining concept level drainage improvement needs to support the development of the Project site. This study will also serve to support the California Environmental Quality Act (CEQA) permitting process. The future Design Build Team will ultimately be responsible for the detailed design of stormwater improvements for the Project.

2.0 Design Criteria and Methodology

The drainage design criteria used for this Project are per the Riverside County Flood Control and Water Conservation District Hydrology Manual (1978).

2.1 Design Runoff Method

Per the Riverside County Flood Control and Water Conservation District Hydrology Manual (RCFC & WCDHM), the rational method is used for tributary areas less than 300 acres, given as:

Q = C x I x A

Where:
Q = Flow rate in cubic feet per second (cfs)
C = Coefficient of runoff (C)
I = Rainfall intensity in inches per hour (in/hr)
A = Drainage area in acres (ac)

Hydraulic characteristics are as follows:

- Soil Type: Group B per Plate C-1.16, see Appendix A.
- Land Use: Pervious and Impervious
- Coefficient of Runoff (C) are calculated using Plate D-5.2, see Appendix A.

3.0 Existing Conditions

3.1 Existing Conditions Description

The 8.3 acre property is currently developed with a University Extension (UNEX) building, parking structure, surface parking lots, and hardscape/landscape. Approximately 85% of the property is impervious and approximately 15% of the property is pervious. Property stormwater runoff is collected and discharged through overland flow, basins, above-ground drainage, and underground storm drains. Three (3) existing storm drain inlet structures, located at the north side of the property, capture the combined flows and convey them through an existing 18-inch reinforced concrete pipe (RCP) storm drain line that ultimately discharges to an existing City-owned 24-inch storm drain main line within University Avenue.

Runoff from adjacent properties contribute to the stormwater collected on the property. Offsite stormwater runoff from the neighboring I-215/SR 60 freeway, the Caltrans site, and the Gage Canal area is collected and conveyed by a concrete swale through the Gage Canal area and discharged to the northeast corner of the property. A portion of the freeway runoff is captured by a storm drain inlet that is piped to the I-215/SR 60 freeway on-ramp retaining wall, which then outlets onto the Caltrans site, see Appendix B for record information. Runoff from the Caltrans site flows to a concrete headwall structure located in the northwest corner of the Caltrans site, which directs it to the concrete swale that crosses the Gage Canal area. Additional surface flows are collected within the Gage Canal area by a dirt swale that carries flows north into the concrete swale. The concrete swale collectively carries the runoff from these three sites onto the property, where it is conveyed along the northern portion of the property by concrete ribbon gutters to the three storm drain inlets described above.

Parking Lot 50 is a recently improved (2017) surface parking lot that has implemented stormwater management facilities. Stormwater sheet flows on impervious pavement and is channeled through curb cuts into an existing bioretention basin network where flows are captured by inlets within the basins before connecting to the existing 18-inch storm drain lateral.

Parking Lot 51 stormwater sheet flows on impervious pavement north and west to concrete ribbon gutters, which carry flows north to the three storm drain inlets described above.

3.2 Existing Inlet and Lateral Capacities

Depending on the condition of the existing lateral, the Mannings coefficient will vary. The capacity of the existing 18-inch storm drain lateral was calculated based on varied Mannings runoff coefficients (n) and is summarized below:

Existing 18-inch Lateral Capacity			
Pipe	**Assumed Slope (ft/ft)**	**Manning's (n)**	**Capacity (cfs)**
Existing 18-inch RCP SD	0.0100	0.01	13.69
Existing 18-inch RCP SD	0.0100	0.015	9.13
Existing 18-inch RCP SD	0.0100	0.021	6.52

See Appendix A for calculations.

The capacity of the three existing storm drain inlets was calculated and is summarized below:

Existing Inlet Capacity				
Pipe	**Effective Perimeter (ft)**	**Effective Area (SF)**	**Depth of Ponding (ft)**	**Capacity (cfs)**
Existing 24-inch x 48-inch inlets	6	2	0.5	6.36
Existing 24-inch x 48-inch inlets	6	2	0.5	6.36
Existing 36-inch x 36-inch inlet	6	2.25	0.5	6.36
Total Capacity of Existing Three Inlets				**19.09**

See Appendix A for calculations.

Overflow paths should be provided as part of the design to convey stormwater via the surface to University Avenue should a given storm event exceed the capacity of the existing 18-inch storm drain lateral.

The property is located within the Santa Ana River Watershed. According to the Federal Emergency Management Agency ("FEMA") Special Flood Hazard Area / Flood Insurance Rate Map (FIRM), this area is located outside of the 100-year flood plain.

Drainage basin areas, flow paths, and concentration points are shown on the Existing Hydrology Map, see Appendix C. Calculations for the existing condition can be found in Appendix A.

4.0 Proposed Conditions

4.1 Hydrology Analysis

Approximately four acres of the larger 8.3-acre property will be demolished, graded, and improved as part of the Project. As part of that improvement, the overall perviousness of the property will increase and imperviousness will, in turn, decrease. The Project site limits of improvements are outlined on the Proposed Hydrology Map, see Appendix C.

The property's pervious and impervious areas are summarized as follows:

Property Pervious Increase	
	Percentage
Existing	15%
Proposed	26%
Delta	11%

Property Impervious Decrease	
	Percentage
Existing	85%
Proposed	74%
Delta	11%

The proposed conditions will increase the property's perviousness by implementing bioretention basins and landscaping as part of the Project improvements, where each proposed basin treats and detains stormwater runoff. Each basin will connect to the existing 18-inch storm drain lateral on the Project site.

The quantity of stormwater runoff from the Project site will decrease from the existing to the proposed condition since the perviousness of the property is increasing. Therefore, the total quantity of runoff for the 8.3-acre property will also decrease.

The RCFC and WCDHM indicate a 100-year level of flood protection required for the Project.

The 8.3-acre property has been broken down into drainage subareas as indicated on the Preliminary Hydrology Exhibit in Appendix C. Subareas identified as "1" represent areas of the property that will not be improved as part of the Project. Subareas identified as "2" represent portions of the property to be improved as part of the Project (approximately 4 acres). Subareas identified as "3" represent areas that are tributary to the 8.3-acre property. Proposed sub-areas are summarized below:

Subarea 1-A (Parking Lot 51 area): Stormwater sheet flows west on impervious pavement and is conveyed via an existing concrete gutter to downstream inlets. Drainage from Subarea 1-A will be bypassed around the Project site, however, will ultimately continue to connect to the existing 18-inch storm drain lateral, similar to the current condition.

Subarea 1-B (Parking Lot 50 area): Stormwater sheet flows on impervious pavement and is channeled through curb cuts into existing bioretention basins and collected at inlets located within the basins before connecting to the existing 18-inch storm drain lateral. The condition will be maintained and not impacted by Project improvements.

Subarea 2-A (OASIS Park Project site): Stormwater from the westerly portion of the improved Project site will be conveyed to a new bioretention basin and then via underground storm drain to the existing 18-inch storm drain lateral.

Subarea 2-B (OASIS Park Project site): Stormwater from the easterly portion of the improved Project site will be conveyed to new bioretention basins and then via underground storm drain to the existing 18-inch storm drain lateral.

Subareas 3-A, 3-B, and 3-C (I-215/SR 60 freeway, Caltrans site and Gage Canal area): Stormwater from these Subareas consists of offsite drainage from the I-215/SR 60 freeway, the adjacent Caltrans site and the Gage Canal area. Drainage from these subareas will continue to be collected at the northeast corner of the property and conveyed via existing concrete ribbon gutters to the east edge of the improved project site. Drainage will then be collected and conveyed to the existing 18-inch storm drain lateral. The condition of these subareas will be maintained and not impacted by the Project improvements.

Proposed Peak Flow		
Subarea ID	Area to Design Point (AC)	Peak Flow, 100-year (cfs)
1-A	2.15	2.01
1-B	1.64	1.54
2-A	1.65	1.54
2-B	2.97	2.78
3-A	4.72	4.42
3-B	0.37	0.35
3-C	0.13	0.12
Total	**13.6**	**12.8**

A summary of the peak flow for the 100-year storm event is summarized below:

Summary of Peak Flow	
	Q_{100} (cfs)
Existing	13.1
Proposed	12.8
Delta	0.3

Overflow paths should be provided as part of the design to convey stormwater via the surface to University Avenue should a given storm event exceed the capacity of the existing 18-inch storm drain lateral.

4.2 Hydromodification

Hydromodification is required for the site. The post-construction stormwater management for the Project shall follow the University's Phase II Small MS4 Post-Construction Stormwater Management Requirements documents and Phase II Small MS4 Post-Construction Stormwater Management Checklist. See the Project specific Preliminary Water Quality Management Plan for analysis and design and Appendix C for the Preliminary Hydrology Exhibit.

4.3 Best Management Practices (BMPs)

Bioretention basins are proposed to treat and store the Project site runoff. These bioretention BMP's will consist of a vegetated area that will collect flows and discharge to the existing 18-inch storm drain lateral. These non-infiltrating bioretention basin BMP's provide necessary flow based treatment to meet UCR's pollution control requirements. See the Preliminary Water Quality Management Plan for analysis and design of long-term post construction BMPs per the University Municipal Separate Storm Sewer System (MS4) Permit and Appendix C for the Preliminary Hydrology Exhibit.

5.0 Summary

The Project will result in an increased perviousness and decreased imperviousness of the 8.3-acre property, and therefore reduce the overall runoff quantity. Bioretention basins will be implemented with the Project improvements to comply with the University MS4 Permit. The existing 18-inch storm drain lateral will continue to convey runoff from the 8.3-acre property, including the Project site, and adjacent tributary areas. Overflow paths should be provided as part of the design to convey stormwater via the surface to University Avenue should a given storm event exceed the capacity of the existing 18-inch storm drain lateral. The Project will not substantially alter the existing drainage patterns nor increase stormwater runoff from the property.

APPENDIX A

Calculations

PSOMAS
401 B STREET, SUITE 1600
SAN DIEGO, CA 92101

UCR OASIS Park
PSOMAS#:5MIL130100
CALCULATED BY: AMP
6/7/2023

2 YEAR - EXISTING CONDITION

DRAINAGE AREA	DEVELOPMENT	A (ACRES)	% OF TOTAL ACREAGE	C*	I** (IN/HR)	Q*** (CFS)	REMARKS
THE FOLLOWING HYDROLOGIC CALCULATIONS DONE PER METHODS DESCRIBED IN THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER DISTRICT HYDROLOGY MANUAL							
SUB-AREA							
1-A	Commercial (Parking Lot 51)	4.28	32.97%	0.81	0.5	1.73	
1-B	Commercial (Parking Lot 50)	1.75	13.48%	0.81	0.5	0.71	
2	Commercial (Discharges offsite onto University Ave)	1.73	N/A	0.81	0.5	0.70	
3-A	Commercial (Caltrans Site)	4.72	36.36%	0.81	0.5	1.91	
3-B	Commercial (I-215 Freeway)	0.37	2.85%	0.81	0.5	0.15	
3-C	Commercial (Gage Canal)	0.13	#DIV/0!	0.81	0.5	0.05	
TOTAL		12.98		0.81	0.5	**5.3**	

100 YEAR - EXISTING CONDITION

DRAINAGE AREA	DEVELOPMENT	A (ACRES)	% OF TOTAL ACREAGE	C*	I** (IN/HR)	Q*** (CFS)	REMARKS
THE FOLLOWING HYDROLOGIC CALCULATIONS DONE PER METHODS DESCRIBED IN THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER DISTRICT HYDROLOGY MANUAL							
SUB-AREA							
1-A	Commercial (Parking Lot 51)	4.28	32.97%	0.84	1.2	4.31	
1-B	Commercial (Parking Lot 50)	1.75	13.48%	0.84	1.2	1.76	
2	Commercial (Discharges offsite onto University Ave)	1.73	N/A	0.84	1.2	1.74	
3-A	Commercial (Caltrans Site)	4.72	36.36%	0.84	1.2	4.76	
3-B	Commercial (I-215 Freeway)	0.37	2.85%	0.84	1.2	0.37	
3-C	Commercial (Gage Canal)	0.13	#DIV/0!	0.84	1.2	0.13	
TOTAL		12.98		0.84	1.2	**13.1**	

* C based on coefficient of runnoff from NOAA Atlas 14
** Intensities are based on the tablr from Plate D-4.1, RCFC & WCD Hydrology Manual
***Q based on the rational method equation from Plate D-1, RCFC & WCD Hydrology Manual
Q = C * I *A

Existing 18" Storm Drain Capacity Calculations

Pipe	Slope (Assumed) (ft/ft)	Diameter (in)	Diameter (ft)	k	Manning's n	Pipe Area (sf)	100% or 75% or 50%	Flow Area (sf)	Wetted Perimeter (ft)	Hydraulic Radius A/P	Velocity fps	Capacity cfs
Exist 18" RCP SD	**0.0100**	**18**	1.5	1.49	0.01	1.7671	100	1.767	4.712	0.375	7.748	13.692

Pipe	Slope (Assumed) (ft/ft)	Diameter (in)	Diameter (ft)	k	Manning's n	Pipe Area (sf)	100% or 75% or 50%	Flow Area (sf)	Wetted Perimeter (ft)	Hydraulic Radius A/P	Velocity fps	Capacity cfs
Exist 18" RCP SD	**0.0100**	**18**	1.5	1.49	0.015	1.7671	100	1.767	4.712	0.375	5.166	9.128

Pipe	Slope (Assumed) (ft/ft)	Diameter (in)	Diameter (ft)	k	Manning's n	Pipe Area (sf)	100% or 75% or 50%	Flow Area (sf)	Wetted Perimeter (ft)	Hydraulic Radius A/P	Velocity fps	Capacity cfs
Exist 18" RCP SD	**0.0100**	**18**	1.5	1.49	0.021	1.7671	100	1.767	4.712	0.375	3.690	6.520

Existing Catch Basin Capacity Calculations

GRATE SIZE	***24"x48"***	***36"x36"***
LENGTH / DIAMETER	*4.0*	*3.0*
WIDTH	*2.0*	*3.0*
EFFECTIVE PERIMETER (50% CLOGGING) (FT.)	6.00	6.00
EFFECTIVE AREA (50% CLOGGING) (SF)	2.000	2.250
DEPTH OF PONDING (FT.)	0.50	0.50
FLOW CAPACITY (CFS)	6.36	6.36
TOTAL FLOW CAPACITY (CFS)	19.09	

