Final Initial Study/ Mitigated Negative Declaration

University of California, Riverside Barn Expansion UCR Project No. 950493

SCH. No. 2017041076

Lead Agency | University of California, Riverside
Campus Planning – Capital Asset Strategies
1223 University Avenue, Suite 240
Riverside, California 92521

Prepared by | Psomas
1500 Iowa Avenue, Suite 210
Riverside, California 92507

August 2017

UNIVERSITY OF CALIFORNIA, RIVERSIDE
BARN EXPANSION
PROJECT NO. 950493

Final Initial Study/Mitigated Negative Declaration
State Clearinghouse No. 2017041076

Prepared for:
University of California, Riverside
Campus Planning – Capital Asset Strategies
1223 University Avenue, Suite 240
Riverside, California 92521

Contact: Ms. Tricia D. Thrasher, ASLA, LEED AP

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1500 Iowa Avenue, Suite 210
Riverside, California 92507

August 2017

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SECTION 1.0 INTRODUCTION

Pursuant to State law and University procedures for the implementation of the California Environmental Quality Act (CEQA), the potential environmental effects of the proposed University of California, Riverside (UCR) Barn Expansion project (project) have been analyzed in a Draft Initial Study (State Clearinghouse [SCH] No. 2017041076) dated April 2017. The environmental analysis for the proposed project is tiered from the 2005 Long Range Development Plan (LRDP) EIR (SCH No. 2005041164), certified by the University of California Board of Regents (The Regents) in November 2005, as augmented, revised and supplemented by the 2005 LRDP Amendment 2 EIR (SCH No. 2010111034) certified by The Regents on November 28, 2011.

Based on the project-specific analysis presented in the Initial Study, it was determined that for each topical issue the project would have no impact or a less than significant impact with the adoption of identified project-level mitigation measures (MMs) and incorporation of all relevant MMs and continuing adherence to adopted Programs and Practices (PPs) identified in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR. The project description includes and incorporates all relevant MMs and campus PPs identified in the Final EIRs to minimize the impacts of projects implementing the LRDP, and the Draft Initial Study identified project-specific mitigation measures to reduce potential project-specific environmental impacts to a less than significant level. Specifically, MM BARN CULT-1 documents UCR's contractor specifications that address measures to be taken should paleontological or archaeological resources be encountered, and MM BARN VIB-1 prohibits the use of certain construction equipment within 50 feet of occupied buildings to minimize vibration.

The Draft Initial Study/Mitigated Negative Declaration was released for a 30-day public review period that concluded on May 26, 2017. The Draft Initial Study/Mitigated Negative Declaration (IS/MND) was provided to approximately 20 interested agencies and individuals (including tribal representatives), and 15 copies were sent to the State Clearinghouse to distribute to state agencies; it was also made available on the UCR Capital Asset Strategies website and at its offices. Two letters were received during the public review period, one letter from the State Clearinghouse acknowledging compliance with CEQA review requirements, and one comment letter from the California Department of Toxic Substances Control [DTSC].

This document is the Final IS/MND for the UCR Barn Expansion project. The document includes:

- The letter from State Clearinghouse;
- The comment letter received from DTSC and the University's response;
- Updates to the proposed project subsequent to release of the Draft IS/MND;
- Mitigation Monitoring and Reporting Program;
- Draft Initial Study/Mitigated Negative Declaration, April 2017 (included in Attachment A). It should be noted that MMs subsequently determined not to be applicable to the proposed project have been deleted; deleted text is shown as ~~strikeout~~ in the attached Initial Study. Added text is shown as **bold and underlined**.

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SECTION 2.0 PUBLIC COMMENT LETTERS AND UNIVERSITY RESPONSES

The University received the attached letter from the Governor's Office of Planning and Research, State Clearinghouse and Planning Unit, documenting compliance with CEQA review requirements, and transmitting the comment letter from the California Department of Toxic Substances Control (DTSC). The DTSC letter was also sent to directly to the University. As to the acknowledgement of CEQA compliance, no response is required.

The comment letter followed by the University's responses to the DTSC comment letter is attached. The numbers provided in the right margin of the DTSC comment letter correspond to the response to comments.

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STATE OF CALIFORNIA
GOVERNOR'S OFFICE of PLANNING AND RESEARCH
STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

May 30, 2017

Tricia Thrasher
Regents of the University of California
1111 Franklin St, 12th Floor
Oakland, CA 94607

Subject: UCR Barn Expansion
SCH#: 2017041076

Dear Tricia Thrasher:

The State Clearinghouse submitted the above named Mitigated Negative Declaration to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on May 26, 2017, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Enclosures
cc: Resources Agency

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
(916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# 2017041076
Project Title UCR Barn Expansion
Lead Agency University of California, Regents of the

Type MND Mitigated Negative Declaration

Description UCR proposes to expand the entertainment and dining facilities provided on campus through the demolition, renovation and expansion of existing Barn Group buildings, and construction of new buildings. With implementation of the proposed project and the Barn Replacement Option, there would be a total of up to 18,860 gsf of development associated with the expanded Barn Complex, a net increase of 10,765 gsf. The proposed project would also involve the construction of an outdoor West Courtyard and stage, and the existing East Courtyard would be renovated. A loading dock/service yard, bicycle parking, landscape and hardscape features, exterior lighting, and utility infrastructure would be installed to support the planned renovation and expansion. No new vehicular parking or roadways would be added.

Lead Agency Contact

Name Tricia Thrasher
Agency Regents of the University of California
Phone 951-827-1484 **Fax**
email
Address 1111 Franklin St, 12th Floor
City Oakland **State** CA **Zip** 94607

Project Location

County Riverside
City Riverside
Region
Lat / Long 33° 58' 20.3" N / 117° 19' 49.8" W
Cross Streets West Campus Dr/Canyon Crest Dr
Parcel No.
Township **Range** **Section** **Base**

Proximity to:

Highways 215, 60
Airports
Railways BNSF
Waterways
Schools Longfellow, Hyatt
Land Use Existing Barn Group facilities; long range development plan des: academic

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Archaeologic-Historic; Biological Resources; Drainage/Absorption; Geologic/Seismic; Landuse; Noise; Other Issues; Public Services; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Vegetation; Water Quality

Reviewing Agencies Resources Agency; Department of Fish and Wildlife, Region 6; Department of Parks and Recreation; Department of Water Resources; California Highway Patrol; Caltrans, District 8; Native American Heritage Commission; Regional Water Quality Control Board, Region 8; Department of Toxic Substances Control

Date Received 04/27/2017 **Start of Review** 04/27/2017 **End of Review** 05/26/2017

Note: Blanks in data fields result from insufficient information provided by lead agency.

Department of Toxic Substances Control

Matthew Rodriquez
Secretary for
Environmental Protection

Barbara A. Lee, Director
5796 Corporate Avenue
Cypress, California 90630

Edmund G. Brown Jr.
Governor

May 9, 2017

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Governor's Office of Planning & Research
MAY 09 2017
STATE CLEARINGHOUSE

Ms. Tricia D. Thrasher, ASLA, LEED AP
Principal Environmental Planner
Capital Planning – Capital Asset Strategies
University of California, Riverside
1223 University Avenue, Suite 240
Riverside, California 92521

INITIAL STUDY AND PROPOSED MITIGATED NEGATIVE DECLARATION (ND) FOR BARN EXPANSION PROJECT (UC RIVERSIDE CAMPUS) (SCH# 2017041076)

Dear Ms. Thrasher:

The Department of Toxic Substances Control (DTSC) has reviewed the subject ND. The following project description is stated in the ND: "The proposed project would involve the demolition of the existing Barn Stable; the renovation and expansion of the Barn Dining building (i.e., new Kitchen Addition, serving area [servery], and seating); the construction of a Faculty/Staff Dining building; the construction of a Campus Meeting Room (for meetings and private event space) and Restroom building; and renovation of the Barn Theater. Collectively, the new, renovated, and expanded buildings with the proposed project are referred to as the Barn Complex." 1

Based on the review of the submitted document DTSC has the following comments:

1. The ND should identify and determine whether current or historic uses at the project site may have resulted in any release of hazardous wastes/substances. A Phase I Environmental Site Assessment may be necessary to identify any recognized environmental conditions. 2
2. If there are any recognized environmental conditions in the project area, then proper investigation, sampling and remedial actions overseen by the appropriate regulatory agencies should be conducted prior to the new development or any construction. 2
3. If the project plans include discharging wastewater to a storm drain, you may be required to obtain an NPDES permit from the overseeing Regional Water Quality Control Board (RWQCB). 3

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4. If planned activities include structures/building modifications/demolitions, lead-based paints or products, mercury, and asbestos containing materials (ACMs) should be addressed in accordance with all applicable and relevant laws and regulations. — 4

5. The ND states, "The remainder of the site includes paved areas . . . (referred to as the East Courtyard); and landscaped areas consisting primarily of turf and mature trees and a citrus grove in the northern portion of the project site." If the site was used for agricultural or related activities, residual pesticides may be present in onsite soil. DTSC recommends investigation and mitigation, as necessary, to address potential impact to human health and environment from residual pesticides. — 5

6. The ND states, "A transformer would be installed on the south side of the Kitchen Addition. Additionally, a connection would be made to the existing generator on the west side of the H&SS building; trenching for this connection would occur in the sidewalk along the east side of West Campus Drive." DTSC recommends evaluation, proper investigation and mitigation, if necessary, on onsite areas with current or historic PCB-containing transformers. — 6

7. Aerially deposited lead (ADL) is generally encountered in unpaved or formerly unpaved areas adjoining older roads, primarily as a result of deposition from historical vehicle emissions when gasoline contained lead. As the project site is adjacent to Freeways 60 and I-215 and Campus Drive, this issue should be addressed in accordance with all applicable and relevant laws and regulations. — 7

8. The ND further states, "The project site is underlain by approximately two feet of artificial fill materials. The fill materials consist of silty sand and are underlain by old alluvial fan deposits that are composed primarily of silty sands and poorly graded sands." Historic source of existing fill materials need to be evaluated and/or investigated to make sure that the imported soil is free of contamination. — 8

9. If soil contamination is suspected or observed in the project area, then excavated soil should be sampled prior to export/disposal. If the soil is contaminated, it should be disposed of properly in accordance with all applicable and relevant laws and regulations. If the project proposes to import soil to backfill the excavated areas, proper evaluation and/or sampling should be conducted to make sure that the imported soil is free of contamination.

10. If during construction/demolition of the project, soil and/or groundwater contamination is suspected, construction/demolition in the area should cease and appropriate health and safety procedures should be implemented. If it is determined that contaminated soil and/or groundwater exist, the ND should identify how any required investigation and/or remediation will be conducted, and the appropriate government agency to provide regulatory oversight. — 9

Ms. Tricia D. Thrasher, ASLA, LEED AP
May 9, 2017
Page 3

If you have any questions regarding this letter, please contact me at (714) 484-5380 or email at Johnson.Abraham@dtsc.ca.gov.

Sincerely,

Johnson P. Abraham
Project Manager
Brownfields Restoration and School Evaluation Branch
Brownfields and Environmental Restoration Program - Cypress

kl/sh/ja

cc: Governor's Office of Planning and Research (via e-mail)
State Clearinghouse
P.O. Box 3044
Sacramento, California 95812-3044
State.clearinghouse@opr.ca.gov

Mr. Guenther W. Moskat, Chief (via e-mail)
Planning and Environmental Analysis Section
CEQA Tracking Center
Department of Toxic Substances Control
Guenther.Moskat@dtsc.ca.gov

Mr. Dave Kereazis (via e-mail)
Office of Planning & Environmental Analysis
Department of Toxic Substances Control
Dave.Kereazis@dtsc.ca.gov

Mr. Shahir Haddad, Chief (via e-mail)
Schools Evaluation and Brownfields Cleanup
Brownfields and Environmental Restoration Program - Cypress
Shahir.Haddad@dtsc.ca.gov

CEQA# 2017041076

Responses to Comments

California Department of Toxic Substances Control (DTSC)
May 9, 2017

1. The commenter accurately describes the proposed project as presented in the Initial Study/Mitigated Negative Declaration (IS/MND). No response is required.

2. The project site is located on the University of California, Riverside (UCR) campus, and is located on property that was acquired by the University of California in 1917. The University of California, Riverside (UCR), Department of Environmental Health and Safety (EH&S) serves various functions, including the provision of technical assistance, consulting, and regulatory compliance support in a variety of fields. Notably, EH&S is responsible for ensuring that on-campus projects are implemented in compliance with applicable regulations, and is also responsible for maintaining records of hazards and hazards materials on campus. UCR EH&S, Environmental Programs is not aware of any current or historic uses that may have resulted in any release of hazardous wastes/substances at the project site. Based on this information, UCR has determined that a Phase I Environmental Site Assessment (ESA), the purpose of which is to identify recognized environmental conditions (RECs)[1] that could present material risk of harm to public health or to the environment, is not required. There are no known RECs identified in the project area and no further investigation, sampling, or remedial actions is required. It should also be noted that UCR maintains standard construction specifications that are imposed on contractors for construction projects on campus. Section 01 3543 identifies Environmental Procedures, including Hazardous and Toxic Materials Procedures, that require work be stopped if potential hazardous materials are encountered, and the condition be reported to the University. UCR EH&S will have an on-site assessment of the material conducted; if it is found to be hazardous a plan to remove it off site and dispose of it at a University of California-approved Treatment, Storage, and Disposal Facility (TSDF) shall be prepared. Construction activities cannot be resumed until the hazardous materials has been rendered harmless. Compliance with Section 01 4100, Regulatory Requirements, of the standard construction specifications, requires that all applicable codes and regulations be followed during construction, including regulations related to the remediation and handling of hazardous materials.

3. The proposed project would not involve the discharge of wastewater to a storm drain. Wastewater from the project site would be discharged to the existing sewer system, as further described in Section II.5, Proposed Project Components, of the IS/MND, under the discussion of Utilities/Infrastructure.

4. As discussed in Section V.8, Hazards and Hazardous Materials, of the IS/MND, an *Asbestos/Lead Building Material Survey* was conducted for the Barn Group by Ambient Environmental, Inc. in March 2017. Asbestos was detected at the Barn Stable and it is also possible that transite pipe, which contains asbestos, is located onsite. As required by Programs, Practices and Procedures (PP) 4.3-2(c) and PPP 4.7-2 from the Long Range Development Plan EIRs, the campus shall follow applicable federal, State and local rules and regulations (including SCAQMD Rule 1403) during building and utility demolition to ensure construction worker and public safety when handling asbestos-containing materials. The *Asbestos/Lead Building Material Survey* also identified that lead was detected in the exterior paint of all the Barn Group buildings. As required by PPP 4.7-2,

[1] RECs are the presence, or likely presence, of any hazardous substances or petroleum products in, at, or on a property due to any release to the environment; under conditions that indicate an existing release, a past release, or a material threat of a release to the environment.

the campus shall follow applicable rules and regulations during building renovation and demolition to ensure construction worker and public safety when handling lead-based paint. There are no known sources of mercury at the project site.

5. The referenced citrus grove at the project site was planted as a landscape feature for the Humanities & Social Sciences (H&SS) building, which was completed in 1996 and is located adjacent to and north/northwest of the project site. The project site was not historically used for agricultural or related activities; legacy (formerly used) organochlorine pesticides were not used at the project site or in the vicinity. No further evaluation or mitigation is required.

6. There is an existing transformer at the project site that would be removed as part of the proposed project. This transformer was installed approximately 15 years ago when the Barn was converted to a restaurant, and after production of polychlorinated biphenyls (PCBs) ceased in 1977. The transformer does not contain PCBs, and UCR EH&S has no documentation indicating that there is any current or historic use of PCB-containing electrical equipment at the project site. No further evaluation or mitigation is required relative to the presence of PCB-containing transformers at the project site.

7. Previously unpaved areas adjacent to Interstate 215/State Route 60 near the project site were excavated and developed with the expansion of this freeway, which was completed in 2007. This includes the area between the freeway and West Campus Drive, which borders the west and south sides of the project site. During the freeway construction, any aerially-deposited lead in the soil was handled and/or disposed of by the California Department of Transportation (Caltrans) in accordance with applicable requirements. With respect to unpaved areas east of West Campus Drive, which carries relatively small traffic volumes, the large landscaped area adjacent to the roadway between the Barn Group and the H&SS building was excavated and planted with construction of the H&SS Building in 1996. The remainder of the project is largely paved or otherwise covered with impervious surfaces associated with outdoor dining areas, pedestrian pathways, etc. However, pursuant to LRDP PP 4.7-2, UCR will test representative soil samples for lead and conduct remediation activities in accordance with applicable laws and regulations, if warranted.

8. As discussed above, UCR has owned the subject property since 1917, and the Barn Group structures were constructed around this time (estimated around 1916). However, the Barn Theater was moved from a site just north of its present location to accommodate the construction of the H&SS building. It is likely the fill materials were generated as part of grading for the buildings and parking lots. As discussed under response to comment 2, above, UCR has contractor specifications in place that require that work be stopped if hazardous materials are encountered, and the condition be reported to the University. Any such materials will be remediated and handled in accordance with all applicable codes and regulations. Similarly, PP 4.7-1 and PP 4.7-2 require that the University adhere to applicable regulations in the event previously unidentified hazardous materials are encountered, and ensure construction worker and public safety. Please also refer to response to comment 9, below.

9. As discussed in Section V.8, Hazards and Hazardous Materials, of the Draft Initial Study, while there are no RECs at the project site, construction activities, including extension or relocation of utilities, could encounter abandoned pipes, discarded building materials, unknown USTs, or previously unidentified contaminated soil, which could result in the exposure of construction workers or campus occupants to hazardous materials. The proposed project incorporates PP 4.7-1, which requires compliance with federal, State, and local regulations as well as current (or equivalent) campus plans, programs, and practices related to the use, storage, disposal, and transport of hazardous materials and

wastes. Further, pursuant to LRDP PP 4.7-2, UCR will test representative soil samples for lead and conduct remediation activities in accordance with applicable laws and regulations, if warranted. It should also be noted that groundwater was not encountered at the project site within the maximum exploratory drilling depth of 26.5 feet below ground surface (refer to Section V.6, Geology and Soils, of the Draft Initial Study). The maximum depth of excavation for the proposed project is estimated at up to 5 feet for building foundations; therefore, groundwater would not be encountered during construction.

SECTION 3.0 UPDATES TO THE PROPOSED PROJECT SUBSEQUENT TO RELEASE OF THE DRAFT INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

On April 26, 2017, the Draft Initial Study/Mitigated Negative Declaration (IS/MND) for the University of California, Riverside (UCR) Barn Expansion project (proposed project) was released for a 30-day public review period. As identified in the Draft IS/MND included in Attachment A, the proposed project evaluated in the Draft IS/MND involves the demolition of the existing Barn Stable; the renovation and expansion of the Barn Dining building (i.e., new kitchen addition, serving area, and seating); the construction of a Faculty/Staff Dining building; the construction of a Campus Meeting Room (for meetings and private event space) and Restroom building; and renovation of the Barn Theater. The Draft IS/MND also identifies that the University considered an option to the proposed project that would involve demolition and replacement of the Barn Theater at a location slightly to the north of the existing building (Barn Theater Replacement Option). The Initial Study evaluates the proposed project and the Barn Theater Replacement Option.

Subsequent to preparation to the Draft IS/MND, the design process continued and the final project going forward for approval continued to evolve due to a variety of factors, including budget. The final project includes the analyzed option of demolition of the existing Barn Theater building and reconstruction at a location further north. Additionally, the Campus Meeting Room will not be constructed at this time. All other project features remain the same. The updated site plan depicting the project being considered for approval is attached. Because the updated project is consistent with the project and option addressed in the IS/MND, none of the conclusions analyzed in the Draft IS/MND, pursuant to CEQA, would change as a result of the updated site plan. No new impacts would result and no new mitigation is required.

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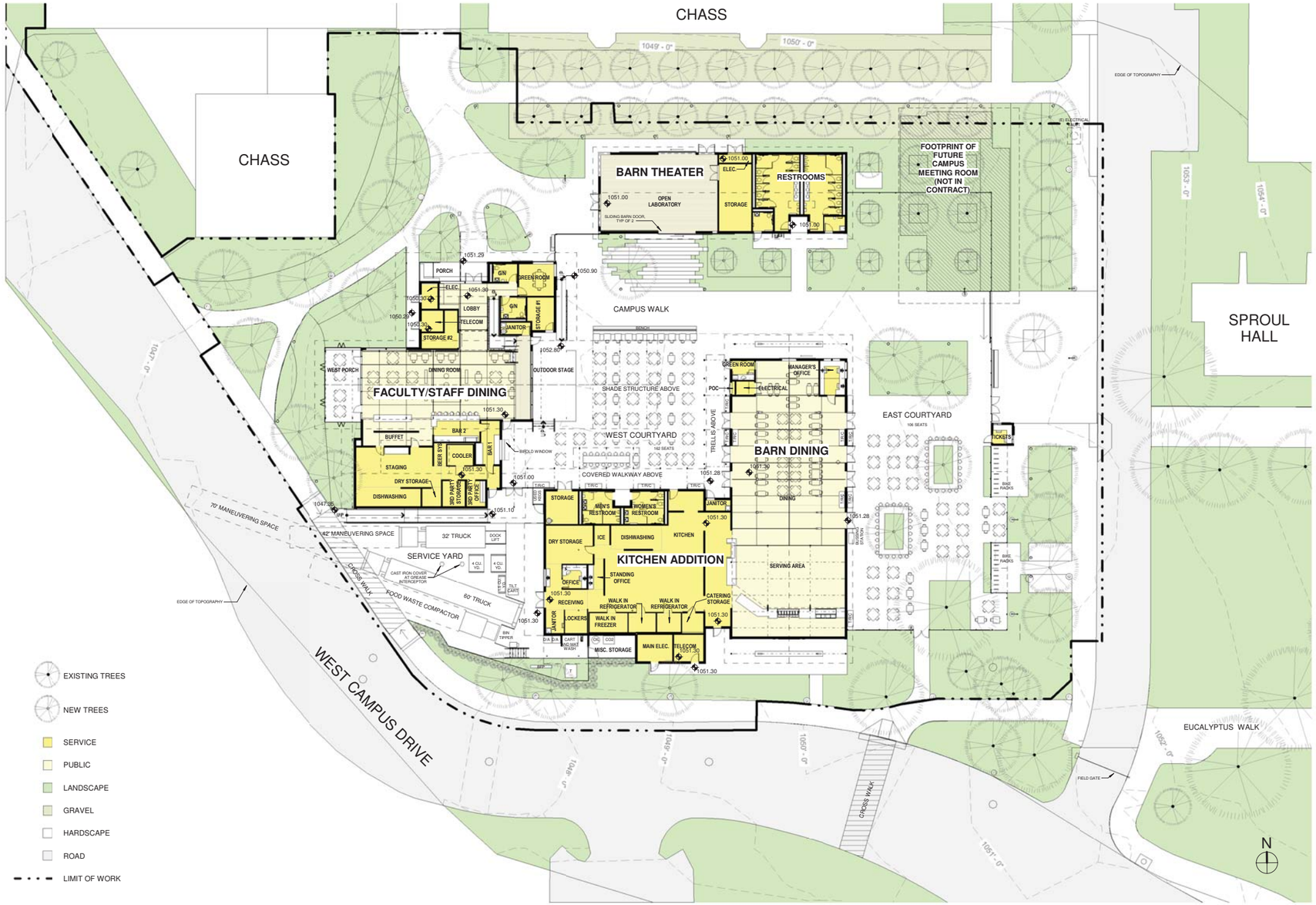