NOAA Atlas 14, Volume 6, Version 2
Location name: Riverside, California, USA*
Latitude: 33.9747°, Longitude: -117.3369°
Elevation: 1016.27 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.091 (0.076-0.110)	0.117 (0.098-0.142)	0.152 (0.126-0.185)	0.181 (0.149-0.222)	0.222 (0.176-0.281)	0.254 (0.198-0.329)	0.287 (0.218-0.382)	0.322 (0.237-0.441)	0.371 (0.262-0.530)	0.409 (0.279-0.607)
10-min	0.130 (0.109-0.158)	0.168 (0.140-0.204)	0.218 (0.181-0.265)	0.260 (0.214-0.318)	0.318 (0.253-0.403)	0.364 (0.283-0.472)	0.411 (0.312-0.547)	0.461 (0.340-0.632)	0.531 (0.375-0.760)	0.587 (0.400-0.870)
15-min	0.158 (0.132-0.191)	0.203 (0.169-0.246)	0.264 (0.219-0.320)	0.314 (0.259-0.385)	0.384 (0.306-0.488)	0.440 (0.342-0.571)	0.497 (0.378-0.662)	0.558 (0.411-0.765)	0.642 (0.454-0.919)	0.710 (0.484-1.05)
30-min	0.232 (0.194-0.281)	0.299 (0.249-0.362)	0.388 (0.322-0.471)	0.462 (0.381-0.567)	0.565 (0.450-0.718)	0.647 (0.504-0.839)	0.732 (0.555-0.974)	0.821 (0.605-1.13)	0.945 (0.668-1.35)	1.04 (0.712-1.55)
60-min	0.336 (0.280-0.406)	0.432 (0.360-0.523)	0.560 (0.466-0.681)	0.668 (0.550-0.819)	0.817 (0.650-1.04)	0.935 (0.728-1.21)	1.06 (0.803-1.41)	1.19 (0.875-1.63)	1.37 (0.965-1.95)	1.51 (1.03-2.24)
2-hr	0.476 (0.397-0.577)	0.610 (0.508-0.739)	0.787 (0.654-0.957)	0.933 (0.769-1.15)	1.14 (0.904-1.44)	1.29 (1.01-1.68)	1.46 (1.11-1.94)	1.63 (1.20-2.23)	1.86 (1.31-2.66)	2.04 (1.39-3.03)
3-hr	0.576 (0.481-0.697)	0.736 (0.614-0.893)	0.949 (0.788-1.15)	1.12 (0.926-1.38)	1.36 (1.09-1.73)	1.55 (1.21-2.01)	1.74 (1.32-2.32)	1.94 (1.43-2.66)	2.22 (1.57-3.17)	2.43 (1.66-3.61)
6-hr	0.793 (0.662-0.960)	1.01 (0.846-1.23)	1.31 (1.09-1.59)	1.55 (1.27-1.90)	1.88 (1.49-2.38)	2.13 (1.66-2.76)	2.39 (1.81-3.18)	2.65 (1.96-3.64)	3.02 (2.13-4.32)	3.30 (2.25-4.90)
12-hr	1.05 (0.872-1.27)	1.35 (1.12-1.63)	1.74 (1.45-2.12)	2.06 (1.70-2.53)	2.50 (1.99-3.18)	2.84 (2.21-3.68)	3.18 (2.42-4.24)	3.54 (2.61-4.84)	4.02 (2.84-5.74)	4.39 (2.99-6.51)
24-hr	1.39 (1.23-1.61)	1.81 (1.60-2.09)	2.36 (2.08-2.73)	2.81 (2.45-3.27)	3.41 (2.89-4.11)	3.88 (3.22-4.77)	4.35 (3.52-5.48)	4.84 (3.81-6.26)	5.49 (4.16-7.40)	6.00 (4.39-8.37)
2-day	1.71 (1.51-1.97)	2.26 (1.99-2.60)	2.97 (2.62-3.44)	3.56 (3.11-4.15)	4.36 (3.69-5.25)	4.97 (4.13-6.12)	5.60 (4.54-7.06)	6.25 (4.93-8.09)	7.12 (5.39-9.60)	7.80 (5.71-10.9)
3-day	1.84 (1.63-2.12)	2.46 (2.18-2.84)	3.29 (2.90-3.80)	3.96 (3.47-4.63)	4.89 (4.14-5.89)	5.61 (4.65-6.90)	6.34 (5.14-7.99)	7.10 (5.60-9.19)	8.13 (6.16-11.0)	8.94 (6.54-12.5)
4-day	1.98 (1.76-2.29)	2.68 (2.37-3.10)	3.61 (3.18-4.17)	4.37 (3.82-5.10)	5.41 (4.58-6.52)	6.22 (5.16-7.66)	7.06 (5.72-8.89)	7.92 (6.24-10.2)	9.10 (6.89-12.3)	10.0 (7.33-14.0)
7-day	2.29 (2.02-2.64)	3.11 (2.75-3.59)	4.21 (3.71-4.87)	5.11 (4.47-5.97)	6.36 (5.39-7.67)	7.33 (6.08-9.02)	8.33 (6.75-10.5)	9.36 (7.38-12.1)	10.8 (8.16-14.5)	11.9 (8.71-16.6)
10-day	2.48 (2.20-2.86)	3.39 (3.00-3.92)	4.61 (4.06-5.33)	5.61 (4.91-6.55)	7.00 (5.93-8.43)	8.08 (6.70-9.94)	9.20 (7.45-11.6)	10.4 (8.16-13.4)	12.0 (9.05-16.1)	13.2 (9.68-18.4)
20-day	3.01 (2.67-3.47)	4.15 (3.67-4.79)	5.68 (5.00-6.57)	6.95 (6.08-8.11)	8.73 (7.39-10.5)	10.1 (8.41-12.5)	11.6 (9.39-14.6)	13.1 (10.3-17.0)	15.3 (11.5-20.6)	16.9 (12.4-23.6)
30-day	3.58 (3.17-4.13)	4.93 (4.36-5.70)	6.77 (5.97-7.84)	8.32 (7.27-9.70)	10.5 (8.88-12.6)	12.2 (10.1-15.0)	14.0 (11.4-17.7)	15.9 (12.6-20.6)	18.6 (14.1-25.1)	20.7 (15.2-28.9)
45-day	4.25 (3.76-4.90)	5.85 (5.17-6.75)	8.03 (7.08-9.29)	9.87 (8.64-11.5)	12.5 (10.6-15.0)	14.6 (12.1-17.9)	16.8 (13.6-21.1)	19.1 (15.1-24.7)	22.4 (17.0-30.2)	25.1 (18.4-35.0)
60-day	4.95 (4.38-5.71)	6.77 (5.99-7.82)	9.27 (8.18-10.7)	11.4 (9.97-13.3)	14.4 (12.2-17.4)	16.8 (14.0-20.7)	19.4 (15.7-24.4)	22.1 (17.4-28.6)	26.0 (19.7-35.0)	29.1 (21.3-40.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

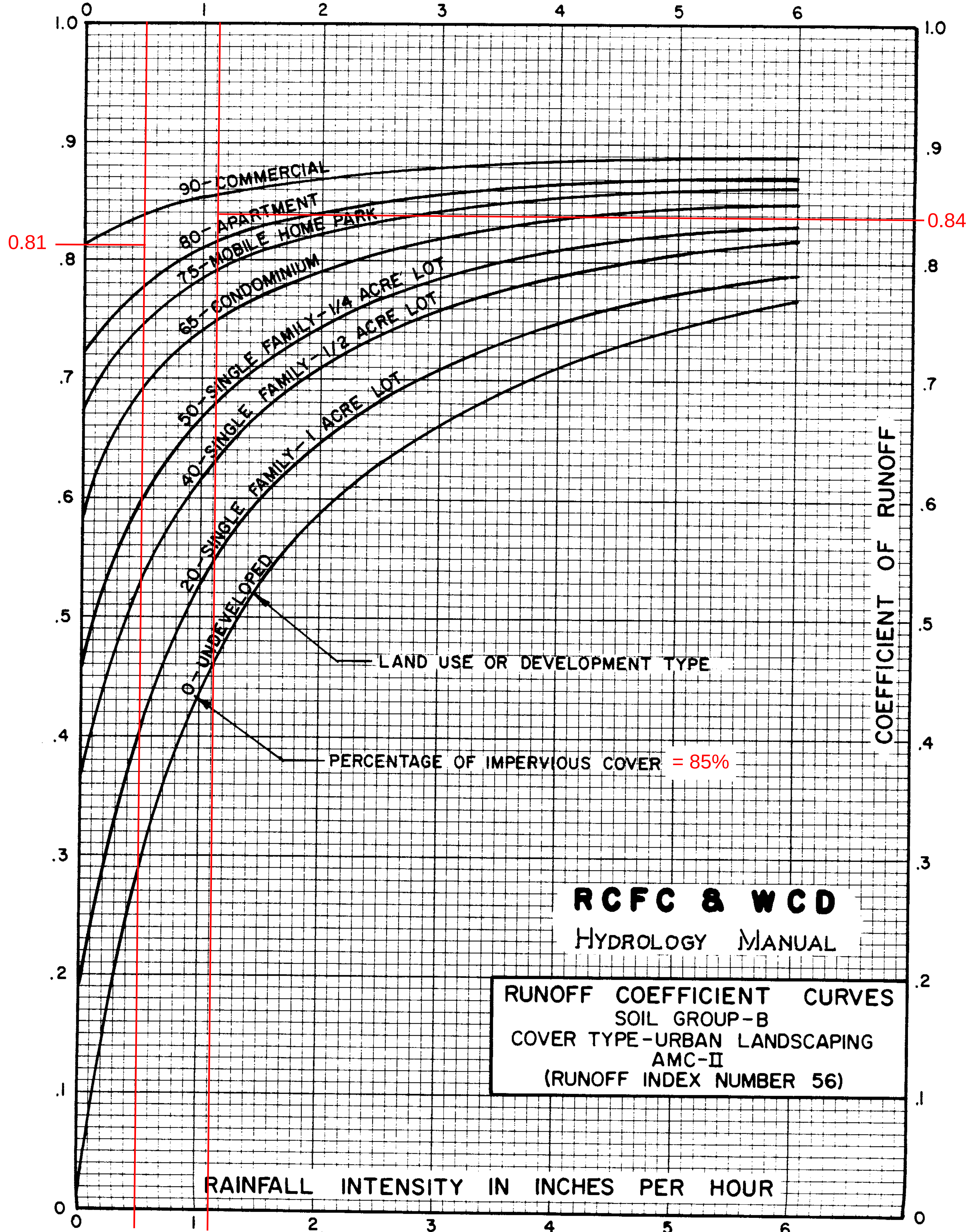


PLATE D-5.2

EXISTING CONDITIONS

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	Riv	215,60, 91	60.7/70.6, 22.0/18.5, 32.7/34.7		2838

REGISTERED CIVIL ENGINEER 7-12-04

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Alan R. Bisi No. C-62808 Exp. 6/30/06 CIVIL STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

Cal-Trans now has a web site! To get to the web site, go to: http://www.dot.ca.gov

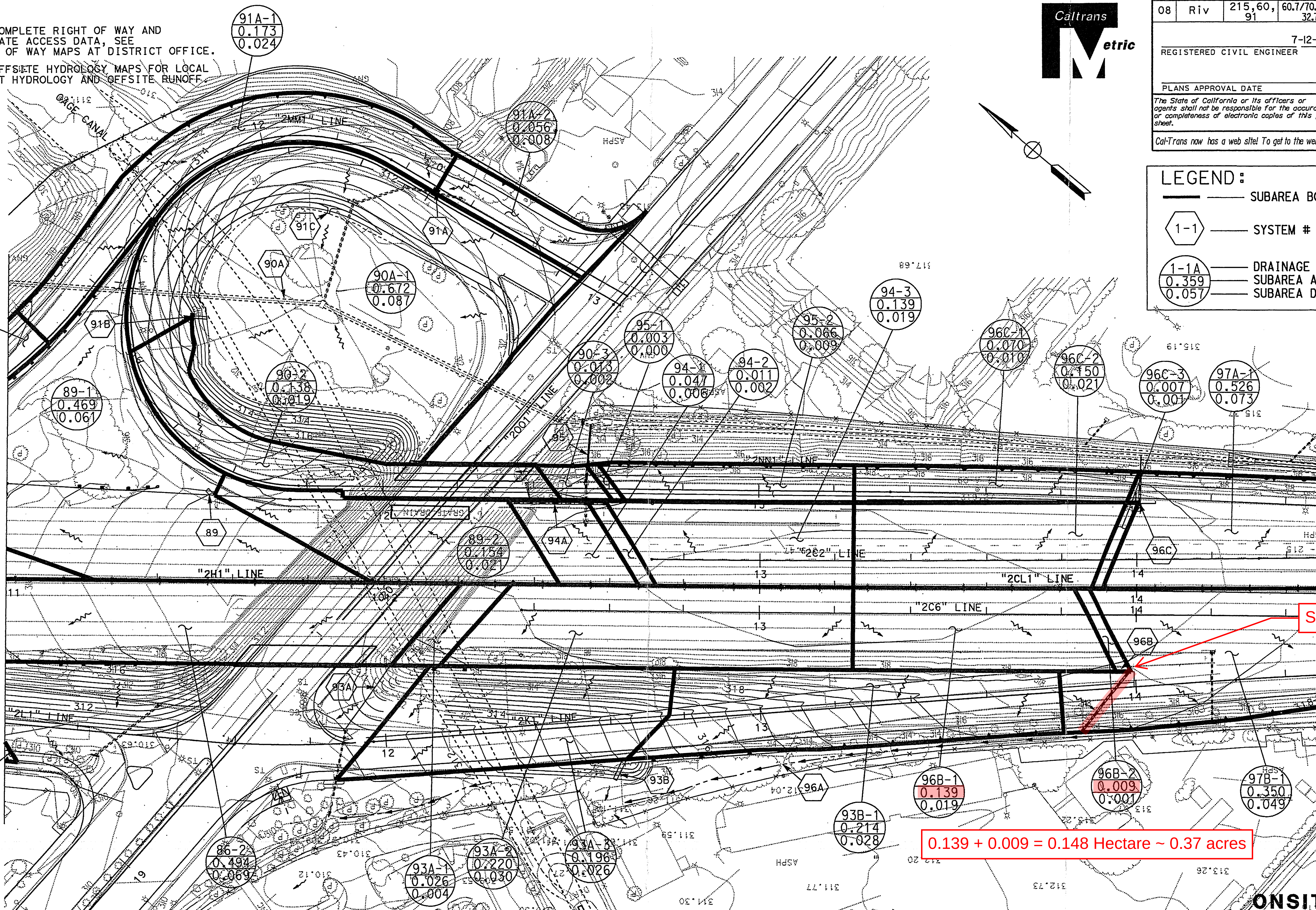
Caltrans Metric

NOTE:

1. FOR COMPLETE RIGHT OF WAY AND ACCURATE ACCESS DATA, SEE RIGHT OF WAY MAPS AT DISTRICT OFFICE.
2. SEE OFFSITE HYDROLOGY MAPS FOR LOCAL STREET HYDROLOGY AND OFFSITE RUNOFF.

LEGEND:

- SUBAREA BOUNDARY
- 1-1 — SYSTEM #
- 1-1A — DRAINAGE SUBAREA #
- 0.359 — SUBAREA AREA (HA)
- 0.057 — SUBAREA DISCHARGE (CMS)



ONSITE HYDROLOGY MAP

SCALE 1:500

H-21

THIS PLAN ACCURATE FOR DRAINAGE WORK ONLY.