1 SITE - FLOOR PLAN
1/16" = 1'-0"

UNIVERSITY OF CALIFORNIA, RIVERSIDE

BARN EXPANSION
PROJECT #950493
WEST CAMPUS DRIVE, RIVERSIDE, CA

UC RIVERSIDE UNIVERSITY OF CALIFORNIA

IDENTIFICATION STAMP
DIVISION OF THE STATE ARCHITECT
OFFICE OF REGULATION SERVICES

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DATE ISSUED: 06/08/17
PROJECT NO: 2016-40128
SCALE: 1/16" = 1'-0"

SHEET NUMBER: **A1.0**
SHEET TITLE:

FLOOR PLAN - SITE

DESIGN ARCHITECT
FERNAU & HARTMAN

EXECUTIVE ARCHITECT
SVA ARCHITECTS

3 MACARTHUR PLACE, SUITE 850 SANTA ANA, CA 92707
T 949.809.3380 WWW.SVA-ARCHITECTS.COM

SECTION 4.0 MITIGATION MONITORING AND REPORTING PROGRAM

4.1 INTRODUCTION

The California Environmental Quality Act (CEQA) requires the adoption of feasible mitigation measures to reduce the severity and magnitude of potentially significant environmental impacts associated with project development. The Final Initial Study/Mitigated Negative Declaration (IS/MND) for the proposed Barn Expansion (proposed project) (State Clearinghouse No. 2017041076) analyzes the impacts of the proposed project, which includes all relevant mitigation measures (MMs) and campus programs and practices (PPs) carried forward from the LRDP EIR. This Mitigation Monitoring and Reporting Program (MMRP), which identifies the LRDP EIR PPs and MMs included as part of the project description and two new project-specific mitigation measures related to air quality and cultural resources, obligates the University to implement the identified PPs and MMs. The MMRP will be reviewed by the University of California Board of Regents (The Regents) or their designee, in conjunction with consideration for approval of the proposed project and adoption of the Final IS/MND.

Following adoption of the Final IS/MND and approval of this MMRP, the PPs and MMs from the LRDP EIR included as part of the project description would be monitored under the existing LRDP EIR Mitigation Monitoring and Reporting Program. In addition, UCR Campus Planning will coordinate monitoring the implementation of the two project-specific mitigation measures. Monitoring will include: (1) verification that each mitigation measure has been implemented; (2) recording of the verification and any necessary notations regarding implementation of each mitigation measure; and (3) retention of records in the Barn Expansion project mitigation monitoring file.

Purpose

The purpose of the MMRP is to ensure compliance with all PPs and MMs to avoid or reduce adverse environmental impacts resulting from construction and operation of the proposed project, which were identified in the IS/MND. The implementation of the applicable PPs and MMs shall be performed by the University, consultants, contractors, and appropriate agencies during the following:

- Development of the design
- Preparation of the construction contracts
- Construction phase
- Project operation

Project Overview

The proposed project is located near the intersection of West Campus Drive with the future Barn Walk and the western terminus of Eucalyptus Walk in the western portion of UCR's East Campus. Specifically, the project site is bound by West Campus Drive to the west and south, Sproul Hall to the east, and the Humanities and Social Sciences (H&SS) building to the north.

The proposed project involves the demolition of the existing Barn Stable; the renovation and expansion of the Barn Dining building (i.e., new Kitchen Addition, serving area, and seating); the construction of a Faculty/Staff Dining building; and demolition of the existing Barn Theater with construction of a replacement Barn Theater building and restrooms at a location slightly north of the existing location. Collectively, the new, renovated, and expanded buildings with the proposed project are referred to as the Barn Complex. With implementation of the proposed project, there

would be a total of 16,445 gsf of development associated with the expanded Barn Complex, a net increase of approximately 8,350 gsf.

The proposed project also involves the construction of an outdoor West Courtyard and stage, and renovation of the existing East Courtyard. Landscape and hardscape features, exterior lighting, and utility infrastructure would be installed to support the planned renovation and expansion. A temporary outdoor dining facility would also be constructed east of the project site and south of Sproul Hall. No new vehicular parking spaces or roadways would be added; however, bicycle parking would be installed and non-vehicular circulation would be maintained. Additionally, a loading dock/service yard would be constructed in the southwest portion of the site.

Construction of the proposed project is anticipated to begin in March 2018 and be completed by June 2019 (construction duration of approximately 18 months). With the exception of existing vehicular and pedestrian access within the project site, during construction, existing vehicular, emergency, and pedestrian access, including access to buildings that surround the Barn Group, would be maintained.

Monitoring Procedures

The Environmental Planning staff from Campus Planning will be responsible for coordinating the reporting of compliance with the measures listed in this MMRP, including

- Coordination with the project manager (PM) and project inspector from the UCR Architects and Engineers office, who would be responsible for ensuring that design and construction contracts contain the relevant mitigation measures adopted in the Final IS/MND, and that mitigation measures are implemented during the design and construction phases of the project.

- Coordination and assistance to other Campus units and/or Departments with monitoring and reporting responsibilities to ensure that they understand their charge and complete their reporting procedures accurately and on schedule, during construction and on-going project operations.

In general, monitoring will consist of demonstrating that mitigation measures were implemented and that the responsible units monitored the implementation of the measures. Monitoring will consist of determining whether the following occurred:

- Specific issues were considered in the design development phase
- Construction contracts included the specified provisions
- Certain actions occurred prior to construction
- The required measures were acknowledged and implemented during construction of the project

Reporting Procedures

Monitoring of applicable LRDP PPs and MMs included as part of the project will be reported through the established LRDP EIR Mitigation Monitoring and Reporting Program process.

Monitoring and reporting of project-specific mitigation measures will consist of responsible entities verifying that the relevant mitigation measures were implemented and documentation confirming compliance. UCR Campus Planning will coordinate and maintain the reporting records.

4.2 LIST OF CAMPUS PROGRAMS, PRACTICES AND PROCEDURES AND MITIGATION MEASURES

Table 1 lists the MMs and PPs from the certified LRDP EIR applicable to and included as part of the Barn Expansion project description, the timing for these measures, and project specific mitigation as identified in the Final IS/MND. Detailed information regarding the category, responsible UCR unit, monitoring triggers, and frequency of reporting for each PP and MM is presented.

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TABLE 1
MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
Monitoring Triggers 1. Design stage 2. Construction documents (CDs) 3. Construction 4. Commencement of occupancy 5. Post-construction 6. On-going through Project operation		UCR Responsible Entities CAS – Capital Asset Strategies A&E – Architects & Engineers TAPS – Transportation and Parking Services Sustainability – Sustainability Office				
Aesthetics						
Substantially degrade the existing visual character or quality of the site and its surroundings.	<u>Applicable LRDP EIR Planning Strategies</u>: PS Open Space 4. Provide landscaped Open Space buffers and setbacks along campus edges, such as Valencia Hill Drive and its extension south of Big Springs Road, Martin Luther King Boulevard, and the I-215/SR-60 freeway.	CAS	1	Once to confirm inclusion in project design		
	<u>Applicable LRDP EIR Programs and Practices</u>: PP 4.1-1. The campus shall provide design architects with the 2007 Campus Design Guidelines and instructions to implement the guidelines, including those sections related to use of consistent scale and massing, compatible architectural style, complementary color palette, preservation of existing site features, and appropriate site and exterior lighting design. (*This is identical to Land Use PP 4.9-1[a]).*	A&E	1	Once to confirm in relation to project design		
	PP 4.1-2(a). The Campus shall continue to provide design professionals with the 2007 Campus Design Guidelines and instructions to develop project-specific landscape plans that are consistent with the Guidelines with respect to the selection of plants, retention of existing trees, and use of water conserving plants, where feasible. *(This is identical to Land Use PP 4.9-1[b].)*	CAS +/or A&E	1	Once to confirm inclusion in project design		

TABLE 1
MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
	PP 4.1-2(b). The campus shall continue to relocate, where feasible, mature "specimen" trees that would be removed as a result of construction activities on the campus. *(This is identical to Land Use PP 4.9-1(c).)*	CAS +/or A&E	1 & 3	Once to confirm inclusion in project design; Ongoing during construction, if required		
	Applicable LRDP EIR Mitigation Measures: MM 4.1-3(a). Building materials shall be reviewed and approved as part of project-specific design and through approval of construction documents. Mirrored, reflective glass is prohibited on campus.	A&E	1 & 2	Once to confirm inclusion in project design documents; Once to confirm inclusion in CDs		
Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area.	Applicable LRDP EIR Planning Strategies: PS Development Strategy 1. Establish a design review process to provide regular review of building and landscape development on campus.	A&E	1	Once to confirm review by Design Review Board		
	Applicable LRDP EIR Programs and Practices: Refer to PP 4.1-1.					
	Applicable LRDP EIR Mitigation Measures: Refer to MM 4.1-3(a).					
Air Quality						
Violate any air quality standard or contribute substantially to an existing or projected air quality violation	Applicable LRDP EIR Planning Strategies: PS Campus and Community 4. Provide strong connections within the campus and its edges to promote walking, bicycling, and transit use, rather than vehicular traffic.	CAS	1	Once to confirm inclusion in project design		

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Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
	PS Transportation 3. Provide a continuous network of bicycle lanes and paths throughout the campus, connecting to off-campus bicycle routes.	CAS	n/a	Ongoing verification through LRDP monitoring and implementation		
	PS Transportation 5. Provide bicycle parking at convenient locations.	A&E +/or TAPS	1, 2	Once to confirm inclusion in project design; Once to confirm inclusion in CDs		
	Applicable LRDP EIR Programs and Practices: PP 4.3-1. The Campus shall continue to implement a Transportation Demand Management program that meets or exceeds all trip reduction and AVR requirements of the SCAQMD. The TDM program may be subject to modification as new technologies are developed or alternate program elements are found to be more effective. *(This is identical to Transportation and Traffic PP 4.14-1.)*	TAPS	n/a	Ongoing verification through LRDP monitoring and implementation		
	PP 4.3-2(a). Construction contract specifications shall include the following: (i) Compliance with all SCAQMD rules and regulations (ii) Maintenance programs to assure vehicles remain in good operating condition (iii) Avoid unnecessary idling of construction vehicles and equipment (iv) Use of alternative fuel construction vehicles (v) Provision of electrical power to the site, to eliminate the need for on-site generators	A&E	2	Once to confirm inclusion in CDs		
.	PP 4.3-2(b). The Campus shall continue to implement dust control measures consistent with SCAQMD Rule 403—Fugitive Dust during the construction phases of new project development. The following actions are currently recommended to implement Rule 403 and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the	A&E	2, 3	Once to confirm inclusion in CDs; Ongoing verification during construction		

TABLE 1
MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
	source of the dust generation. The Campus shall implement these measures as necessary to reduce fugitive dust. Individual measures shall be specified in construction documents and require implementation by construction contractor: (i) Apply water and/or approved non-toxic chemical soil stabilizers according to manufacturer's specification to all inactive construction areas (previously graded areas that have been inactive for 10 or more days) (ii) Replace ground cover in disturbed areas as quickly as possible (iii) Enclose, cover, water twice daily, or apply approved chemical soil binders to exposed piles with 5 percent or greater silt content (iv) Water active grading sites at least twice daily (v) Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour over a 30-minute period (vi) All trucks hauling dirt, sand, soil, or other loose materials shall be covered or maintain at least two feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer), in accordance with Section 23114 of the California Vehicle Code (vii) Sweep streets at the end of the day if visible soil material is carried over to adjacent roads (viii) Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip (ix) Apply water three times daily or chemical soil stabilizers according to manufacturers' specifications to all unpaved parking or staging areas or unpaved road surfaces					

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MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
	(x) Post and enforce traffic speed limits of 15 miles per hour or less on all unpaved roads *(This is identical to Geology PP 4.6-2(a) and Hydrology PP 4.8-3[c].)*					
	Applicable LRDP EIR Mitigation Measures: MM 4.3-1(a). For each construction project on the campus, the project contractor will implement Programs and Practices 4.3-2(a) and 4.3-2(b). In addition, the following PM10 and PM2.5 control measure shall be implemented for each construction project: • Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The phone number of the District shall also be visible to ensure compliance.	A&E	2, 3	Once to confirm inclusion in CDs; Ongoing verification during construction		
	MM 4.3-1(b). For each construction project on the campus, the University shall require that the project include a construction emissions control plan that includes a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that will be used for an aggregate of 40 or more hours during any portion of the construction project. During construction activity, the contractor shall utilize CARB certified equipment or better for all on-site construction equipment according to the following schedule: • January 1, 2011 to December 31, 2011: All off-road diesel-powered construction equipment greater than 50 hp shall meet Tier 2 off-road emissions standards. In addition, all construction equipment shall be outfitted with the BACT devices certified by CARB. Any emissions	A&E	2, 3	Once to confirm inclusion in CDs; Ongoing verification during construction		

TABLE 1
MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
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	control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 2 or Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations. [2] • January 1, 2012 to December 31, 2014: All off-road diesel-powered construction equipment greater than 50 hp shall meet Tier 3 off-road emissions standards. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations. [3] • Post January 1, 2015: All off-road diesel-powered construction equipment greater than 50 hp shall meet the Tier 4 emission standards, where available. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations. • A copy of each unit's certified specification, BACT documentation and CARB or SCAQMD operating permit shall be provided at the time of					

[2] The time frame for this component of MM 4.3-1(b) has passed and the more restrictive requirements defined are applicable.
[3] Although the time frame for this component has passed, the use of Tier 3 equipment is required where Tier 4 equipment is not available.

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Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
	mobilization of each applicable unit or equipment. • Encourage construction contractors to apply for AQMD 'SOON" funds. Incentives could be provided for those construction contractors who apply for AQMD "SOON" funds. The "SOON" program provides funds to accelerate clean-up of off-road diesel vehicles, such as heavy duty construction equipment. More information on this program can be found at the following website: http://www.aqmd.gov/home/programs/business/business-detail?title=off-road-diesel-engines. The contractor shall also implement the following measures during construction: • Prohibit vehicle and engine idling in excess of 5 minutes and ensure that all off-road equipment is compliant with the California Air Resources Board's (CARB) in-use off-road diesel vehicle regulation and SCAQMD Rule 2449. • Configure construction parking to minimize traffic interference. • Provide temporary traffic controls such as a flag person, during all phases of construction to maintain smooth traffic flow. • Provide dedicated turn lanes for movement of construction trucks and equipment on and off site. • Schedule construction activities that affect traffic flow on the arterial system to off-peak hour to the extent practicable. • Improve traffic flow by signal synchronization, and ensure that all vehicles and equipment will					

TABLE 1
MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
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	be properly tuned and maintained according to manufacturers' specifications. • Use diesel-powered construction vehicles and equipment that operate on low-NOx fuel where possible. • Reroute construction trucks away from congested streets or sensitive receptor areas. • Maintain and tune all vehicles and equipment according to manufacturers' specifications.					
	MM 4.3-1(c). To minimize VOC emissions from the painting/finishing phase, for each construction project on the campus, the project contractor will implement the following VOC control measures: • Construct or build with materials that do not require painting, or use pre-painted construction materials. • If appropriate materials are not available or are cost-prohibitive, use low VOC-content materials more stringent than required under SCAQMD Rule 113.	A&E	2	Once to confirm inclusion in CDs		
Biological Resources						
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.	Applicable LRDP EIR Planning Strategies: PS Conservation 2. Site buildings and plan site development to minimize site disturbance, reduce erosion and sedimentation, reduce stormwater runoff, and maintain existing landscapes, including healthy mature trees whenever possible.	CAS	1	Once to confirm inclusion in project design		
	Applicable LRDP EIR Programs and Practices: Refer to PP 4.1 2(a) and PP 4.1-2(b).					

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Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
	Applicable LRDP EIR Mitigation Measures: MM 4.4-4(a). Prior to the onset of construction activities that would result in the removal of mature trees that would occur between March and mid-August, surveys for nesting special status avian species and raptors shall be conducted on the affected portion of the campus following USFWS and/or CDFG (now CDFW) guidelines. If no active avian nests are identified on or within 250 feet of the construction site, no further mitigation is necessary.	CAS/A&E	3	As needed, prior to start of construction		
	MM 4.4-4(b). If active nests for avian species of concern or raptor nests are found within the construction footprint or a 250-foot buffer zone, exterior construction activities shall be delayed within the construction footprint and buffer zone until the young have fledged or appropriate mitigation measures responding to the specific situation have been developed and implemented in consultation with USFWS and CDFG (now CDFW).	CAS/A&E	3	As needed, prior to start of construction		
Conflict with any local policies or ordinances protecting biological resources, such as tree preservation policy or ordinance	Applicable LRDP EIR Programs and Practices: Refer to PP 4.1 2(a) and PP 4.1-2(b).					
Cultural Resources						
Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.	Project-Level Mitigation Measures: MM BARN CULT-1. If a paleontological or archaeological resource is discovered during construction, all soil-disturbing work within 100 feet of the find shall cease and the University Representative shall contact a qualified Archaeologist meeting the Secretary of the Interior standards within 24 hours of discovery to inspect the site. If a resource within the project area of potential effect is determined to qualify as a unique archaeological resource	A&E A&E/CAS	2 3	Confirm inclusion in CDs; Ongoing verification during construction, as required		

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MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
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	(as defined by the California Environmental Quality Act [CEQA]), the University shall devote adequate time and funding to determine if it is feasible, through project design measures, to preserve the find intact. If it cannot be preserved, the University shall retain a qualified non-University Paleontologist/Archaeologist to 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. a. If significant Native American cultural resources are discovered, as determined by the consulting Archaeologist for which a Treatment Plan must be prepared, the contractor or his Archaeologist shall immediately contact the University Representative. The University Representative shall contact the appropriate tribal representatives. b. If requested by tribal representatives, the University, the contractor, or his project Archaeologist shall, in good faith, consult on the discovery and its disposition (e.g., avoidance, preservation, return of artifacts to tribe). c. In the event of the discovery of a burial, human bone, or suspected human bone, all excavation or grading in the vicinity of the find shall halt immediately and the area of the find shall be protected. The University shall immediately notify the Riverside County Coroner of the find and comply with the provisions of *California Health and Safety Code* Section 7050.5.					

TABLE 1
MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	Applicable LRDP EIR Programs and Practices: PP 4.5-4. Construction specifications shall require that if a paleontological resource is uncovered during construction activities: (i) A qualified paleontologist shall determine the significance of the find. (ii) The campus shall make an effort to preserve the find intact through feasible project design measures. (iii) If it cannot be preserved intact, then the University shall retain a qualified non-University paleontologist to design and implement a treatment plan to document and evaluate the data and/or preserve appropriate scientific samples. (iv) The paleontologist shall prepare a report of the results of the study, following accepted professional practice. (v) Copies of the report shall be submitted to the University and the Riverside County Museum.	A&E A&E/CAS	2 3	Confirm inclusion in CDs; Ongoing verification during construction, as required		
Disturb any human remains, including those interred outside of formal cemeteries.	Applicable LRDP EIR Programs and Practices: PP 4.5-5. In the event of the discovery of a burial, human bone, or suspected human bone, all excavation or grading in the vicinity of the find shall halt immediately and the area of the find shall be protected and the University immediately shall notify the Riverside County Coroner of the find and comply with the provisions of P.R.C. Section 5097 with respect to Native American involvement, burial treatment, and re-burial, if necessary.	A&E A&E/CAS	2 3	Confirm inclusion in CDs; Ongoing verification during ground disturbance phases, as required		