ALL DIMENSIONS ARE METERS UNLESS OTHERWISE SHOWN

FOR BIDDING PURPOSES ONLY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans PROJECT DEVELOPMENT

PROJECT ENGINEER ALAN R. BISI

CALCULATED/DESIGNED BY | CHECKED BY | REVISED BY | DATE REVISED | DATE

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

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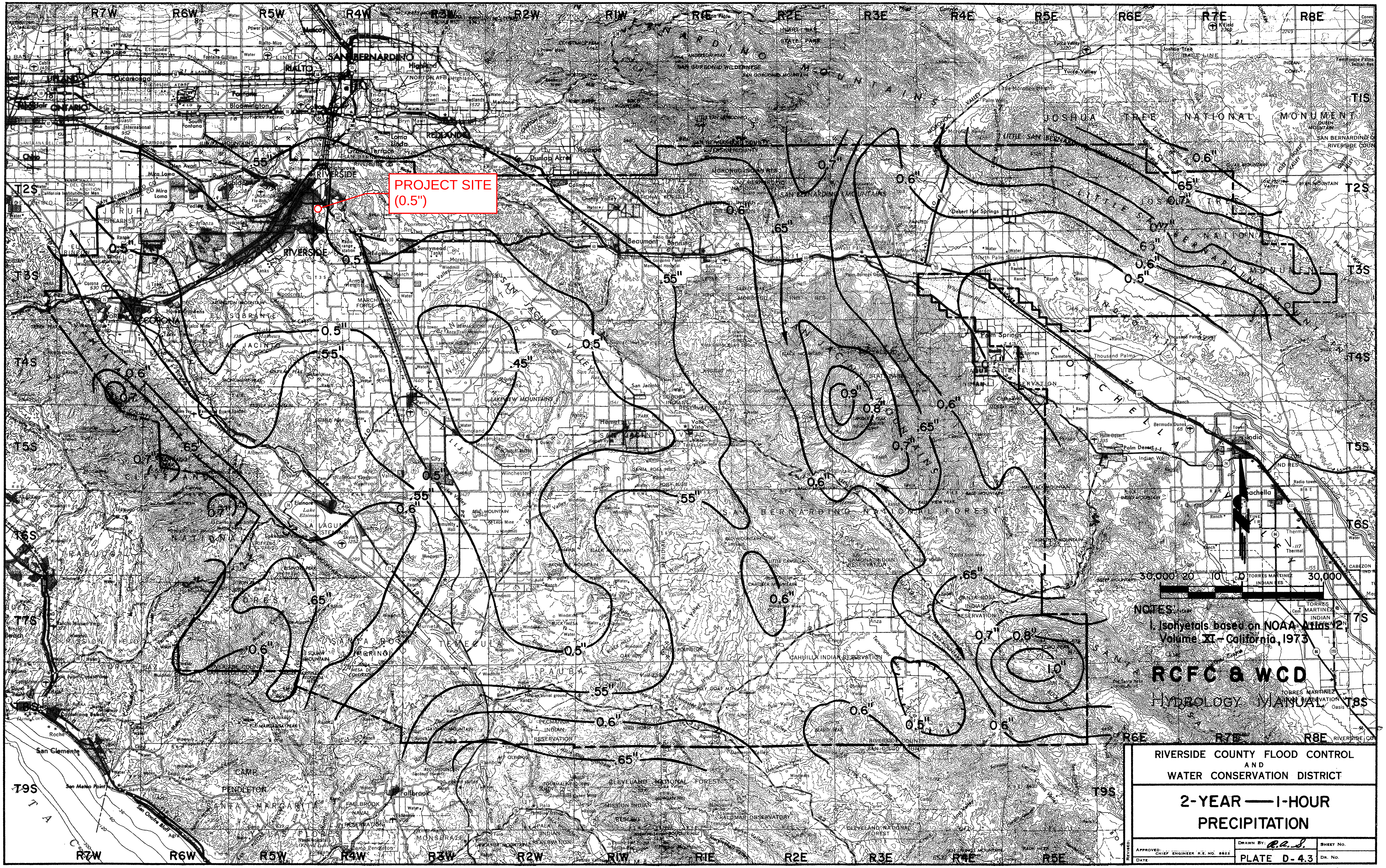
DATE PLOTTED => 26-NOV-2008
TIME PLOTTED => 09:11

LAST REVISION



PROJECT SITE
(0.5")
NOTES
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR
PRECIPITATION
PLATE D-4.3
JOSHUA TREE NATIONAL MONUMENT
SAN BERNARDINO NATIONAL FOREST
CLEVELAND NATIONAL FOREST
SAN BERNARDINO
RIVERSIDE
REDLANDS
CORONA
ONTARIO
RIALTO
Beaumont
Banning
Hemet
San Jacinto
Palm Springs
Indio
Coachella
Thermal
Elsinore
Fallbrook
San Clemente
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
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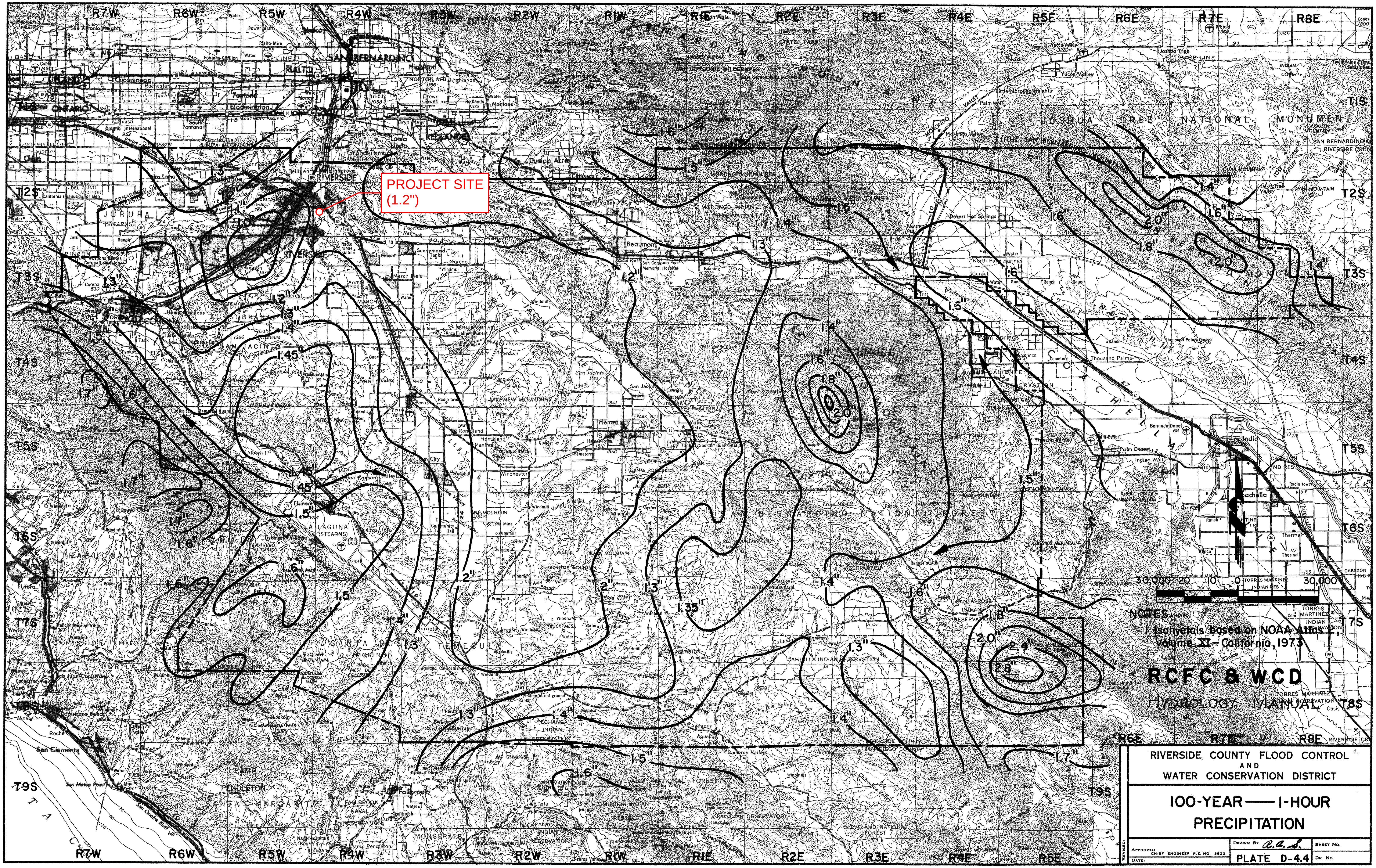
PROJECT SITE
(1.2")
NOTES
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR —— 1-HOUR
PRECIPITATION
PLATE D-4.4
30,000 20 10 0 30,000
SAN BERNARDINO
RIVERSIDE
JOSHUA TREE NATIONAL MONUMENT
SAN BERNARDINO NATIONAL FOREST
CLEVELAND NATIONAL FOREST
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
R5E
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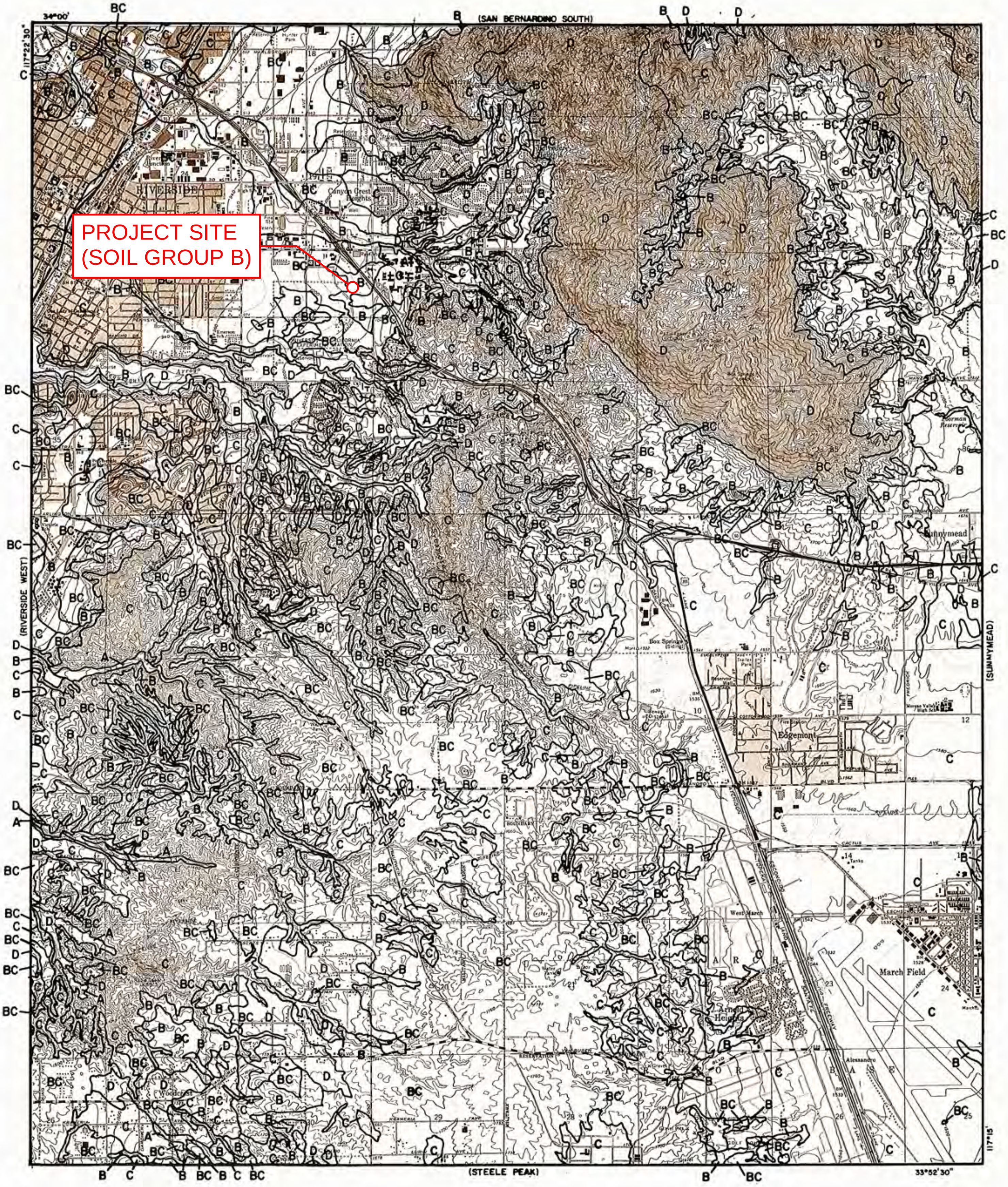
T7S
T8S
T9S



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC & WCD

HYDROLOGY MANUAL

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR RIVERSIDE-EAST

PLATE C-1.16

PSOMAS
401 B STREET, SUITE 1600
SAN DIEGO, CA 92101

UCR OASIS Park
PSOMAS#:5MIL130100
CALCULATED BY: AMP
6/7/2023

2 YEAR - PROPOSED CONDITION

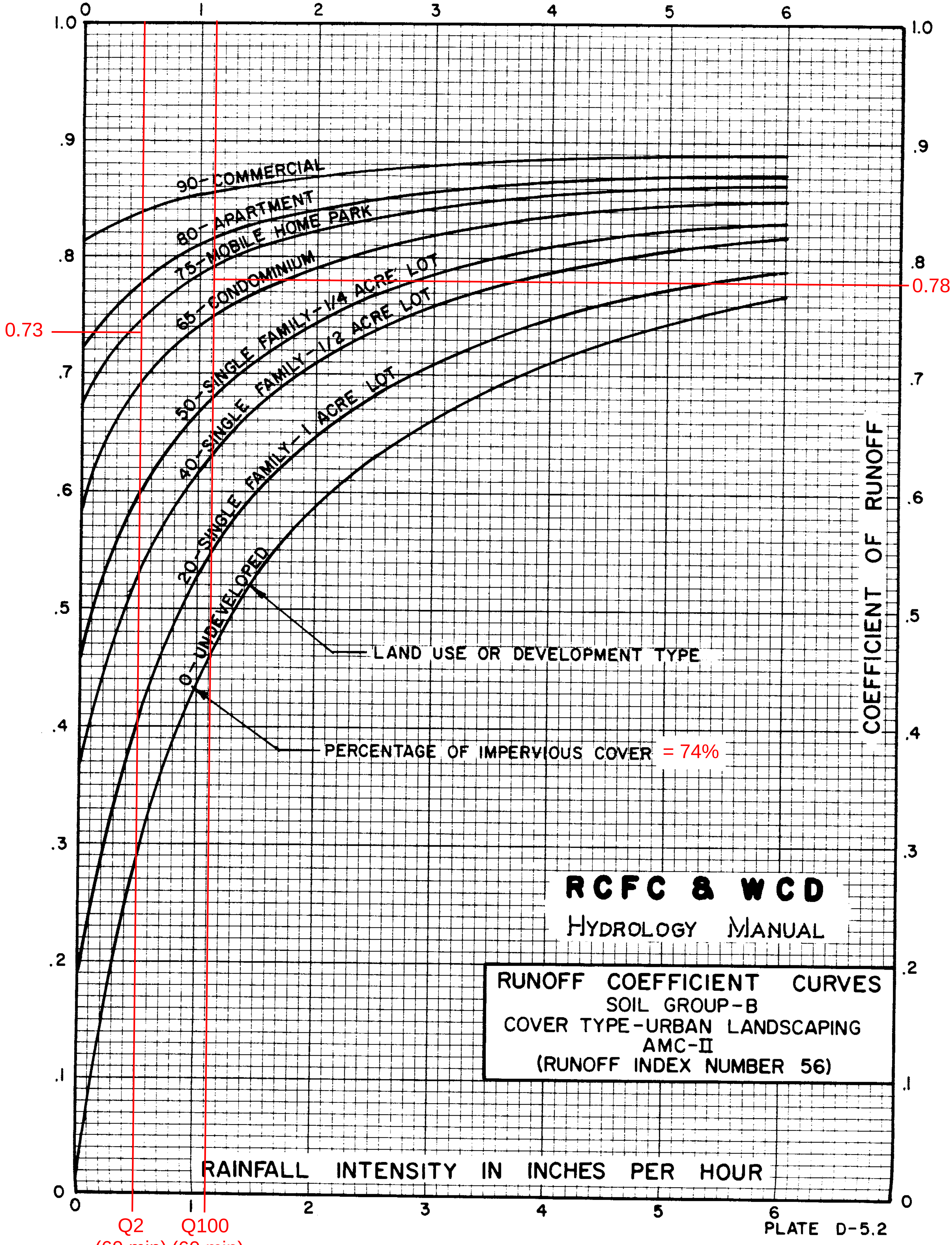
DRAINAGE AREA	DEVELOPMENT	A (ACRES)	% OF TOTAL ACREAGE	C*	I** (IN/HR)	Q*** (CFS)	REMARKS
THE FOLLOWING HYDROLOGIC CALCULATIONS DONE PER METHODS DESCRIBED IN THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER DISTRICT HYDROLOGY MANUAL							
SUB-AREA							
1-A	Commercial (Parking Lot 51)	2.15	15.77%	0.73	0.5	0.78	
1-B	Commercial (Parking Lot 50)	1.64	12.03%	0.73	0.5	0.60	
2-A	Commercial (West Proposed Site)	1.65	12.11%	0.73	0.5	0.60	
2-B	Commercial (East Proposed Site)	2.97	21.79%	0.73	0.5	1.08	
3-A	Commercial (Caltrans Site)	4.72	N/A	0.73	0.5	1.72	
3-B	Commercial (I-215 Freeway)	0.37	N/A	0.73	0.5	0.14	
3-C	Commercial (Gage Canal)	0.13	N/A	0.73	0.5	0.05	
	TOTAL	13.63		0.73	0.5	**5.0**	

100 YEAR - PROPOSED CONDITION

DRAINAGE AREA	DEVELOPMENT	A (ACRES)	% OF TOTAL ACREAGE	C*	I** (IN/HR)	Q*** (CFS)	REMARKS
THE FOLLOWING HYDROLOGIC CALCULATIONS DONE PER METHODS DESCRIBED IN THE RIVERSIDE COUNTY FLOOD CONTROL AND WATER DISTRICT HYDROLOGY MANUAL							
SUB-AREA							
1-A	Commercial (Parking Lot 51)	2.15	15.77%	0.78	1.2	2.01	
1-B	Commercial (Parking Lot 50)	1.64	12.03%	0.78	1.2	1.54	
2-A	Commercial (West Proposed Site)	1.65	12.11%	0.78	1.2	1.54	
2-B	Commercial (East Proposed Site)	2.97	21.79%	0.78	1.2	2.78	
3-A	Commercial (Caltrans Site)	4.72	N/A	0.78	1.2	4.42	
3-B	Commercial (I-215 Freeway)	0.37	N/A	0.78	1.2	0.35	
3-C	Commercial (Gage Canal)	0.13	N/A	0.78	1.2	0.12	
	TOTAL	13.63		0.78	1.2	**12.8**	

* C based on coefficient of runoff from NOAA Atlas 14
** Intensities are based on the tablr from Plate D-4.1, RCFC & WCD Hydrology Manual
***Q based on the rational method equation from Plate D-1, RCFC & WCD Hydrology Manual

$Q = C * I * A$



PROPOSED CONDITIONS

APPENDIX B

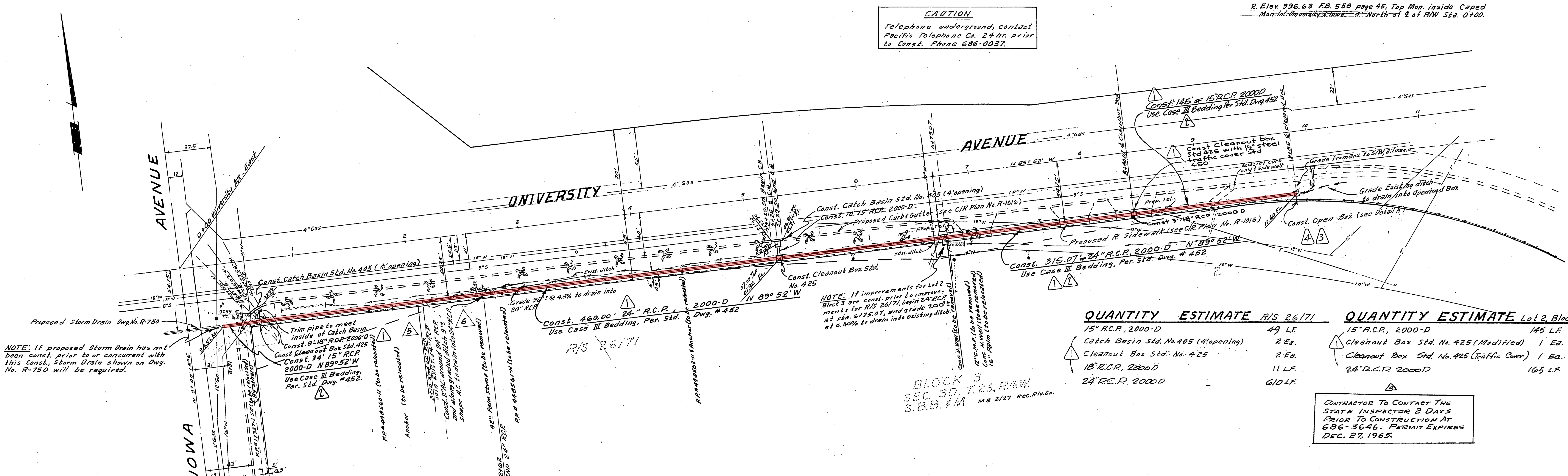
Record Information

BENCH MARKS:

1. Elev. 997.623 C/R F.B. 625 P.K. in N.W. curb return University Ave & Iowa.
2. Elev. 996.63 F.B. 558 page 45, Top Mon. inside Caped Mon. Int. University & Iowa 4' North of ℄ of R/W Sta. 0+00.

CAUTION

Telephone underground, contact Pacific Telephone Co. 24 hr. prior to Const. Phone 686-0037.



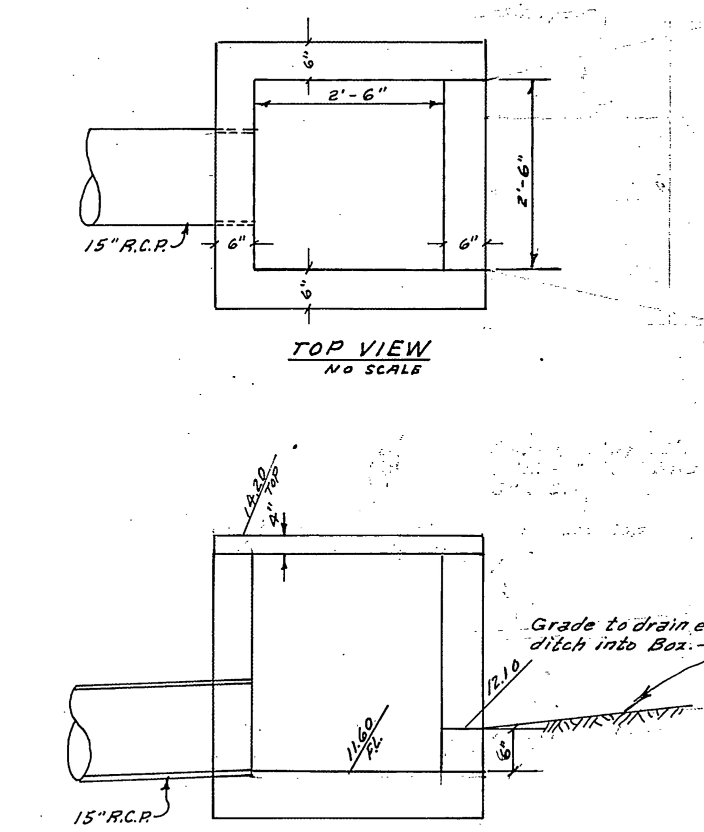
QUANTITY ESTIMATE R/S 26/71

15" R.C.P., 2000-D	49 L.F.
Catch Basin Std. No. 405 (4' opening)	2 Ea.
Cleanout Box Std. No. 425	2 Ea.
18" R.C.P. 2000D	11 L.F.
24" R.C.P. 2000D	610 L.F.

QUANTITY ESTIMATE Lot 2, Block 3

15" R.C.P., 2000-D	145 L.F.
Cleanout Box Std. No. 425 (Modified)	1 Ea.
Cleanout Box Std. No. 425 (Traffic Cover)	1 Ea.
24" R.C.P. 2000D	165 L.F.

Contractor To Contact The State Inspector 2 Days Prior To Construction At 686-3646. Permit Expires Dec. 27, 1965.



DETAIL A
NO SCALE

To be Const. per Standard Dwg. No. 425 without Frame & cover & one side, as shown.

NOTE: The Contractor is to get the necessary encroachment permits, to work on State Right of Way.

INDEXED MR

ALBERT A. WEBB ASSOCIATES CIVIL ENGINEERS RIVERSIDE, CALIFORNIA	APPROVED BY Ernest N. Webb DATE 1/19/65 R.E. No. 9876
W.O. 64-402 FOR: JIMMY TOTMAN	F.B. 558

MARK	REVISIONS	APPR.	DATE
6	Added End Const. 24" RCP @ 2+62 ENW		10.28.71
5	~~Added End Const. 24" RCP @ 2+10~~		
4	Added Note To Contact State Insp.		
3	Revised C.O. Box to Open Box / ENW		
2	Changed Case I Bedding to Case III / E.N.W.		5.27
1	Add C.O. Box - Changed Pipe Sizes / E.N.W.		

DESIGNED BY BEL DRAWN BY BEL CHECKED BY

CITY OF RIVERSIDE, CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

APPROVED BY	BY	DATE
OFFICE ENGINEER	wdg	4-16
PARK DEPARTMENT		
TRAFFIC DIVISION		
ASSISTANT CITY ENG.	ARJ	4-16

APPROVED BY
DIRECTOR OF PUBLIC WORKS
DATE 4-19-65

STORM DRAIN PLAN & PROFILE
UNIVERSITY AVENUE
BETWEEN IOWA AVE & F/W
SOUTHERLY SIDE

HORIZ. SCALE: 1" = 50' VERT. SCALE: 1" = 5'

PROJECT NO. D-130
SHEET 1 OF 1
FILE NO. 64-402-D

NOTE:

1. FOR COMPLETE RIGHT OF WAY AND ACCURATE ACCESS DATA, SEE RIGHT OF WAY MAPS AT DISTRICT OFFICE.
2. SEE OFFSITE HYDROLOGY MAPS FOR LOCAL STREET HYDROLOGY AND OFFSITE RUNOFF.

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
08	Riv	215,60,91	60.7/70.6, 22.0/18.5, 32.7/34.7		2838

Caltrans Metric

REGISTERED CIVIL ENGINEER 7-12-04

PLANS APPROVAL DATE

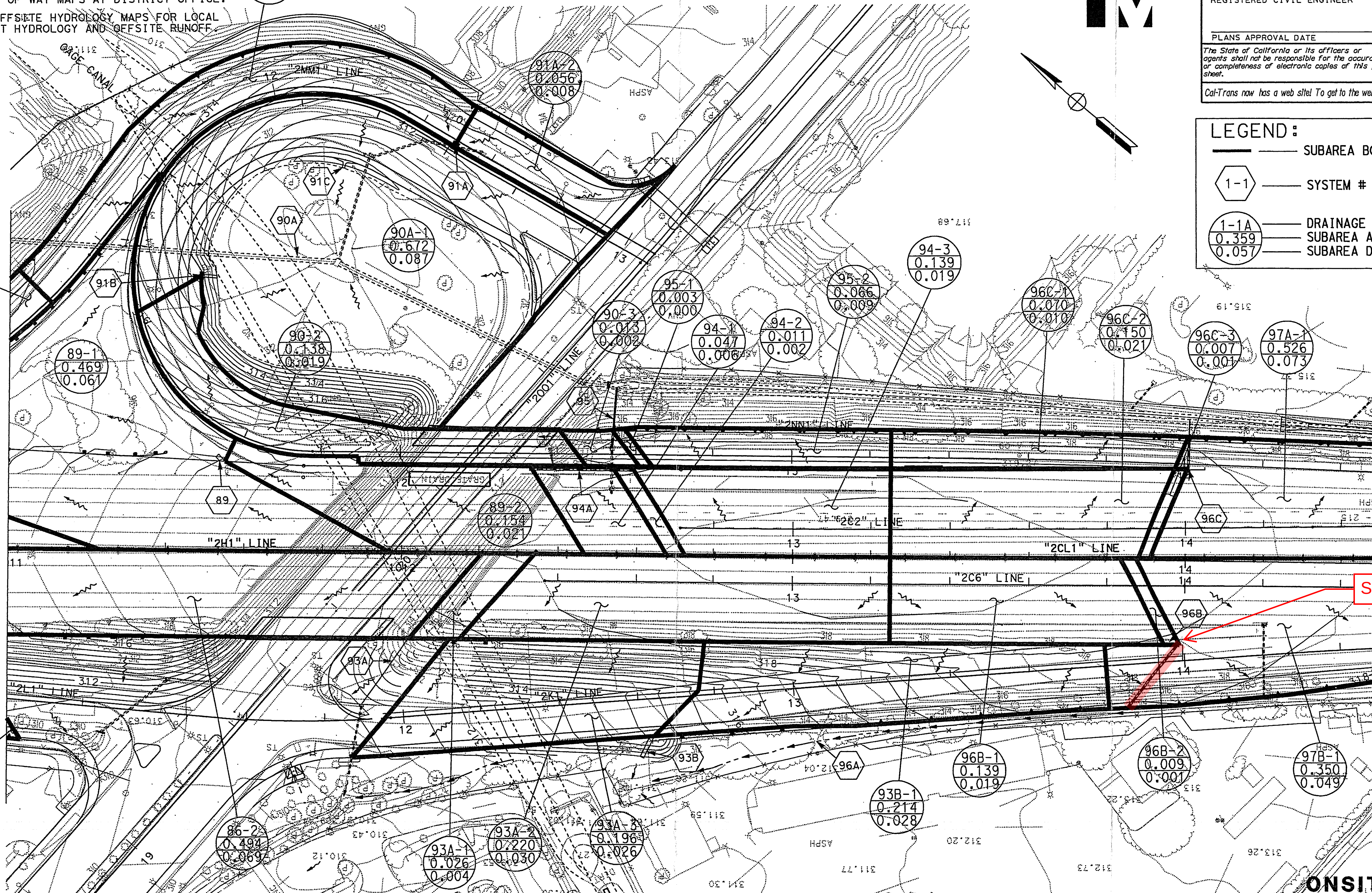
REGISTERED PROFESSIONAL ENGINEER Alan R. Bisi No. C-62808 Exp. 6/30/06 CIVIL STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

Cal-Trans now has a web site! To get to the web site, go to: http://www.dot.ca.gov

LEGEND:

- SUBAREA BOUNDARY
- 1-1 — SYSTEM #
- 1-1A — DRAINAGE SUBAREA #; 0.359 — SUBAREA AREA (HA); 0.057 — SUBAREA DISCHARGE (CMS)



ONSITE HYDROLOGY MAP

SCALE 1:500

H-21

THIS PLAN ACCURATE FOR DRAINAGE WORK ONLY.