TABLE 1
MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
Geology and Soils						
Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: rupture of a known earthquake fault; seismic ground shaking; seismic-related ground failure; or landslides.	Applicable LRDP EIR Programs and Practices: PP 4.6-1(a). During project-specific building design, a site-specific geotechnical study shall be conducted under the direct supervision of a California Registered Engineering Geologist or licensed geotechnical engineer to assess seismic, geological, soil, and groundwater conditions at each construction site and develop recommendations to prevent or abate any identified hazards. The study shall follow applicable recommendations of CDMG Special Publication 117 and shall include, but not necessarily be limited to • Determination of the locations of any suspected fault traces and anticipated ground acceleration at the building site • Potential for displacement caused by seismically induced shaking, fault/ground surface rupture, liquefaction, differential soil settlement, expansive and compressible soils, landsliding, or other earth movements or soil constraints • Evaluation of depth to groundwater The structural engineer shall incorporate the recommendations made by the geotechnical report when designing building foundations.	A&E	1, 2	Once to confirm inclusion in project design; Once to confirm inclusion in CDs		
	PP 4.6-1(b). The campus shall continue to implement its current seismic upgrade program.	A&E	n/a	Ongoing verification through LRDP monitoring and implementation		

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MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
	PP 4.6-1(c). The Campus will continue to fully comply with the University of California's Policy for Seismic Safety, as amended. The intent of this policy is to ensure that the design and construction of new buildings and other facilities shall, as a minimum, comply with seismic provisions of California Code of Regulations, Title 24, California Administrative Code, the California State Building Code, or local seismic requirements, whichever requirements are most stringent.	A&E	2	Once to confirm inclusion in CDs		
Result in substantial soil erosion or the loss of topsoil.	Applicable LRDP EIR Programs and Practices: PP 4.6-2(a). This is identical to Air Quality PP 4.3-2(b).					
	PP 4.6-2(b). In compliance with National Pollution Discharge Elimination System (NPDES), the campus would continue to implement Best Management Practices, as identified in the *UCR Stormwater Management Plan* (UCR 2003): (i) Public education and outreach on stormwater impacts (ii) Public involvement/participation (iii) Illicit discharge detection and elimination (iv) Pollution prevention/good housekeeping for facilities (v) Construction site stormwater runoff control (vi) Post-construction stormwater management in new development and redevelopment *(This is identical to and Hydrology PP 4.8-3[d].)*	A&E	2	Once to confirm inclusion in CDs		
Be located on a geologic unit or soil that is unstable or become unstable, or be located on expansive soil.	Applicable LRDP EIR Programs and Practices: Refer to PP 4.6-1(a).					

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MITIGATION MONITORING AND REPORTING PROGRAM

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					Initial if Completed	Remarks
Greenhouse Gas Emissions						
Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.	Applicable LRDP EIR Planning Strategies: Refer to PS Campus and Community 4, PS Transportation 3, and PS Transportation 5.					
	Applicable LRDP EIR Mitigation Measures: MM 4.16-1. All projects developed under the amended 2005 LRDP shall be evaluated for consistency with the GHG reduction policies of the UCR CAP and the UC Policy on Sustainable Practices, as may be updated from time to time by the University. GHG reduction measures, including, but not limited to, those found within the UCR CAP and UC Policy identified in Tables 4.16-9 and 4.16-10 shall be incorporated in all campus projects so that at a minimum an 8 percent reduction in emissions from BAU is achieved. It is expected that the GHG reduction measures in the UCR CAP will be refined from time to time, especially in light of the evolving regulations and as more information becomes available regarding the effectiveness of specific GHG reduction measures. As part of the implementation of the UCR CAP, the Campus will also monitor its progress in reducing GHG emissions to ensure it will attain the established targets.	Sustainability	1	Once to confirm inclusion in project design		
	Also refer to MM 4.3-2b, MM 4.14-1b, and MM 4.14-1d.					
Conflict with an applicable plan, policy, or regulations adopted for the purpose of reducing the emissions of greenhouse gases.	Applicable LRDP EIR Planning Strategies: Refer to PS Transportation 3 and PS Transportation 5.					

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MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
	Applicable LRDP EIR Mitigation Measures: Refer to MM 4.3-2b, MM 4.14-1b, MM 4.14-1d, and MM 4.16-1.					
Hazards and Hazardous Materials						
Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	Applicable LRDP EIR Programs and Practices: PP 4.7-1. The Campus shall continue to implement the current (or equivalent) health and safety plans, programs, and practices related to the use, storage, disposal, or transportation of hazardous materials, including, but not necessarily limited to, the Business Plan, the Broadscope Radioactive Materials License, and the following programs: Biosafety, Emergency Management, Environmental Health, Hazardous Materials, Industrial Hygiene and Safety, Laboratory/Research Safety, Radiation Safety, and Integrated Waste Management. These programs may be subject to modification as more stringent standards are developed or if the programs are replaced by other programs that incorporate similar health and safety protection measures.	EH&S	n/a	Ongoing verification through LRDP monitoring and implementation		
	PP 4.7-2. The campus shall perform hazardous materials surveys on buildings and soils, if applicable, prior to demolition. When remediation is deemed necessary, surveys shall identify all potential hazardous materials within the structure to be demolished, and identify handling and disposal practices. The campus shall follow the practices during building demolition to ensure construction worker and public safety.	A&E	2, 3	Once to confirm inclusion in CDs; Ongoing verification during demolition phase of construction, as applicable		

TABLE 1
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Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<u>Applicable LRDP EIR Programs and Practices</u>: PP 4.3-2(c). The campus shall continue to implement SCAQMD Rule 1403-Asbestos when demolishing existing buildings on campus.	A&E	2, 3	Once to confirm inclusion in CDs; Ongoing verification during demolition phase of construction, as applicable		
	Also refer to PP 4.7-1 and PP 4.7-2.					
Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	<u>Applicable LRDP EIR Programs and Practices</u>: PP 4.7-7(a). To the extent feasible, the Campus shall maintain at least one unobstructed lane in both directions on campus roadways. At any time only a single lane is available, the Campus shall provide a temporary traffic signal, signal carriers (i.e., flag persons), or other appropriate traffic controls to allow travel in both directions. If construction activities require the complete closure of a roadway segment, the Campus shall provide appropriate signage indicating alternative routes. *(This is identical to Transportation and Traffic PP 4.14-5.)*	A&E	2, 3	Once to confirm inclusion in CDs; Ongoing verification during construction		
	PP 4.7-7(b). To maintain adequate access for emergency vehicles when construction projects would result in roadway closures, Architects & Engineers (formerly the Office of Design and Construction) shall consult with the UCPD, EH&S, and the RFD to disclose roadway closures and identify alternative travel routes. *(This is identical to Transportation and Traffic PP 4.14-8.)*	A&E	3	Ongoing verification during construction		

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Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
Hydrology and Water Quality						
Violate any water quality standards or waste discharge requirements.	Applicable LRDP EIR Programs and Practices: PP 4.8-1. The campus will continue to comply with all applicable water quality requirements established by the SARWQCB. *(This is identical to Utilities PP 4.15-5.)*	A&E	2	Once to confirm inclusion in construction documents and SWPPP.		
Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.	Applicable LRDP EIR Programs and Practices: PP 4.8-2(a). To further reduce the campus' impact on domestic water resources, to the extent feasible, UCR will (i) Install hot water recirculation devices (to reduce water waste) (ii) Continue to require all new construction to comply with applicable State laws requiring water-efficient plumbing fixtures, including but not limited to the Health and Safety Code and Title 24, California Code of Regulations, Part 5 (California Plumbing Code) (iii) Retrofit existing plumbing fixtures that do not meet current standards on a phased basis over time (iv) Install recovery systems for losses attributable to existing and proposed steam and chilled-water systems (v) Prohibit using water as a means of cleaning impervious surfaces (vi) Install water-efficient irrigation equipment to maximize water savings for landscaping and retrofit existing systems over time *(This is identical to Utilities PP 4.15-1[b].)*	A&E	1	Once to confirm inclusion in project design		

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Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
	PP 4.8-2(b). The Campus shall promptly detect and repair leaks in water and irrigation pipes. *(This is identical to Utilities PP 4.15-1[c].)*	Facilities Services	n/a	Ongoing verification through LRDP monitoring and implementation		
	PP 4.8-2(c). The campus shall avoid serving water at food service facilities except upon request. *(This is identical to Utilities PP 4.15-1[d].)*	Dining, Hospitality, and Retail Services	n/a	Ongoing verification through LRDP monitoring and implementation		
Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of stream or river, in a manner, which would result in substantial erosion or siltation on- or off-site.	Applicable LRDP EIR Programs and Practices: PP 4.8-3(c). This is identical to Air Quality PP 4.3-2(b) and Geology PP 4.6-2(a). PP 4.8-3(d). This is identical to and Geology and Soils PP 4.6-2(b). Also refer to PP 4.8-1.					
Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.	Applicable LRDP EIR Programs and Practices: Refer to PP 4.8-1 and PP 4.8-3(d).					
Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.	Applicable LRDP EIR Programs and Practices: PP 4.8-3(e) Prior to the time of design approval, the Campus will evaluate each specific project to determine if the project runoff would exceed the capacity of the existing storm drain system. If it is found that the capacity would be exceeded, one or more of the following components of the storm drain system would be implemented to minimize the occurrence of local flooding: (i) Multi-project stormwater detention basins	A&E	1	Once to confirm inclusion in project design		

TABLE 1
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Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
	(ii) Single-project detention basins (iii) Surface detention design (iv) Expansion or modification of the existing storm drain system (v) Installation of necessary outlet control facilities					
	Also refer to PP 4.8-1 and PP 4.8-3(d).					
Otherwise substantially degrade water quality.	Applicable LRDP EIR Programs and Practices: Refer to PP 4.8-1 and PP 4.8-3(d).					
Land Use and Planning						
Conflict with applicable land use plan, policy or regulation of an agency with jurisdiction over the project (including but not limited to the general plan, specific plan, coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.	Applicable LRDP EIR Planning Strategies: PS Land Use 1. Achieve academic core densities of 1.0 FAR or higher on both the East and West Campuses in order to achieve a balance of academic land area versus other required uses.	CAS	n/a	Ongoing verification through LRDP monitoring and implementation		
	PS Land Use 2. In order to achieve a compact and contiguous academic core and desired development densities, strategies will include infill sites in the developed East Campus academic core as well as expansion to the West Campus academic zone immediately adjacent to the I-215/SR-60 freeway.	CAS	n/a	Ongoing verification through LRDP monitoring and implementation		
	PS Development Strategy 1. Establish a design review process to provide regular review of building and landscape development on campus.	A&E	n/a	Ongoing verification through LRDP monitoring and implementation		
	PS Conservation 2. Refer to this PS in Biological Resources section.					

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Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
	Applicable LRDP EIR Programs and Practices: PP 4.9-1(a). This is identical to Aesthetics PP 4.1-1. PP 4.9-1(b). This is identical to Aesthetics PP 4.1-2[a].					
Create other land use impacts.	Applicable LRDP EIR Programs and Practices: Refer to PP 4.9-1(a), PP 4.9-1(b), and PP 4.9-1(c). PP 4.9-1(c) is identical to Aesthetics PP 4.1(b).					
Noise						
Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.	Applicable LRDP EIR Programs and Practices: PP 4.10-2. The UCR campus shall limit the hours of exterior construction activities from 7:00 a.m. to 9:00 p.m. Monday through Friday and 8:00 a.m. to 6:00 p.m. on Saturday when necessary. Construction traffic shall follow transportation routes prescribed for all construction traffic to minimize the impact of this traffic (including noise impacts) on the surrounding community.	A&E	2, 3	Once to confirm inclusion in CDs; Ongoing verification during construction		
	Applicable LRDP EIR Mitigation Measures: MM 4.10-2. The campus shall notify all academic and residential facilities within 300 feet of approved construction sites of the planned schedule of vibration causing activities so that the occupants and/or researchers can take necessary precautionary measures to avoid negative effects to their activities and/or research.	A&E	3	Once to confirm notification prior to commencement of vibration causing activities; Ongoing verification of precautionary measures, if any, during construction.		