ALL DIMENSIONS ARE METERS UNLESS OTHERWISE SHOWN

FOR BIDDING PURPOSES ONLY

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans PROJECT DEVELOPMENT

PROJECT ENGINEER ALAN R. BISI

CALCULATED/DESIGNED BY | CHECKED BY

REVISED BY | DATE REVISED | DATE

FOR REDUCED PLANS ORIGINAL SCALE IS IN MILLIMETERS 0 20 40 60 80

USERNAME => bpatschu
DGN FILE => 833484h021.dgn

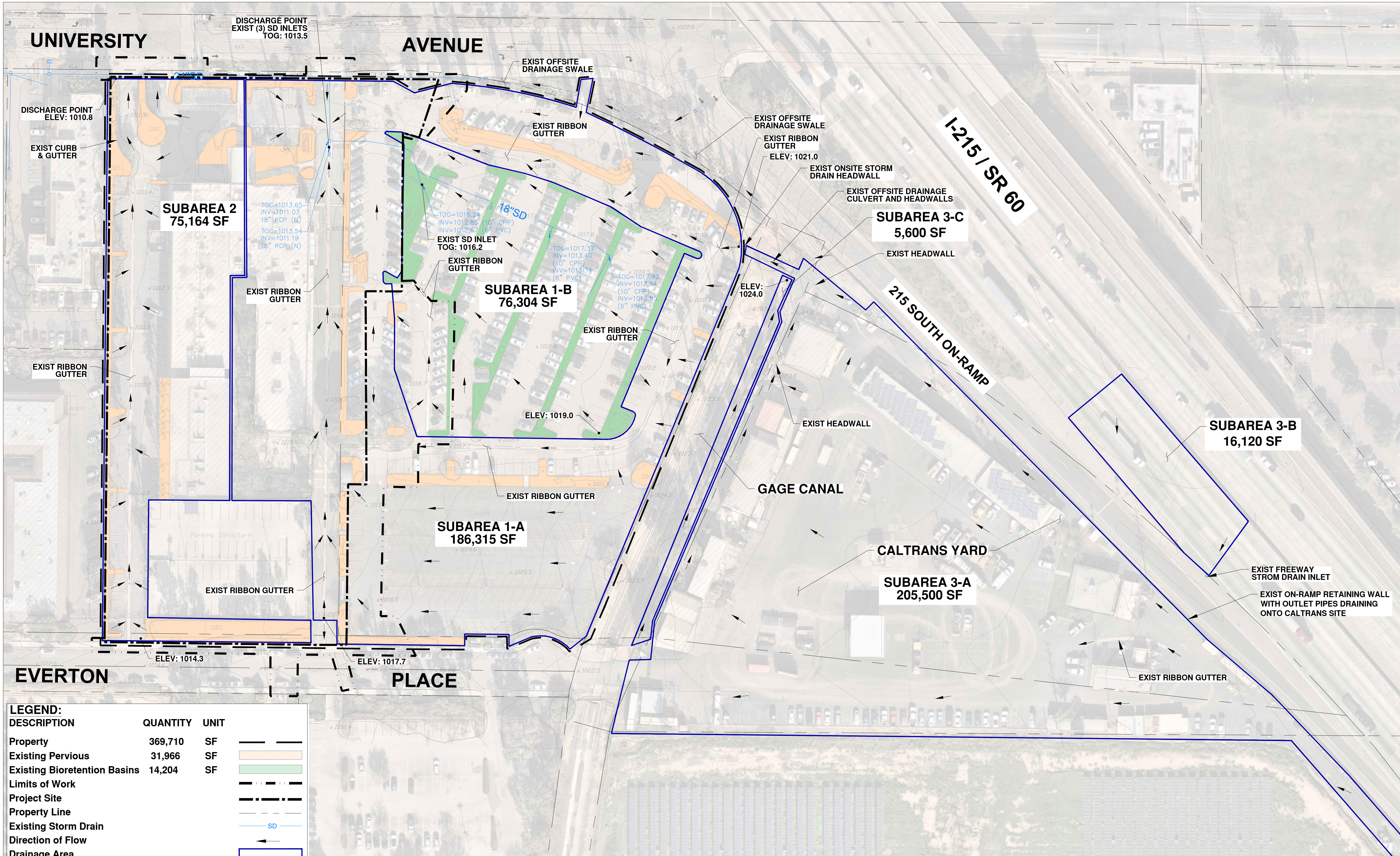
CU 08227 | EA 334841

DATE PLOTTED => 26-NOV-2008
TIME PLOTTED => 09:11

LAST REVISION

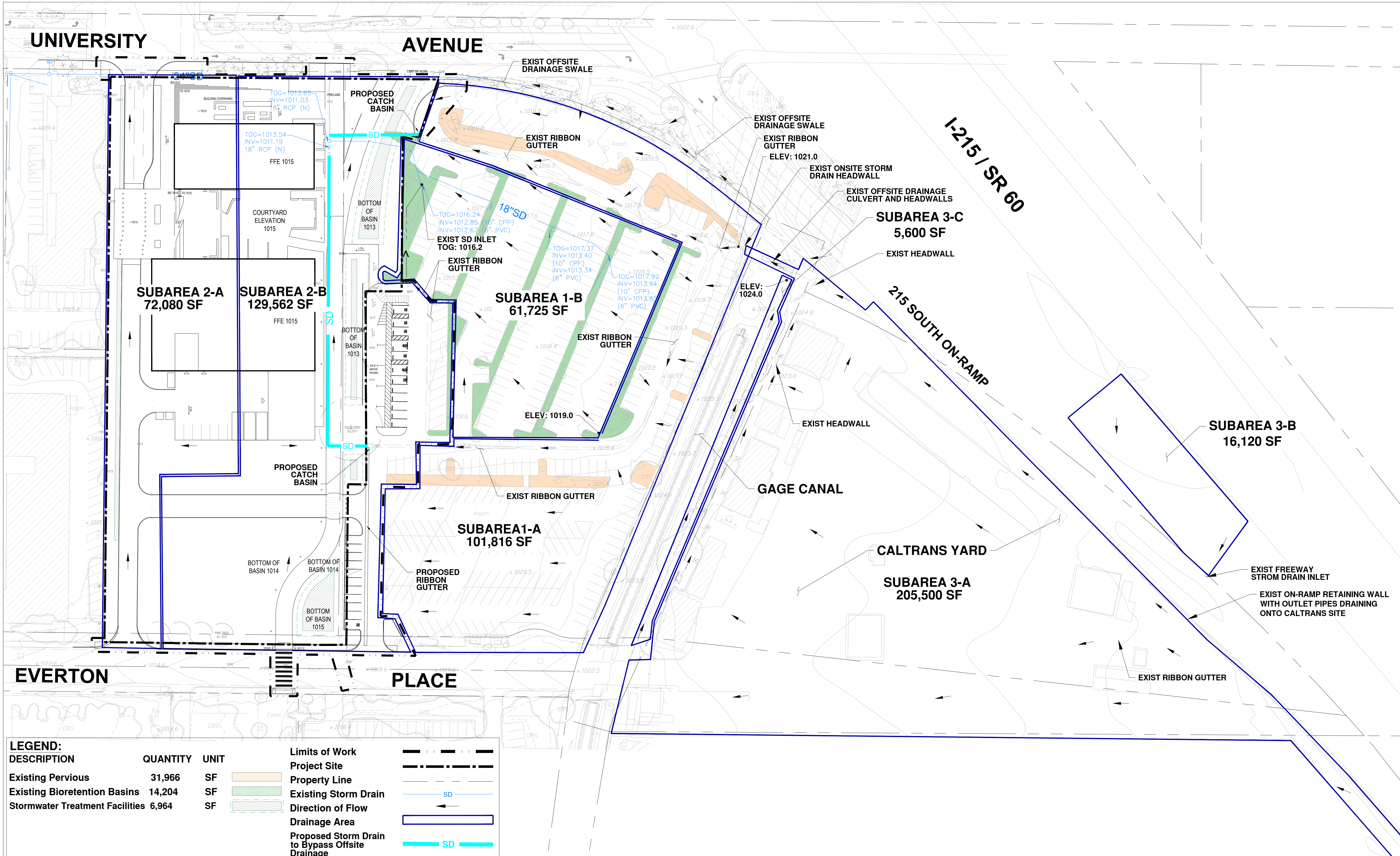
APPENDIX C

Exhibits



EXISTING HYDROLOGY MAP

0' 40' 80' 160'



LEGEND:

DESCRIPTION	QUANTITY	UNIT
Existing Pervious	31,966	SF
Existing Bioretention Basins	14,204	SF
Stormwater Treatment Facilities	6,964	SF

Limits of Work
Project Site
Property Line
Existing Storm Drain
Direction of Flow
Drainage Area
Proposed Storm Drain to Bypass Offsite Drainage

PRELIMINARY HYDROLOGY EXHIBIT

0' 40' 80' 160'

Appendix F

Supporting Noise Information

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/18/2023
Case Description: UCR OASIS - Demo

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Off-site Residences	Residential	52.7	52.7	52.7

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	150	0
Excavator	No	40		80.7	150	0
Dozer	No	40		81.7	150	0
Front End Loader	No	40		79.1	150	0
Backhoe	No	40		77.6	150	0

Results
Calculated (dBA)

Equipment		*Lmax	Leq
Concrete Saw		80	73
Excavator		71.2	67.2
Dozer		72.1	68.1
Front End Loader		69.6	65.6
Backhoe		68	64
	Total	**80**	**75.8**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date:	10/18/2023
Case Description:	UCR OASIS - Site Prep

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Off-site Residences	Residential	52.7	52.7	52.7

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	150	0
Tractor	No	40	84		150	0

Equipment		Results Calculated (dBA) *Lmax	Leq
Dozer		72.1	68.1
Tractor		74.5	70.5
	Total	**74.5**	**72.5**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/18/2023
Case Description: UCR OASIS - Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Off-site Residences	Residential	52.7	52.7	52.7

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	150	0
Dozer	No	40		81.7	150	0
Grader	No	40	85		150	0
Tractor	No	40	84		150	0

Results
Calculated (dBA)

Equipment		*Lmax	Leq
Excavator		71.2	67.2
Dozer		72.1	68.1
Grader		75.5	71.5
Tractor		74.5	70.5
	Total	**75.5**	**75.7**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/18/2023
Case Description: UCR OASIS - Building Construction

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Off-site Residences	Residential	52.7	52.7	52.7

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	150	0
Front End Loader	No	40		79.1	150	0
Generator	No	50		80.6	150	0
Tractor	No	40	84		150	0
Welder / Torch	No	40		74	150	0

Results
Calculated (dBA)

Equipment		*Lmax	Leq
Crane		71	63
Front End Loader		69.6	65.6
Generator		71.1	68.1
Tractor		74.5	70.5
Welder / Torch		64.5	60.5
	Total	**74.5**	**73.9**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date:	10/18/2023
Case Description:	UCR OASIS - Architectural Coatings

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Off-site Residences	Residential	52.7	52.7	52.7

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	150	0

		Results	
		Calculated (dBA)	
Equipment		*Lmax	Leq
Compressor (air)		68.1	64.1
	Total	**68.1**	**64.1**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/18/2023
Case Description: UCR OASIS - Paving

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Off-site Residences	Residential	52.7	52.7	52.7

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	150	0
Paver	No	50		77.2	150	0
Concrete Pump Truck	No	20		81.4	150	0
Roller	No	20		80	150	0
Tractor	No	40	84		150	0

Results
Calculated (dBA)

Equipment		*Lmax	Leq
Concrete Mixer Truck		69.3	65.3
Paver		67.7	64.7
Concrete Pump Truck		71.9	64.9
Roller		70.5	63.5
Tractor		74.5	70.5
	Total	**74.5**	**73.6**

*Calculated Lmax is the Loudest value.

Appendix G

Water Capacity Study

MEMO

To: Daneca Stevens, Project Manager, University of California, Riverside

From: Jaylee McDowell, Project Engineer, Psomas

Date: September 8, 2023

Subject: UCR OASIS Park – Water Capacity Study for CEQA Purposes

Purpose

The University of California ("UCR" or "University") is developing an Opportunities to Advance Sustainability, Innovation and Social Inclusion (OASIS) Park ("Project") on University property located at 1200 University Avenue and a portion of 1150 and 1160 University Avenue (Assessor Parcel Number [APN] 253-050-005, and a portion of APNs 253-050-006, 253-050-007, and 253-050-008), south of University Avenue, north of Everton Place, and west of the Caltrans yard and Interstate 215/State Route 60 (I-215/SR 60) freeway, in the City of Riverside, California. This memorandum summarizes the existing and proposed water demands for the UCR OASIS Park project, and the resulting will serve letter and fire flow test provided by the City of Riverside.

Existing Conditions

The property comprises approximately 8 acres, approximately 4 of which will be improved as part of the Project ("Project site"). The existing property consists of a University Extension (UNEX) building, parking structure, surrounding surface parking lots, and hardscape/landscape. There are two existing City of Riverside water mains located adjacent to the site: an 18-inch transmission main and a 12-inch distribution main. The project site is currently serviced by two (2) 3-inch domestic water meters and one (1) 1-inch irrigation meter, fed from the existing 12-inch City of Riverside water main. One of the existing 3-inch service laterals connects to the existing UNEX building. The existing building does not include a fire sprinkler system and there is no dedicated fire service to the site. Three (3) existing public fire hydrants are located near the site, one (1) on University Avenue and two (2) on Everton Place.

An exhibit showing the existing water system and lateral connections has been included as Attachment 1.

An analysis prepared by the MEP programming consultant, estimates the existing site to have a domestic water demand of 270 gallons per minute (gpm). See Attachment 2 for related correspondence.

Proposed Conditions

The UCR OASIS Park project proposes the demolition of the existing UNEX building, Parking Structure, and associated hardscape and landscape areas, and for CEQA purposes, construction of a new, approximately 70,000-square-foot (sf) building with a program mix consisting of the following spaces: Research/Laboratory facilities (60% or approximately 42,000 sf), Offices (30% or approximately 21,000 sf), and Academic Instruction facilities/Assembly and Exhibition Spaces (10% or approximately 7,000 sf). This program results in a domestic water demand of 150 gpm, as calculated by the MEP programming consultant (See Attachment 2), therefore reducing the demand from the public water main from the existing condition.

An exhibit showing the proposed water system and lateral connections has been included as Attachment 2.

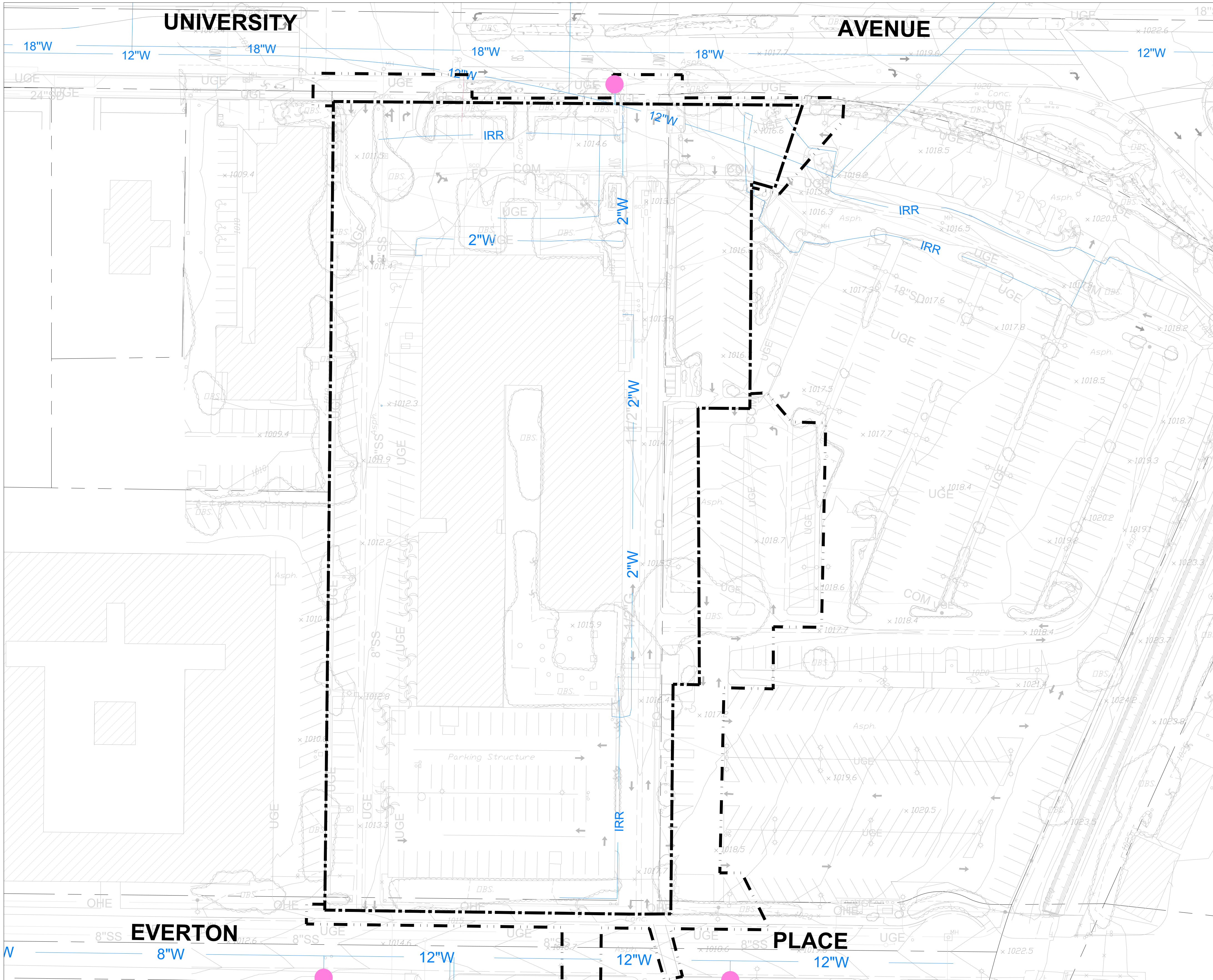
A meeting with the City of Riverside was held on May 1, 2023 and it was confirmed that, due to the reduction in water demand from the project site, no improvements will be required for the existing water system (See Attachment 4, City of Riverside Meeting Minutes). The city subsequently provided a will serve letter (Attachment 5) confirming its ability to service the Project as well as a Fire Flow Test (Attachment 6).