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Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
	Project-Level Mitigation Measures: MM BARN VIB-1. The campus shall require by contract specifications that large bulldozers; large, heavy trucks; vibratory rollers; and other similar equipment not be used within 50 feet of occupied academic buildings. The work shall be done with medium-sized equipment or smaller within these prescribed distances. Vibratory rollers operated in the static mode would be allowed.	A&E	2	Once to confirm inclusion in CDs		
Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.	Applicable LRDP EIR Programs and Practices: PP 4.10-1(a). UCR will incorporate the following siting design measures to reduce long-term noise impacts: (i) Truck access, parking area design, and air conditioning/refrigeration units will be designed and evaluated when planning specific individual new facilities to minimize the potential for noise impacts to adjacent developments. (ii) Building setbacks, building design and orientation will be used to reduce intrusive noise at sensitive student residential and educational building locations near main campus access routes, such as Blaine Street, Canyon Crest Drive, University Avenue, and Martin Luther King Jr. Boulevard. Noise walls may be advisable to screen existing and proposed facilities located near the I-215/SR-60 freeway. (iii) Adequate acoustic insulation would be added to residence halls to ensure that the interior L_{dn} would not exceed 45 dBA during the daytime and 40 dBA during the nighttime (10 PM to 7 AM) in rooms facing major streets. (iv) Potential noise impacts would be evaluated as part of the design review for all projects. If	A&E	1	Once to confirm inclusion in project design		

TABLE 1
MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
	determined to be significant, mitigation measures would be identified and alternatives suggested. At a minimum, campus residence halls and student housing design would comply with Title 24, Part 2 of the California Administrative Code.					
	PP 4.10-6. The Campus shall continue to shield all new stationary sources of noise that would be located in close proximity to noise-sensitive buildings and uses.	A&E	1	Once to confirm inclusion project design		
Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.	Applicable LRDP EIR Programs and Practices: PP 4.10-7(a). To the extent feasible, construction activities shall be limited to 7:00 a.m. to 9:00 p.m. Monday through Friday, 8:00 a.m. to 6:00 p.m. on Saturday, and no construction on Sunday and national holidays, as appropriate, in order to minimize disruption to area residences surrounding the campus and to on-campus uses that are sensitive to noise.	A&E	2, 3	Once to confirm inclusion in CDs; Ongoing verification during construction		
	Refer to PP 4.10-2.					
	PP 4.10-7(b). The campus shall continue to require by contract specifications that construction equipment be required to be muffled or otherwise shielded. Contracts shall specify that engine-driven equipment be fitted with appropriate noise mufflers.	A&E	2	Once to confirm inclusion in CDs		
	PP 4.10-7(c). The campus shall continue to require that stationary construction equipment material and vehicle staging be placed to direct noise away from sensitive receptors.	A&E	2	Once to confirm inclusion in CDs		

TABLE 1
MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
	PP 4.10-7(d). The campus shall continue to conduct regular meetings, as needed, with on campus constituents to provide advance notice of construction activities in order to coordinate these activities with the academic calendar, scheduled events, and other situations, as needed.	A&E	2, 3	Once to confirm communication prior to commencement of construction activities; Ongoing verification during construction		
Public Services						
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 fire protection.	Applicable LRDP EIR Programs and Practices: PP 4.12-1(a). As development occurs, the following measures will be incorporated: (i) New structures would be designed with adequate fire protection features in compliance with State law and the requirements of the State Fire Marshal. Building designs would be reviewed by appropriate campus staff and government agencies. (ii) Prior to implementation of individual projects, the adequacy of water supply and water pressure will be determined in order to ensure sufficient fire protection services. (iii) Adequate access will be provided to within 50 feet of the main entrance of occupied buildings to accommodate emergency ambulance service. (iv) Adequate access for fire apparatus will be provided within 50 feet of stand pipes and sprinkler outlets. (v) Service roads, plazas, and pedestrian walks that may be used for fire or emergency vehicles will be constructed to withstand loads of up to 45,000 pounds. (vi) As implementation of the LRDP occurs, campus fire prevention staffing needs would be assessed; increases in staffing would be determined through such needs assessments.	A&E	1	Once to confirm inclusion in project design		

TABLE 1
MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
	PP 4.12-1(b) (i) Accident prevention features shall be reviewed and incorporated into new structures be reviewed to minimize the need for emergency response from the City of Riverside.	A&E	1	Once to confirm inclusion in project design		
	PP 4.12-1(b) (ii) Increased staffing levels for local fire agencies shall be encouraged to meet needs generated by LRDP project related on-campus population increases.	EH&S	n/a	Ongoing verification through LRDP monitoring and implementation		
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 police protection.	<u>Applicable LRDP EIR Programs and Practices</u>: PP 4.12-2(a). As development under the LRDP occurs, the Campus will hire additional police officers and support staff as necessary to maintain an adequate level of service, staff, and equipment, and will expand the existing police facility when additional space is required.	UC Police Department	n/a	Ongoing verification through LRDP monitoring and implementation		
	PP 4.12-2(b). The Campus will continue to participate in the "UNET" program (for coordinated police response and staffing of a community service center), which provides law enforcement services in the vicinity of the campus, with equal participation of UCR and City police staffs.	UC Police Department	n/a	Ongoing verification through LRDP monitoring and implementation		

TABLE 1
MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
Transportation/Traffic						
Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.	Applicable LRDP EIR Programs and Practices: PP 4.14-2. The Campus will periodically assess construction schedules of major projects to determine the potential for overlapping construction activities to result in periods of heavy construction vehicle traffic on individual roadway segments, and adjust construction schedules, work hours, or access routes to the extent feasible to reduce construction-related traffic congestion.	A&E	3	Ongoing verification during construction		
	PP 4.14-5. This is identical to Hazards and Hazardous Materials PP 4.7-7[a].					
	Applicable LRDP EIR Mitigation Measures: MM 4.14-11. If on-campus parking is not available, off-site construction worker parking shall be provided with shuttle service to the remote parking location.	A&E	3	Ongoing verification during construction		
Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	Applicable LRDP EIR Programs and Practices: PP 4.14-6. For any construction-related closure of pedestrian routes, the Campus shall provide alternate routes and appropriate signage and provide curb cuts and street crossings to assure alternate routes are accessible.	A&E	3	Ongoing verification during construction		
	Also refer to PP 4.14-2 and PP 4.14-5.					
Result in inadequate emergency access.	Applicable LRDP EIR Programs and Practices: PP 4.14-8. This is identical to Hazards and Hazardous Materials PP 4.7-7(b)					

TABLE 1
MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.	Applicable LRDP EIR Planning Strategies: Refer to PS Campus and Community 4, PS Transportation 3, and PS Transportation 5.					
	Applicable LRDP EIR Programs and Practices: PP 4.14-1. This is identical to Air Quality PP 4.3-1.					
	Applicable LRDP EIR Mitigation Measures: MM 4.14-1(b). Travel Demand Management. To reduce on- and off-campus vehicle trips and resulting impacts, the University will enhance its Transportation Demand Management (TDM) program. TDM strategies will include measures to increase transit and Shuttle use, encourage alternative transportation modes including bicycle transportation, implement parking policies that reduce demand, and other mechanisms that reduce vehicle trips to and from the campus. The University shall monitor the performance of campus TDM strategies through annual surveys.	TAPS	n/a	Ongoing verification through LRDP monitoring and implementation		
	MM 4.14-1(d). Sustainability and Monitoring. The University shall review individual projects proposed under the amended 2005 LRDP for consistency with UC sustainable transportation policy and UCR TDM strategies to ensure that bicycle and pedestrian improvements, alternative fuel infrastructure, transit stops, and other project features that promote alternative transportation are incorporated into each project to the extent feasible.	Sustainability/TAPS	1	Once to confirm inclusion in project design		

TABLE 1
MITIGATION MONITORING AND REPORTING PROGRAM

Impact	Mitigation Measures	Responsible Entity	Monitoring Triggers	Frequency of Reporting	Verification of Compliance	
					Initial if Completed	Remarks
Utilities and Service Systems						
Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.	Applicable LRDP EIR Programs and Practices: PP 4.15-1(a). Improvements to the campus water distribution system, including necessary pump capacity, will be made as required to serve new projects. Project-specific CEQA analysis of environmental effects that would occur prior to project-specific approval will consider the continued adequacy of the domestic/fire water systems, and no new development would occur without a demonstration that appropriate domestic/fire water supplies continue to be available.	CAS	1	Once to confirm inclusion in project design and CEQA analysis		
	PP 4.15-1(b). This is identical to Hydrology PP 4.8-2(a). PP 4.15-1(c). This is identical to Hydrology PP 4.8-2(b). PP 4.15-1(d). This is identical to Hydrology PP 4.8-2(c).					
Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed.	Applicable LRDP EIR Planning Strategies: PS Conservation 5. Continue to adhere to the conservation requirements of Title 24 of the California Code of Regulations and comply with any future conservation goals or programs enacted by the University of California.	A&E	2	Once to confirm inclusion in construction documents.		
	Applicable LRDP EIR Programs and Practices: Refer to PP 4.15-1(a) through PP 4.15-1(d).					
Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.	Applicable LRDP EIR Programs and Practices: PP 4.15-5. This is identical to Hydrology PP 4.8-1.					