According to the city, the existing water meter may be salvaged for reuse, or it may be replaced with a smaller meter in order to receive a connection fee credit. The existing backflow preventer may also be salvaged for reuse or replaced with the new system.

The proposed building will include a fire sprinkler system and at least one (1) new onsite hydrant with an estimated fire demand of 1,500gpm at 20psi. A new fire service lateral will be established independently from the proposed domestic water service which will connect to the existing 12-inch City of Riverside water main. The new fire service will require backflow prevention.

Attachment 1

Existing Water System



LEGEND

LIMITS OF WORK	
SITE BOUNDARY	
PROPERTY LINE	
SANITARY SEWER (SIZE PER PLAN)	SS
WATER (SIZE PER PLAN)	W
IRRIGATION (SIZE PER PLAN)	IRR
STORM DRAIN (SIZE PER PLAN)	SD
UNDERGROUND ELECTRICAL	UGE
OVERHEAD ELECTRICAL	OHE
GAS (SIZE PER PLAN)	G
COMMUNICATION	COM
FIBEROPTIC LINE	FO
FIRE HYDRANT	

EXISTING WATER EXHIBIT

0' 40' 80' 160'

Attachment 2

Existing and Proposed Water Demands

From: Heather Ruszczyk <hruszczyk@MillerHull.com>
Sent: Thursday, March 23, 2023 6:50 PM
To: Beeks, Kameron <kbeeks@glumac.com>; Navarro, Ari <ANavarro@glumac.com>
Cc: Sarah Curran <sarah.curran@psomas.com>
Subject: UCR_CEQA Utility Capacity

Hi Kameron and Ari,

Confirming the following areas/program mix:

- Total Building Area (CEQA): 70,000 sf
- Program: The program mix is actually going to be Lab (60% or 42,000 sf), Office (30% or 21,000 sf), Meeting/Assembly (10% or 7,000 sf)

Sanitary: 252 dfu; **6” sanitary sewer service**

Domestic Water: 150 gpm; **3” domestic water service**

Please provide the following no later than EOD 3/31:

- Update plumbing calcs accordingly to program mix/areas identified above.
- Provide plumbing calcs for existing UNEX Plumbing Calcs. Based on what I could clearly make out as plumbing fixtures on the as-builts from the last known use, I counted:
  - Lavs: 186
  - Toilets: 191
  - Urinals: 5
  - Tub/Showers: 172

We ran the existing fixture unit counts above. Given the large amount of tub showers we assumed that these were living/dormitories, so I ran the numbers using tank type, private water closets. If these are flush valve type water closets than the numbers will change.

Sanitary: 1200 dfu; **8” sanitary sewer service**

Domestic Water: 270 gpm; **4” domestic water service**

Regarding energy, I’ll be reaching out to UCR to see if they can provide contact information for a Customer Manager either at UCR or the electrical company and whether we are able to reach out directly or if they’d like to be involved. Objective is to get a meeting with them sometime in the next month.

Please let me know if you need anything else right now for utility capacity related items.

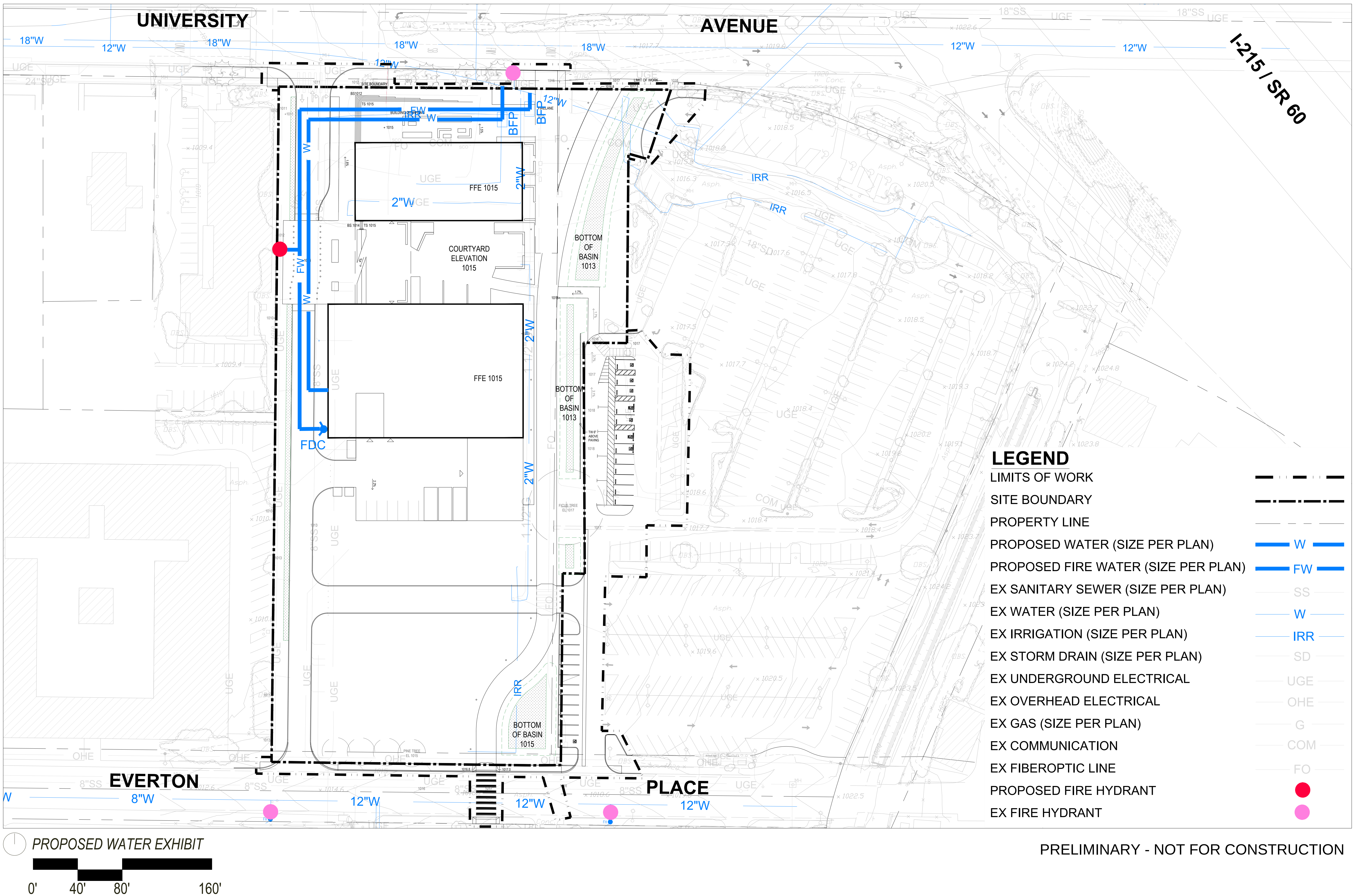
Thanks,
Heather

Heather Ruszczyk, AIA, Associate

The Miller Hull Partnership, LLP
4980 North Harbor Drive, Suite 100
San Diego, CA 92106
Main: 619-220-0984

Attachment 3

Proposed Water System



PROPOSED WATER EXHIBIT

PRELIMINARY - NOT FOR CONSTRUCTION

Attachment 4

City of Riverside Meeting Minutes

Meeting Notes
UCR OASIS Park – City of Riverside Utility Discussion
05-01-2023
11:00AM-12:00AM

Attendees:
Psomas – Sarah Curran, Jaylee McDowell, Amy Palowski
Miller Hull – Heather Ruszczyk
UCR – Stephanie Tang, Daneca Stevens
City of Riverside – Chris Scully (Public Works), Chris Gross (Public Utilities Department)

Discussion:

I. **Overview:**
   1. City Overview
      a. Public Works (Chris Scully) – oversees sewer and storm drain
      b. Public Utilities Department (Chris Gross) – oversees water
   2. Project Overview
      a. Site study to see how it impacts utilities.
      b. Consultant team is preparing utility study for future development to be implemented via design build bid.
      c. Desire to understand utility needs/impacts to inform CEQA process, cost estimate, and future design build bid.
      d. Proposed building footprint – 70,000 sf.
      e. Existing building footprint – Just under 200,000 sf.

II. **Notes:**
   1. Water
      a. Existing City owned water lines adjacent to project:
         i. 12-inch and 18-inch waterline within University Ave. Reclaimed water is not available at this location.
         ii. Lateral to existing building is from 12-inch main.
            - Psomas to send existing conditions exhibit to Chris Gross to review for their size and location.
         iii. What is the existing meter size?
            - Chris Gross to confirm size of existing meter(s) (Domestic and Irrigation if applicable).
         iv. Domestic water demand will decrease from existing to proposed condition (approximately 270 gpm to 150 gpm).
         v. Proposed Domestic Water Service:
            - No issues with municipal system capacity since demands of site are going down.
            - New connections should be made to 12-inch city main.
            - Use same meter, relocate, or replace
            - If meter is sized down, a connection fee credit will be retained for future meter.
            - Meter could be sized for future connection -OR- Install 2nd meter in different location as part of future project. Either would be okay.

- Backflow preventer can be reused, relocated or replaced.
- Confirm required backflow prevention type for Domestic Service.

vi. Proposed Fire Water service:

- No existing hydrants located on site. One (1) public in University and two (2) public in Everton.
- Existing building is not sprinklered. No dedicated fire service on site.
- New building will be sprinklered and overall fire hydrant demand will likely be around 1500GPM/20PSI.
- Fire service will require separate lateral.
- Backflow prevention: Sprinkler system would implicate need for backflow prevention. General backflow guidelines are available from the city website, but it would be dependent on project and designated as part of city review process. Detector Assembly to be part of backflow preventer. RPDA protection is required on City system if sprinkler water is mixed with other chemicals. Otherwise DCDA. Backflow protection. Backflow should be located as close to city system as possible.

vii. Installation:

- City will install water service up to and including meter (at or near property line). Fire water will be installed by city up to property line, or near to it. If mainline updates required within the ROW, then plans must be prepared by UCR consultant and submitted to plan check, contractor to install, City to tie-in laterals. Separate meter preferred for landscape irrigation (CG to confirm).
- Contractor to install backflow preventer and everything downstream of meter or property line (fire).
- City staff will do initial inspection/certification of backflow device to confirm installed per City standards. UCR is responsible for annual certification. No separate fee for this – included in construction cost all as 1 fee (CG will include this in the letter).

viii. Will Serve Letter:

- Based on discussion, city can provide team with fire flow letter for existing hydrants on both University and Everton Place. No additional documentation required.
- Similarly, city will prepare will serve letter including service costs, without any additional documentation from UCR team. This letter can also provide estimate of capacity for future development at the site in GPM.

2. Sewer
   a. Existing sewer facilities adjacent to and within project limits:
      i. Psomas exhibit indicates one 8-inch and two 12-inch city sewer mains within University. According to the city, the 8-inch sewer is abandoned and two 12-inch sewer lines abandoned and replaced by 18-inch within University. City to send us updated information. Everything drains to the West.

- City may find record of building plan for the assumed 6-inch lateral coming onto site (appears there is only 1 lateral coming onto the site; not two as shown on Psomas exhibit).

b. Will Serve Letter:
   i. Demands for sewer service will decrease with future development.
   ii. Psomas to prepare Technical Memo describing existing use and demands of proposed development. Submit to Public Works for use in preparing Will Serve Letter.

c. Installation/Standards:
   i. City Standard 562 for sewer lateral connection. Minimum size is 6-inches.
   ii. CCTV will need to be performed to confirm exist line can be used to service future development.

d. Future Capacity:
   i. In order to evaluate capacity for future improvements on site it would be necessary for the city's model to be updated to reflect future demands.

3. Storm Drain

a. Existing City Storm Drain:
   i. 24-inch city storm drain in University as indicated on Psomas exhibit. There appears to be a 15-inch SD connecting to that not shown on Exhibit. City can provide as builts for existing Storm Drain. Storm Drain mains drain East to West.

b. Requirements for future connection
   i. Encroachment permit required (private lateral tying into City main). Can also tie into existing private lateral without permit.

Attachment 5

City of Riverside Will Serve Letter

City of Arts & Innovation

May 18, 2023

Attn: Customer

RE: WATER SERVICE AVAILABILITY TO:
UCR - Oasis Park Project
1200 University Avenue, Riverside, CA 92507
APN#253-050-005, -006, -007, -008

To Whom It May Concern,

The Riverside Public Utilities Department is prepared to offer water service to the above referenced property upon completion of financial arrangements and compliance with the Department's Rules and Regulations for the installation of water facilities.

This property is currently served by (2) 3" domestic water meters and (1) 1" irrigation meter.

Please feel free to contact our office at (951) 826-5285 if you have any questions or need further information.

Sincerely,

Christopher Gross
Utilities Senior Water Engineer
cgross@riversideca.gov

Attachment 6

Fire Flow Test

CITY OF RIVERSIDE

City of Arts & Innovation

May 4, 2023

UNIVERSITY OF CALIFORNIA, RIVERSIDE
1223 UNIVERSITY AVE, SUITE 240
RIVERSIDE, CA 92507

Attn: DANECA STEVENS

Subject: Fire Flow Test Results for 1200 UNIVERSITY AVE , Riverside, CA 92507-4562 – Conducted on 05/03/2023

Project: GP-2023-09166

Dear DANECA STEVENS:

The City of Riverside Public Utilities Department (RPU) is providing this letter in response to your request dated 05/04/2023 for fire flow test data near 1200 UNIVERSITY AVE , Riverside, CA 92507-4562. The following results were determined from a computer simulation of RPU's water system from a hydraulic model.

- RPU's analysis identified the available fire flow near FH 2764 (on University) is approximately 4,000 gallons per minute (gpm) at 25 psi residual. Furthermore, the anticipated static pressure in the area is 77 psi.

- RPU's analysis identified the available fire flow near FH 3032 (on Everton)is approximately 1,800 gallons per minute (gpm) at 55 psi residual. Furthermore, the anticipated static pressure in the area is 77 psi.

Please note, the results of this test are valid for one year following the date of this letter. Please contact Water Engineering at 951-826-5285, if you have any questions regarding this test.