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ATTACHMENT A

BARN EXPANSION
DRAFT INITIAL STUDY/MITIGATED NEGATIVE DECLARATION

Draft Initial Study/ Mitigated Negative Declaration

University of California, Riverside Barn Expansion UCR Project No. 950493

Lead Agency | University of California, Riverside
Capital Planning – Capital Asset Strategies
1223 University Avenue, Suite 240
Riverside, California 92521

Prepared by | Psomas
1500 Iowa Avenue, Suite 210
Riverside, CA 92507

April 2017

UNIVERSITY OF CALIFORNIA, RIVERSIDE
BARN EXPANSION
PROJECT NO. 950493

Draft Initial Study/Mitigated Negative Declaration

Lead Agency:
University of California, Riverside
Capital Planning – Capital Asset Strategies
1223 University Avenue, Suite 240
Riverside, California 92521

Contact: Ms. Tricia D. Thrasher, ASLA, LEED AP

Prepared by:
Psomas
1500 Iowa Avenue, Suite 210
Riverside, California 92507

April 2017

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D Hydrology and Water Quality Reports

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BARN EXPANSION
UNIVERSITY OF CALIFORNIA, RIVERSIDE

Project No. 950493

Initial Study and Environmental Checklist Form

I. PROJECT INFORMATION

1. PROJECT TITLE

Barn Expansion

2. LEAD AGENCY NAME AND ADDRESS

The Regents of the University of California
1111 Franklin Street, 12th Floor
Oakland, California 94607

3. CONTACT PERSON AND PHONE NUMBER

Tricia D. Thrasher, ASLA, LEED AP
Principal Environmental Planner
Capital Planning – Capital Asset Strategies
University of California, Riverside
1223 University Avenue, Suite 240
Riverside, California 92521
(951) 827-1484

4. PROJECT LOCATION

University of California, Riverside
Riverside, California 92521
(Refer to Figures 1 and 2)

5. PROJECT SPONSOR'S NAME AND ADDRESS

University of California, Riverside
Capital Asset Strategies
1223 University Avenue, Suite 240
Riverside, California 92521

6. CUSTODIAN OF THE ADMINISTRATIVE RECORD FOR THIS PROJECT

Same as listed under No. 3 above

7. IDENTIFICATION AND LOCATION OF ENVIRONMENTAL IMPACT REPORT(S) BEING RELIED ON FOR TIERING

University of California, Riverside 2005 Long Range Development Plan Environmental Impact Report (referred to hereinafter as the 2005 LRDP EIR) and the *University of California, Riverside 2005 Long Range Development Plan Amendment 2 Environmental Impact Report* (referred to hereinafter as the 2005 LRDP Amendment 2 EIR) (collectively referred to as the

"LRDP EIR"). The documents are available for review at the University of California, Riverside (UCR) Capital Asset Strategies office, at the address listed above in Section 3 and online at http://lrdp.ucr.edu/.

Introduction

The environmental analysis for the proposed UCR Barn Expansion project (proposed project) is tiered from the 2005 LRDP EIR (State Clearinghouse [SCH] No. 2005041164), certified by the University of California (UC) Board of Regents (The Regents) in November 2005, as augmented, revised, and supplemented by the 2005 LRDP Amendment 2 EIR (SCH No. 2010111034) certified by The Regents on November 28, 2011. The 2005 LRDP Amendment 2 EIR is a supplement to the 2005 LRDP EIR and provides an analysis of only those environmental effects identified in the 2005 LRDP EIR that changed as a result of the 2005 LRDP Amendment 2, which includes a revision to the land use map to allow for the location of a new School of Medicine (SOM) as well other land use map changes; additional building space to accommodate the increased square footage requirements for the SOM; and the extension of the LRDP horizon year (described further below). The 2005 LRDP Amendment 2 EIR also includes an analysis of greenhouse gas (GHG) emissions resulting from development under the 2005 LRDP, as amended. The 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR are Program EIRs and were prepared in accordance with the California Environmental Quality Act (CEQA) (*Public Resources Code* [PRC]*,* Sections 21000, et seq., specifically, Section 21094), the State CEQA Guidelines (Title 14, *California Code of Regulations* [CCR], Sections 15000 et seq.), and the *University of California Procedures for the Implementation of CEQA*.

Section 15152 of the State CEQA Guidelines states, "'Tiering' refers to using the analysis of general matters contained in a broader EIR (such as one prepared for a general plan or policy statement) with later EIRs and negative declarations (NDs) on narrower projects; incorporating by reference the general discussions from the broader EIR; and concentrating the later EIR or ND solely on issues specific to the later project". CEQA and the State CEQA Guidelines encourage the use of tiered environmental documents to eliminate repetitive discussions of the same issues. As stated in the 2005 LRDP Amendment 2 EIR, "As authorized by Section 15168(c) of the State CEQA Guidelines, projects implementing the 2005 LRDP as revised by Amendment 2 will be examined in light of the 2005 LRDP EIR and this supplemental EIR [the 2005 LRDP Amendment 2 EIR] to determine whether the potential environmental effects of the individual project were adequately addressed in these EIRs, and whether any additional mitigation measures are required". Therefore, this Initial Study/Mitigated Negative Declaration (IS/MND) is hereby tiered from the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR, which was certified November 28, 2011. The documents are available for review at the UCR Capital Programs – Capital Asset Strategies office, at the address listed above in Section I, and online at http://lrdp.ucr.edu/.

The 2005 LRDP EIR analyzes the direct, indirect, and cumulative impacts resulting from the projected need for development of approximately 7.1 million gross square feet (gsf) of new academic, housing, and support space to accommodate a total enrollment of 25,000 students[1] by the academic year 2015/16, for a total of 11.8 million gsf on the UCR campus with 2005 LRDP buildout. The 2005 LRDP Amendment 2 EIR analyzes the direct, indirect, and cumulative impacts resulting from revisions to the 2005 LRDP land use map and an increase in the maximum building space that could be built on the campus from 11.8 million gsf to 14.9 million gsf to accommodate the SOM. The 2005 LRDP Amendment 2 does not change the projected enrollment level of

[1] Derived from 1 Full-Time Equivalent (FTE) = 1 Headcount. UCR uses a conversion rate of 1 FTE (0.95 rounded up) = 1 Headcount, and for the purposes of the 2005 LRDP and for the proposed Amendment 2, 1 FTE = 1 Headcount with the "student" taking full course loads every quarter with graduation in four years.

25,000 students but projects that this enrollment level will be attained in 2020/2021, five years later than projected in the 2005 LRDP. The 2005 LRDP Amendment 2 EIR addresses a total projected on-campus population associated with faculty, staff, and visitors of 16,393 persons (an increase of 5,852 persons associated with the SOM). Measures to mitigate the significant direct, indirect, and/or cumulative impacts identified for UCR's projected development are identified in both the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR.

Section 15152(f) of the State CEQA Guidelines instructs that when tiering, a later EIR or ND shall be prepared only when, on the basis of an IS, the later project may cause significant effects on the environment that were not adequately addressed in the prior EIR(s) or ND(s). Significant environmental effects are considered to have been "adequately addressed" if the lead agency determines that:

> (A) they have been mitigated or avoided as a result of the prior environmental impact report and findings adopted in connection with that prior environmental report; or
>
> (B) they have been examined at a sufficient level of detail in the prior environmental impact report to enable those effects to be mitigated or avoided by site specific revisions, the imposition of conditions, or by other means in connection with the approval of the later project.

Following review of the proposed project and the analysis presented in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR, it has been determined that the proposed project is a "project" under CEQA that was not fully addressed in the Program EIRs; therefore, additional environmental review is required. Accordingly, this tiered IS has been prepared on the basis that UCR has proposed to adopt an MND.

In conjunction with certification of the 2005 LRDP Amendment 2 EIR and approval of the 2005 LRDP Amendment 2, The Regents also adopted a Mitigation Monitoring and Reporting Program (MMRP). The MMRP ensures that 2005 LRDP Planning Strategies (PSs), Campus Programs and Practices (PPs), and Mitigation Measures (MMs), as revised by the 2005 LRDP Amendment 2 EIR, that are the responsibility of the UC are implemented in a timely manner. The MMs are monitored by the appropriate campus entity and are reported on an annual basis. As individual projects, such as the proposed project, are designed and constructed, the projects include features necessary to implement relevant PSs, PPs, and MMs. Therefore, in accordance with The Regents' November 2011 approval of the 2005 LRDP Amendment 2 and certification of the associated Final EIR, all relevant PSs, PPs, and MMs have been incorporated into the proposed project description and would be implemented as a part of the proposed project and monitored through the approved MMRP. Relevant UCR PSs, PPs, and/or MMs are listed in the introduction to the analysis for each topical issue in Section V, Evaluation of Environmental Impacts. In addition to PSs, PPs, and MMs from the MMRP relevant to the proposed project, this IS/MND includes new project-specific mitigation measures identified to reduce project-specific environmental impacts to a less than significant level (specifically related to vibration impacts during construction and impacts to cultural resources).

In summary, this IS/MND provides a project-specific environmental analysis to determine if the proposed Barn Expansion project would result in any significant impacts not adequately addressed in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR and/or if additional MMs beyond those adopted in the MMRP for the 2005 LRDP Amendment 2 would be required to reduce identified impacts. In accordance with the State CEQA Guidelines, an MND is the appropriate environmental document because, after incorporation of the identified MMRP and proposed project-specific mitigation measures, the

proposed project would not result in any new significant impacts that are not examined in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR or in a significant increase in the previously identified impacts.

This IS, along with a Notice of Intent to Adopt an MND, has been circulated by the State Clearinghouse Office of Planning and Research (SCH) for review by State agencies and to any responsible agencies, trustee agencies, and interested parties, as required by CEQA, for a 30-day public review. Following receipt and evaluation of comments from agencies, organizations, and/or individuals, the UC will determine whether any substantial new environmental issues have been raised. It is anticipated that the proposed project will subsequently be submitted to the Chancellor for consideration in July 2017.

II. PROJECT DESCRIPTION

The existing Barn Group buildings located at the project site include Barn Dining, Barn Theater, and Barn Stable, which total approximately 8,095 gsf. The University Cottage is located south of the project site and is not part of the proposed project. The proposed project would involve the demolition of the existing Barn Stable; the renovation and expansion of the Barn Dining building (i.e., new Kitchen Addition, serving area [servery], and seating); the construction of a Faculty/Staff Dining building; the construction of a Campus Meeting Room (for meetings and private event space) and Restroom building; and renovation of the Barn Theater. Collectively, the new, renovated, and expanded buildings with the proposed project are referred to as the Barn Complex. With implementation of the proposed project, there would be a total of 18,795 gsf of development associated with the expanded Barn Complex, a net increase of 10,700 gsf.