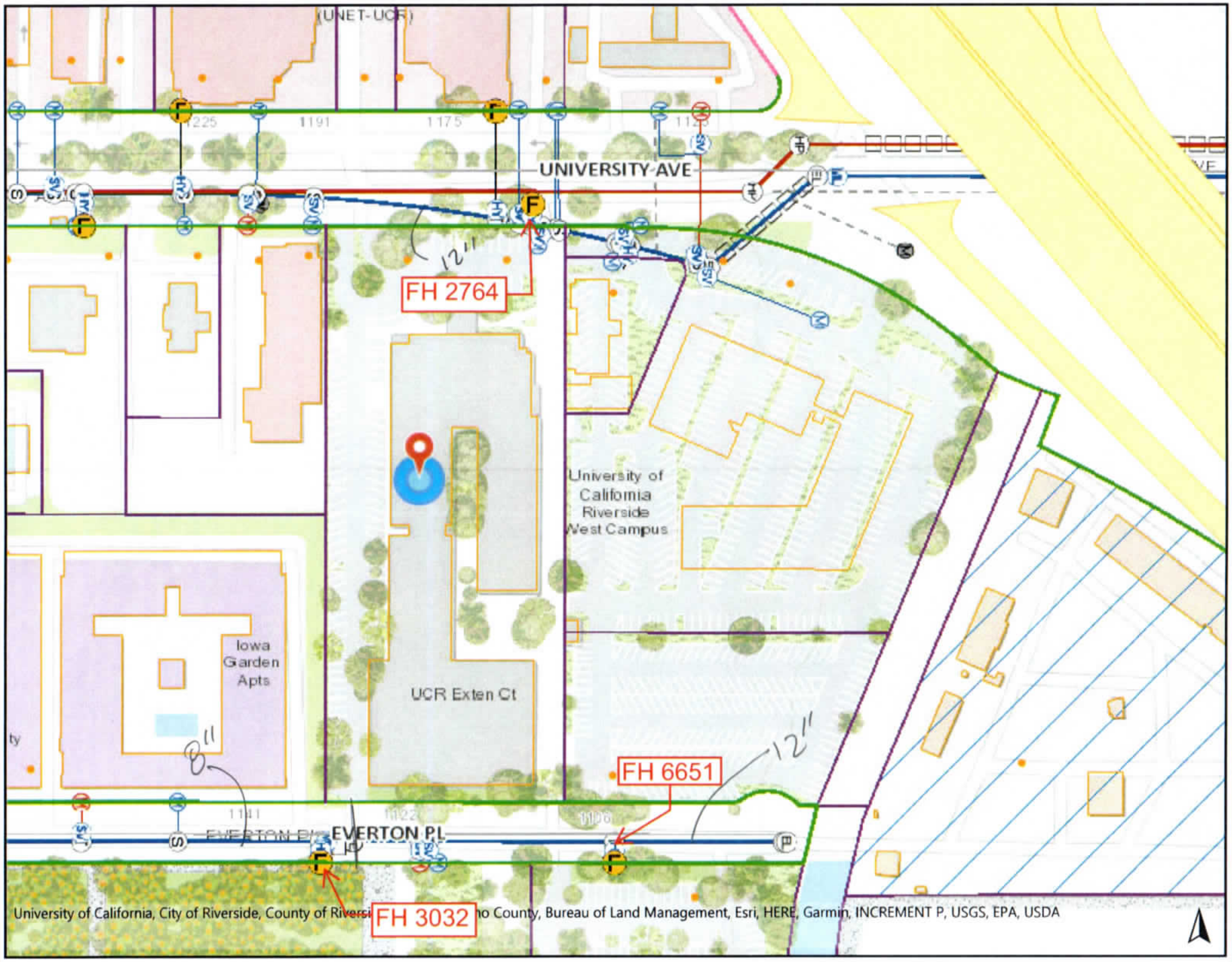
Sincerely,

RPU Water Engineering

Attachment: Fire Flow Test Exhibit

CITY OF RIVERSIDE

1200 University Ave



Legend

AdministrativeBoundary

City Boundary

GeneralReference

Freeways

Cadastral

Address Pt

Single Family

Street Centerline

Waiver Of Access Restricted

Parcel Line

Lot Line

ROW Line

Parcel

Planimetric

Buildings

Notes

0 250 500 ft

This map was created, in part, by the City of Riverside Geographic Information System and intended to be operated solely for the convenience of the City. The City does not warrant the accuracy of this map, and no decision involving a risk of economic loss or physical injury should be made in reliance thereon.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Appendix H

Sewer Capacity Study

MEMO

To: Daneca Stevens, Project Manager, University of California, Riverside

From: Jaylee McDowell, Project Engineer, Psomas

Date: September 8, 2023

Subject: UCR OASIS Park – Sewer Capacity Study for CEQA purposes

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Purpose

The University of California ("UCR" or "University") is developing an Opportunities to Advance Sustainability, Innovation and Social Inclusion (OASIS) Park ("Project") on University property located at 1200 University Avenue and a portion of 1150 and 1160 University Avenue (Assessor Parcel Number [APN] 253-050-005, and a portion of APNs 253-050-006, 253-050-007, and 253-050-008), south of University Avenue, north of Everton Place, and west of the Caltrans yard and Interstate 215/State Route 60 (I-215/SR 60) freeway, in the City of Riverside, California. This memorandum summarizes the existing and proposed sanitary sewer demands for the UCR OASIS Park project, and the resulting will serve letter provided by the City of Riverside. The summary herein has been prepared to support the CEQA permitting for the project.

Existing Conditions

The property comprises approximately 8 acres, approximately 4 of which will be improved as part of the Project ("Project site"). The existing property consists of a University Extension (UNEX) building, parking structure, surrounding surface parking lots, and hardscape/landscape. Based on review of the record drawings, an 8-inch sewer lateral services the existing UNEX building before connecting to an 8-inch City of Riverside Sanitary Sewer main in University Avenue. This 8-inch main connects to an existing City of Riverside 18-inch sanitary sewer main located to the north, also within University Avenue.

An exhibit showing the existing sewer system and lateral connection has been included as Attachment 1.

An analysis prepared by the MEP programming consultant, estimates the sanitary sewer demand for the existing building is approximately **1200 dfu.** See Attachment 2 for related correspondence.

Proposed Conditions

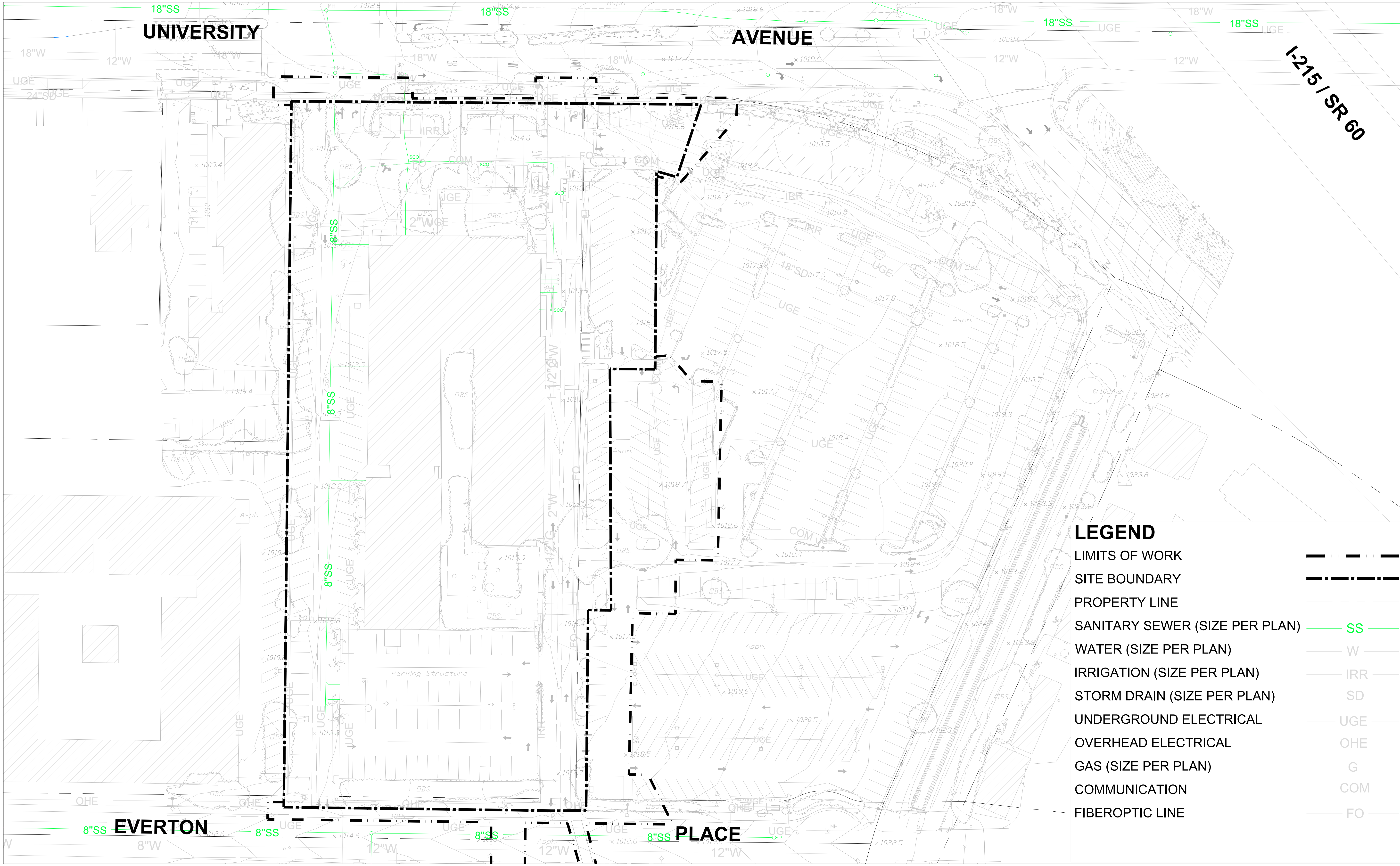
The UCR OASIS Park project proposes the demolition of the existing UNEX building, Parking Structure, and associated hardscape and landscape areas, and for CEQA purposes, construction of a new, approximately 70,000-square-foot (sf) building with a program mix consisting of the following spaces: Research/Laboratory facilities (60% or approximately 42,000 sf), Offices (30% or approximately 21,000 sf), and Academic Instruction facilities/Assembly and Exhibition Spaces (10% or approximately 7,000 sf). This program results in a demand of **252 dfu,** as calculated by the MEP programming consultant (See Attachment 2) therefore reducing the contribution to the public sewer system from the existing condition.

An exhibit showing the proposed sewer system and lateral connection has been included as Attachment 3.

A meeting was held with the City of Riverside on May 1, 2023 to discuss offsite utility impacts. Attachment 4 provides the minutes of that meeting. As stated in the attached Sanitary Sewer Will Serve Letter (Attachment 5) provided by the City of Riverside, no improvements will be required to the municipal sewer system.

Attachment 1

Existing Sanitary Sewer System



EXISTING SEWER EXHIBIT

0' 40' 80' 160'

Attachment 2

Existing and Proposed Sewer Demands

From: Heather Ruszczyk <hruszczyk@MillerHull.com>
Sent: Thursday, March 23, 2023 6:50 PM
To: Beeks, Kameron <kbeeks@glumac.com>; Navarro, Ari <ANavarro@glumac.com>
Cc: Sarah Curran <sarah.curran@psomas.com>
Subject: UCR_CEQA Utility Capacity

⚠ **CAUTION:** This email originated from an external sender. Verify the source before opening links or attachments. ⚠

Hi Kameron and Ari,

Confirming the following areas/program mix:

- Total Building Area (CEQA): 70,000 sf
- Program: The program mix is actually going to be Lab (60% or 42,000 sf), Office (30% or 21,000 sf), Meeting/Assembly (10% or 7,000 sf)

Sanitary: 252 dfu; **6" sanitary sewer service**

Domestic Water: 150 gpm; **3" domestic water service**

Please provide the following no later than EOD 3/31:

- Update plumbing calcs accordingly to program mix/areas identified above.
- Provide plumbing calcs for existing UNEX Plumbing Calcs. Based on what I could clearly make out as plumbing fixtures on the as-builts from the last known use, I counted:
  - Lavs: 186
  - Toilets: 191
  - Urinals: 5
  - Tub/Showers: 172

We ran the existing fixture unit counts above. Given the large amount of tub showers we assumed that these were living/dormitories, so I ran the numbers using tank type, private water closets. If these are flush valve type water closets than the numbers will change.

Sanitary: 1200 dfu; **8" sanitary sewer service**

Domestic Water: 270 gpm; **4" domestic water service**

Regarding energy, I'll be reaching out to UCR to see if they can provide contact information for a Customer Manager either at UCR or the electrical company and whether we are able to reach out directly or if they'd like to be involved. Objective is to get a meeting with them sometime in the next month.

Please let me know if you need anything else right now for utility capacity related items.

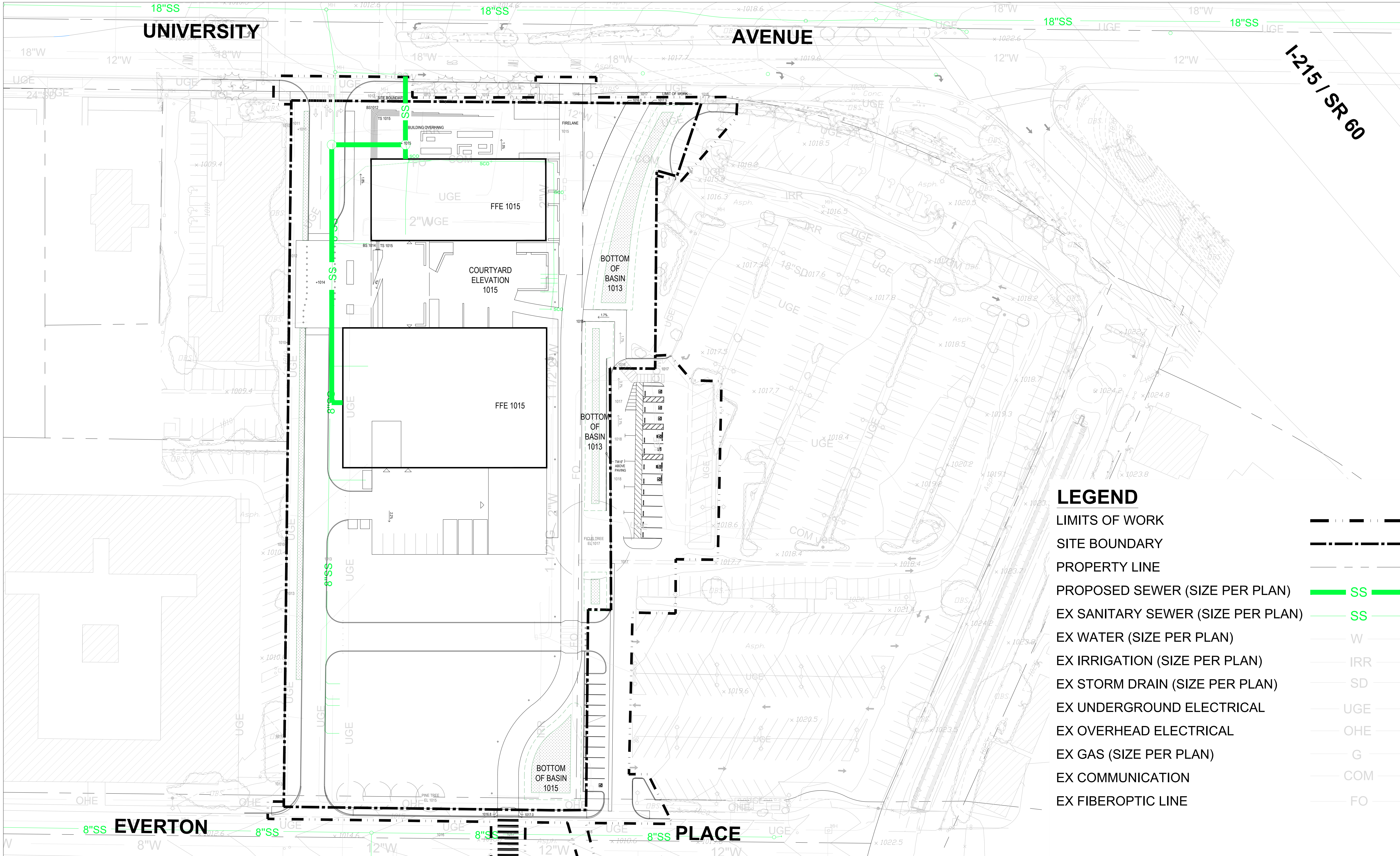
Thanks,
Heather

Heather Ruszczyk, AIA, Associate

The Miller Hull Partnership, LLP
4980 North Harbor Drive, Suite 100
San Diego, CA 92106
Main: 619-220-0984

Attachment 3

Proposed Sanitary Sewer System



PROPOSED SEWER EXHIBIT

0' 40' 80' 160'

PRELIMINARY - NOT FOR CONSTRUCTION

Attachment 4

City of Riverside Meeting Minutes

Meeting Notes
UCR OASIS Park – City of Riverside Utility Discussion
05-01-2023
11:00AM-12:00AM

Attendees:
Psomas – Sarah Curran, Jaylee McDowell, Amy Palowski
Miller Hull – Heather Ruszczyk
UCR – Stephanie Tang, Daneca Stevens
City of Riverside – Chris Scully (Public Works), Chris Gross (Public Utilities Department)

Discussion:

I. **Overview:**
1. City Overview
    a. Public Works (Chris Scully) – oversees sewer and storm drain
    b. Public Utilities Department (Chris Gross) – oversees water
2. Project Overview
    a. Site study to see how it impacts utilities.
    b. Consultant team is preparing utility study for future development to be implemented via design build bid.
    c. Desire to understand utility needs/impacts to inform CEQA process, cost estimate, and future design build bid.
    d. Proposed building footprint – 70,000 sf.
    e. Existing building footprint – Just under 200,000 sf.

II. **Notes:**
1. Water
    a. Existing City owned water lines adjacent to project:
        i. 12-inch and 18-inch waterline within University Ave. Reclaimed water is not available at this location.
        ii. Lateral to existing building is from 12-inch main.
            - Psomas to send existing conditions exhibit to Chris Gross to review for their size and location.
        iii. What is the existing meter size?
            - Chris Gross to confirm size of existing meter(s) (Domestic and Irrigation if applicable).
        iv. Domestic water demand will decrease from existing to proposed condition (approximately 270 gpm to 150 gpm).
        v. Proposed Domestic Water Service:
            - No issues with municipal system capacity since demands of site are going down.
            - New connections should be made to 12-inch city main.
            - Use same meter, relocate, or replace
            - If meter is sized down, a connection fee credit will be retained for future meter.
            - Meter could be sized for future connection -OR- Install 2nd meter in different location as part of future project. Either would be okay.

- Backflow preventer can be reused, relocated or replaced.
- Confirm required backflow prevention type for Domestic Service.

vi. Proposed Fire Water service:
- No existing hydrants located on site. One (1) public in University and two (2) public in Everton.
- Existing building is not sprinklered. No dedicated fire service on site.
- New building will be sprinklered and overall fire hydrant demand will likely be around 1500GPM/20PSI.
- Fire service will require separate lateral.
- Backflow prevention: Sprinkler system would implicate need for backflow prevention. General backflow guidelines are available from the city website, but it would be dependent on project and designated as part of city review process. Detector Assembly to be part of backflow preventer. RPDA protection is required on City system if sprinkler water is mixed with other chemicals. Otherwise DCDA. Backflow protection. Backflow should be located as close to city system as possible.

vii. Installation:
- City will install water service up to and including meter (at or near property line). Fire water will be installed by city up to property line, or near to it. If mainline updates required within the ROW, then plans must be prepared by UCR consultant and submitted to plan check, contractor to install, City to tie-in laterals. Separate meter preferred for landscape irrigation (CG to confirm).
- Contractor to install backflow preventer and everything downstream of meter or property line (fire).
- City staff will do initial inspection/certification of backflow device to confirm installed per City standards. UCR is responsible for annual certification. No separate fee for this – included in construction cost all as 1 fee (CG will include this in the letter).

viii. Will Serve Letter:
- Based on discussion, city can provide team with fire flow letter for existing hydrants on both University and Everton Place. No additional documentation required.
- Similarly, city will prepare will serve letter including service costs, without any additional documentation from UCR team. This letter can also provide estimate of capacity for future development at the site in GPM.

2. Sewer

a. Existing sewer facilities adjacent to and within project limits:

i. Psomas exhibit indicates one 8-inch and two 12-inch city sewer mains within University. According to the city, the 8-inch sewer is abandoned and two 12-inch sewer lines abandoned and replaced by 18-inch within University. City to send us updated information. Everything drains to the West.

            - City may find record of building plan for the assumed 6-inch lateral coming onto site (appears there is only 1 lateral coming onto the site; not two as shown on Psomas exhibit).
   b. Will Serve Letter:
      i. Demands for sewer service will decrease with future development.
      ii. Psomas to prepare Technical Memo describing existing use and demands of proposed development. Submit to Public Works for use in preparing Will Serve Letter.
   c. Installation/Standards:
      i. City Standard 562 for sewer lateral connection. Minimum size is 6-inches.
      ii. CCTV will need to be performed to confirm exist line can be used to service future development.
   d. Future Capacity:
      i. In order to evaluate capacity for future improvements on site it would be necessary for the city's model to be updated to reflect future demands.
3. Storm Drain
   a. Existing City Storm Drain:
      i. 24-inch city storm drain in University as indicated on Psomas exhibit. There appears to be a 15-inch SD connecting to that not shown on Exhibit. City can provide as builts for existing Storm Drain. Storm Drain mains drain East to West.
   b. Requirements for future connection
      i. Encroachment permit required (private lateral tying into City main). Can also tie into existing private lateral without permit.

Attachment 5

City of Riverside Will Serve Letter

CITY OF RIVERSIDE

City of Arts & Innovation

July 10, 2023

Stephanie Tang
1223 University Ave, Suite 240
Riverside CA 92507

RE: Sewer Availability – 1200 University Ave & a portion of 1150 & 1160 University Ave
APN's 253-050-005, 253-050-006, 253-050-007, 253-050-008

To Whom It May Concern:

According to our records, sewer facilities are available to serve 1200 University and 1150 and 1160 University Ave Riverside, CA 92507. If you should have any further questions, please feel free to contact Public Works at (951) 826-5341.

Thank you,

Chris Scully, PE
Engineering Manager
Public Works, Land Development

3900 Main Street, Riverside, CA 92522 | Phone: (951) 826-5311 | **RiversideCA.gov**

Appendix I

Electrical Will Serve Letter

MEMO

To: Daneca Stevens, Project Manager, University of California, Riverside

From: Ari Navarro, Project Engineer, Glumac

Date: September 8, 2023

Subject: UCR OASIS Park – Electrical Will Serve Letter for CEQA purposes

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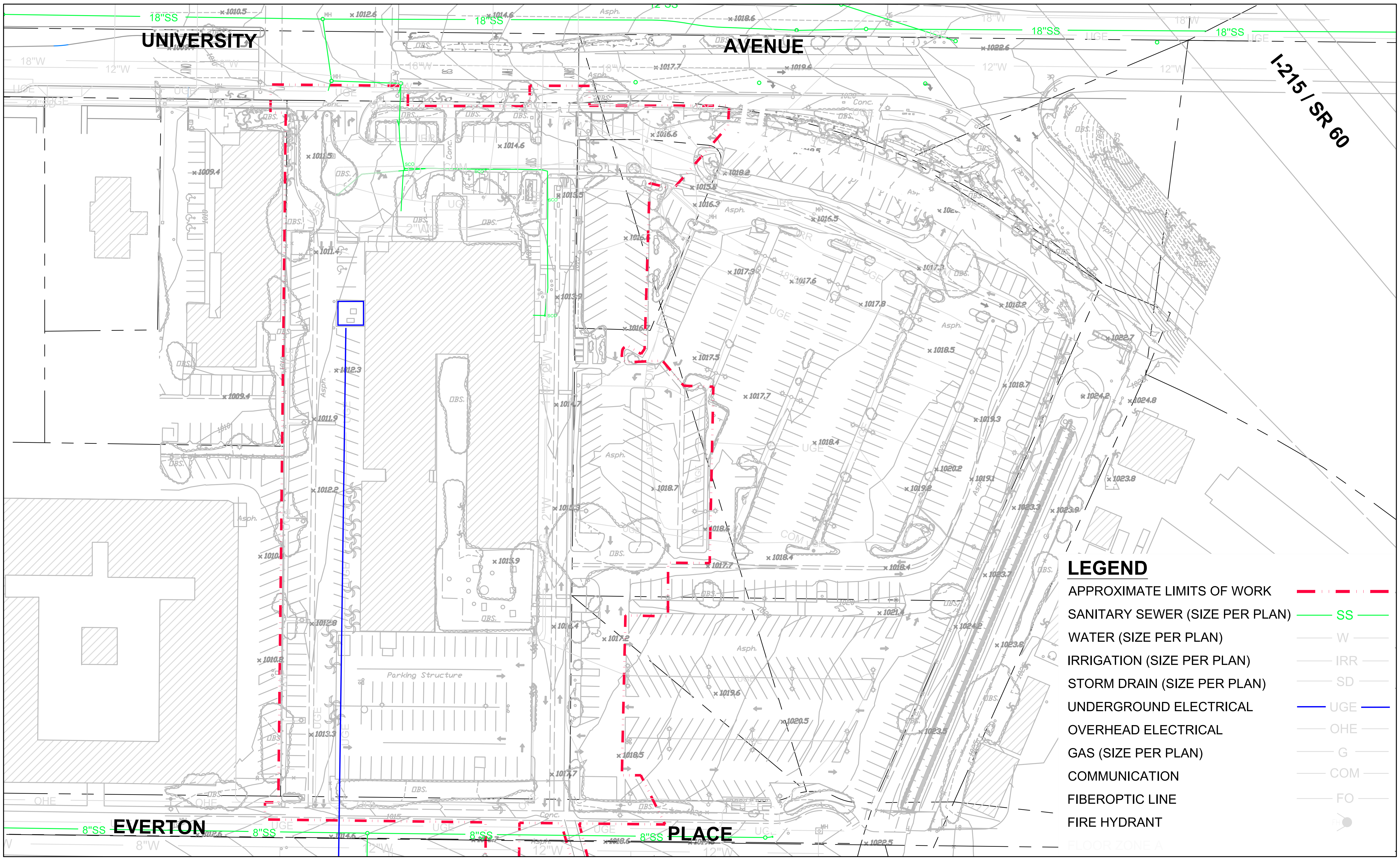
Purpose
The University of California (“UCR” or “University”) is developing an Opportunities to Advance Sustainability, Innovation and Social Inclusion (OASIS) Park (“Project”) on University property located at 1200 University Avenue and a portion of 1150 and 1160 University Avenue (Assessor Parcel Number [APN] 253-050-005, and a portion of APNs 253-050-006, 253-050-007, and 253-050-008), south of University Avenue, north of Everton Place, and west of the Caltrans yard and Interstate 215/State Route 60 (I-215/SR 60) freeway, in the City of Riverside, California. This memorandum summarizes the existing and proposed electrical utility and demand for the UCR OASIS Park project, and the resulting will serve letter provided by Riverside Public Utility (RPU). The summary herein has been prepared to support the CEQA permitting for the project.

Existing Conditions
The project site is located at 1150 & 1200 University Avenue, Riverside, CA and consists of a University Department building, parking structure and surrounding surface parking lots. Based on review of the record drawings, there is an existing transformer that services the existing facility to be demoed. RPU contains two (2) medium voltage switches for future build out on Everton Place An exhibit showing the existing electrical system and connection has been included as Attachment 1.

Proposed Conditions
The UCR OASIS Park project proposes the demolition of the existing University Building and Parking Structure and construction of a new 70,000 square foot building with a program mix consisting of the following spaces: Research/Laboratory facilities (60% or approximately 42,000 sf), Offices (30% or approximately 21,000 sf), and Academic Instruction facilities/Assembly and Exhibition Spaces (10% or approximately 7,000 sf). An exhibit showing the proposed electrical system and connection has been included as Attachment 2. This program results in a demand of 2.5 Mega Volt Amps (mVA), as calculated (See Attachment 3) with an increase to the contribution to the public utility system from the existing condition. No improvements would be required to the RPU electrical distribution system to serve the project.

GLUMAC
A TETRA TECH COMPANY
engineers for a sustainable future™

Attachment 1
Existing Electrical System



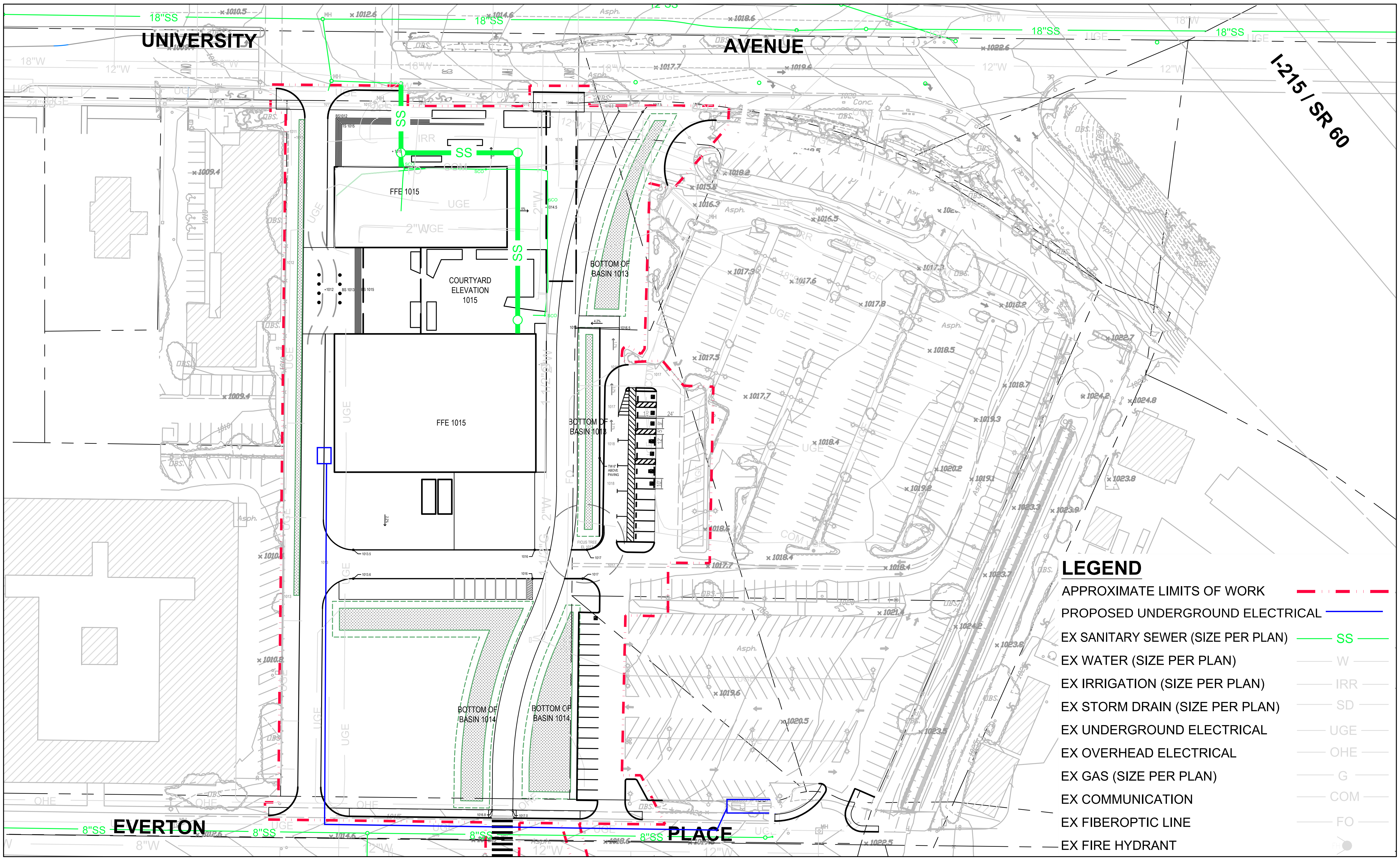
EXISTING SEWER EXHIBIT

0' 40' 80' 160'

engineers for a sustainable future™

GLUMAC
A TETRA TECH COMPANY

Attachment 2
Proposed Electrical System



PROPOSED SEWER EXHIBIT

0' 40' 80' 160'

Attachment 3
Proposed Electrical Demands

UCR OASIS Technology Park		Design	Connected Load	Utility Demand	Utility Demand Load
Building Type	Building GSF	Watt/SF	(KVA)	Factor	(KVA)
Office and Classroom	21,000	12	252	0.6	151.2
Academic Instruction facilities/Assembly and Exhibition	7,000	12	84	0.6	50.4
Research/ Laboratory Facilities	39,200	16	627.2	0.5	313.6
Specialty Lab (ASML)*	2,400	425	1020	1	1020
Specialty Lab (DYNO)*	400	2500	1000	1	1000
Totals	70,000		2,983		2,535
*=Based on specific lab equipment loads					