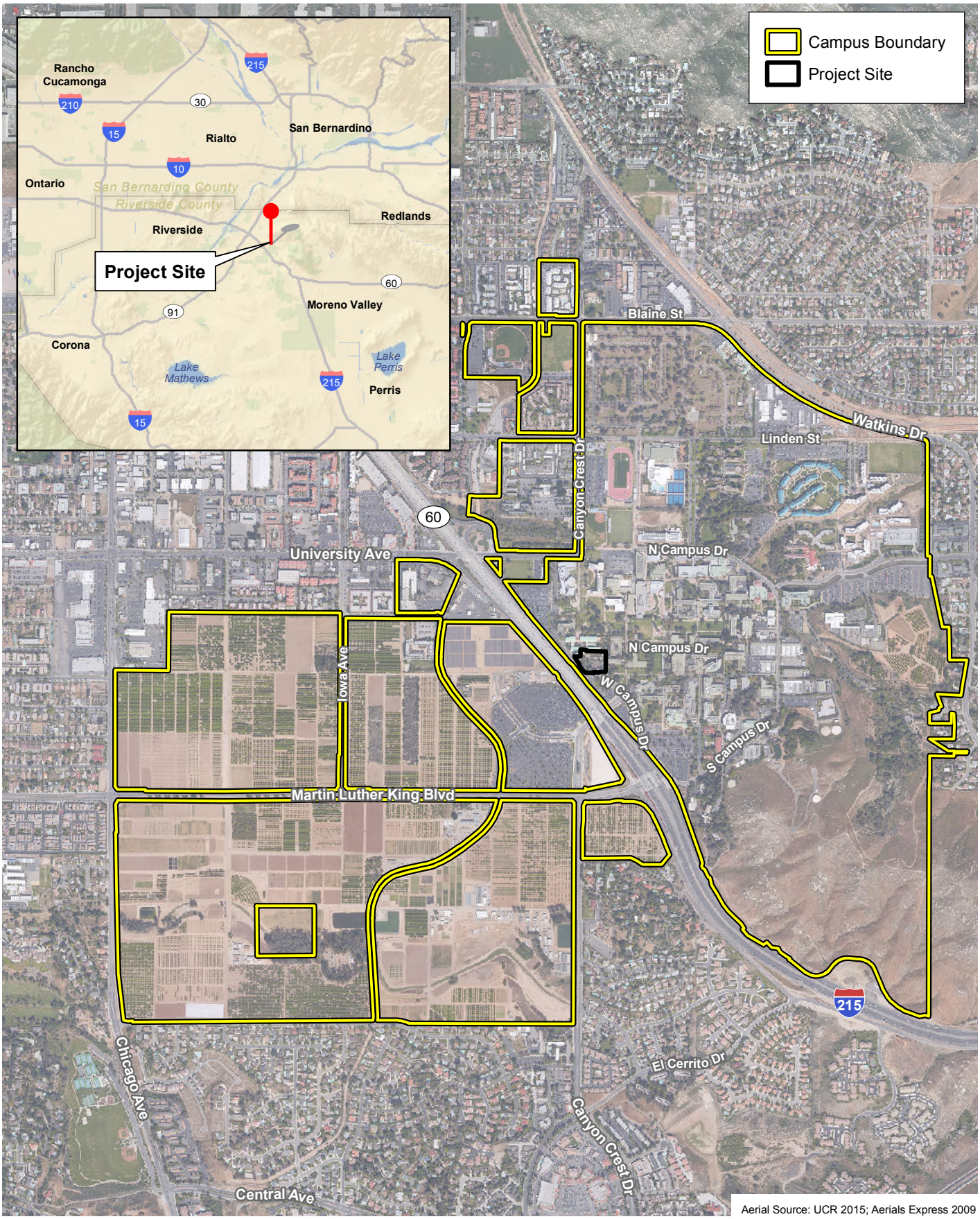
It should be noted that the University is considering an option to the proposed project that would involve demolition and replacement of the Barn Theater at a location slightly to the north of the existing building (referred to hereinafter as the Barn Theater Replacement Option or Option). The ability to implement this Option will be based on available funding; however, for purposes of analysis, this Option is evaluated in this IS/MND for those environmental impact categories where it would result in potentially greater impacts than the proposed project.

In addition to the building demolition, renovation, and construction, the proposed project would involve the construction of an outdoor West Courtyard and stage, and the existing East Courtyard would be renovated. Landscape and hardscape features, exterior lighting, and utility infrastructure would be installed to support the planned renovation and expansion. No new vehicular parking spaces or roadways would be added; however, bicycle parking would be installed and non-vehicular circulation would be maintained. Additionally, a loading dock/service yard would be constructed in the southwest portion of the site.

More detailed information regarding the Project Description is provided below under “Proposed Project Components”.

1. PROJECT LOCATION

The proposed project is located near the intersection of West Campus Drive with the future Barn Walk and the western terminus of Eucalyptus Walk in the western portion of UCR’s East Campus. The UCR campus is located within the City of Riverside, approximately 1.5 miles east of downtown Riverside and just west of the Box Springs Mountains. Specifically, the project site is bound by West Campus Drive to the west and south, Sproul Hall to the east, and the Humanities and Social Sciences (H&SS) building to the north. Figure 1 shows the regional location and local vicinity for the proposed project, and Figure 2 provides a map of the UCR campus, including the location of the proposed project.



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Regional and Local Vicinity

Figure 1

UCR Barn Expansion

N W E S

1,500 750 0 1,500

Feet

PSOMAS

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Source: UCR 2016

UCR Campus Map

Figure 2

UCR Barn Expansion

N W E S

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For the purposes of this IS/MND, the "project site" includes the areas that would be subject to physical modifications to implement the proposed project, including, but not limited to, building demolition and construction, vehicular and non-vehicular circulation, and hardscape and landscape, as described in this section. The project site encompasses approximately 71,875 square feet (sf) (1.7 acres) and is shown on the aerial photograph provided in Figure 3.

It should be noted that the proposed project also involves the establishment of temporary dining facilities east of the existing Barn facility to be used while the proposed project is under construction (refer to Figure 3).

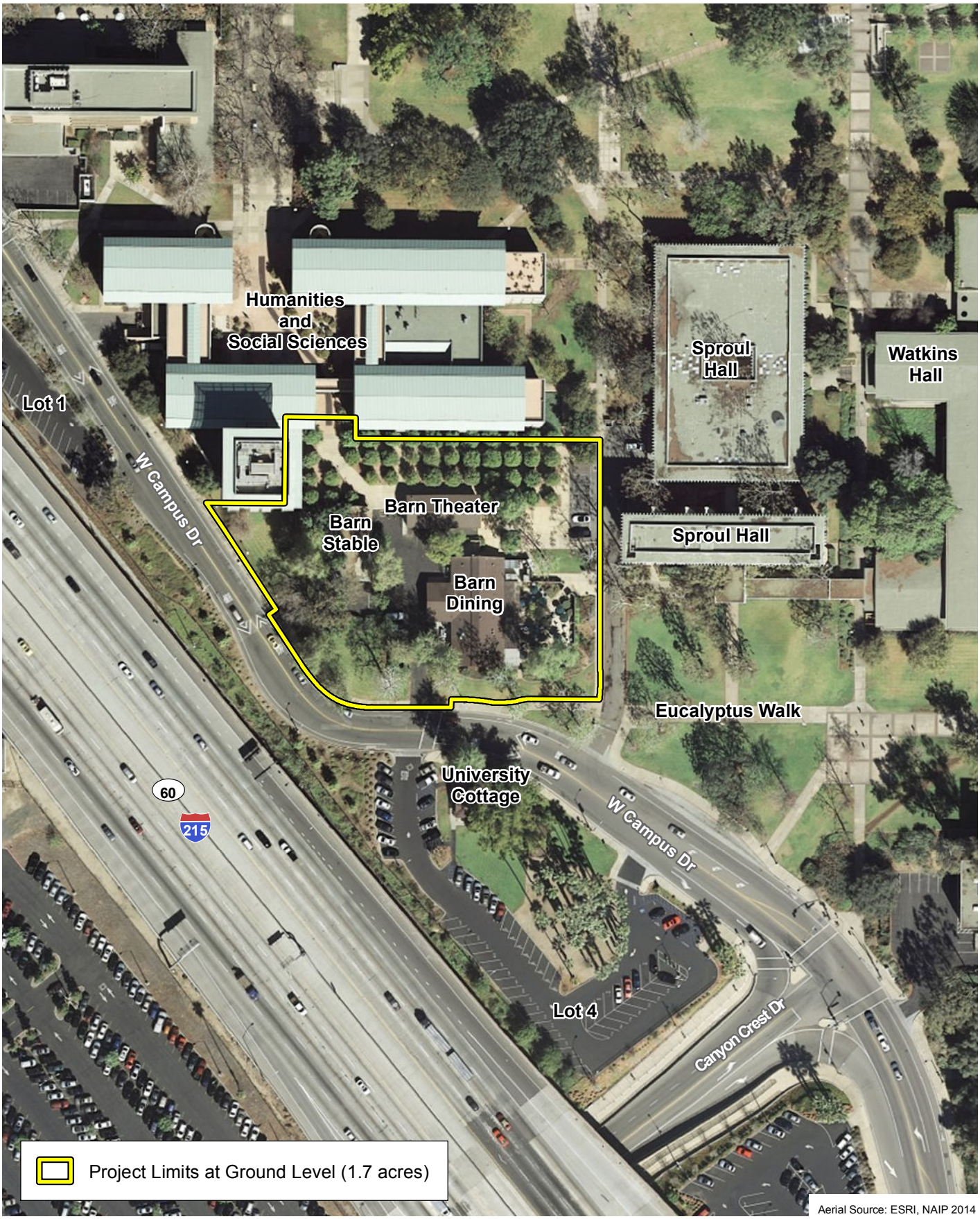
2. ENVIRONMENTAL SETTING

The 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR include descriptions of the regulatory and environmental setting for the region, the County and City, and the UCR campus, though the 2005 LRDP Amendment 2 EIR largely focuses on the West Campus. The regulatory and environmental settings for the topics addressed in this IS/MND have not substantively changed since preparation of the 2005 LRDP EIR or the 2005 LRDP Amendment 2 EIR, as appropriate. Therefore, they are not wholly repeated in this document. Particularly relevant and site-specific details of the regulatory and environmental settings are summarized in this IS/MND. Following is a description of the environmental setting for the proposed project and surrounding areas.

As shown in Figure 3, the proposed project would be constructed on an approximate 1.7-acre site in the western portion of the UCR East Campus. The project site serves as an important gateway and link to the East Campus core. The project site is currently developed with three single-level buildings associated with the existing Barn Group (the Barn Dining, Barn Theater, and Barn Stable). The University Cottage is located south of the project site across West Campus Drive and is not part of the proposed project. As further discussed in Section V.5, Cultural Resources, of this IS/MND, none of the existing buildings in the Barn Group are historic resources, as defined by CEQA. The remainder of the site includes paved areas for parking, vehicular access, and pedestrian access; an outdoor dining area adjacent to and east of the Barn Dining building (referred to as the East Courtyard); and landscaped areas consisting primarily of turf and mature trees and a citrus grove in the northern portion of the project site. Figure 4, Site Survey, depicts the existing condition of the project area.

The Barn Group has been and continues to be one of the most popular campus dining venues and is a social gathering place for UCR's campus community. The facility provides a quiet, relaxed dining atmosphere and offers an event space for the campus and community. Additional information about existing operations at the Barn Group is provided under the discussion of Operations in Section II.5, Proposed Project Components, below.

Vehicular access to the project site is currently provided from West Campus Drive and includes a service driveway that provides direct access to the existing buildings and a restricted-access service road adjacent to the future Barn Walk that provides access to the Accessible/Disabled parking spaces and the Sproul Hall service area adjacent to and northeast of the project site. Pedestrian access is provided by various pedestrian facilities primarily including the sidewalk along the eastern project boundary, Eucalyptus Walk, and the sidewalk running along West Campus Drive. Interstate (I) 215/State Route (SR) 60 is located approximately 75 feet southwest of the project site and physically separates the UCR East and West Campus areas. There is a concrete wall located along I-215/SR-60 (estimated to be a minimum of ten feet high). Canyon Crest Drive southeast of the project site passes under the freeway and provides a connection between the East and West Campuses.



Aerial Source: ESRI, NAIP 2014

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Aerial Photograph

Figure 3

UCR Barn Expansion

N W E S

120 60 0 120 Feet

PSOMAS

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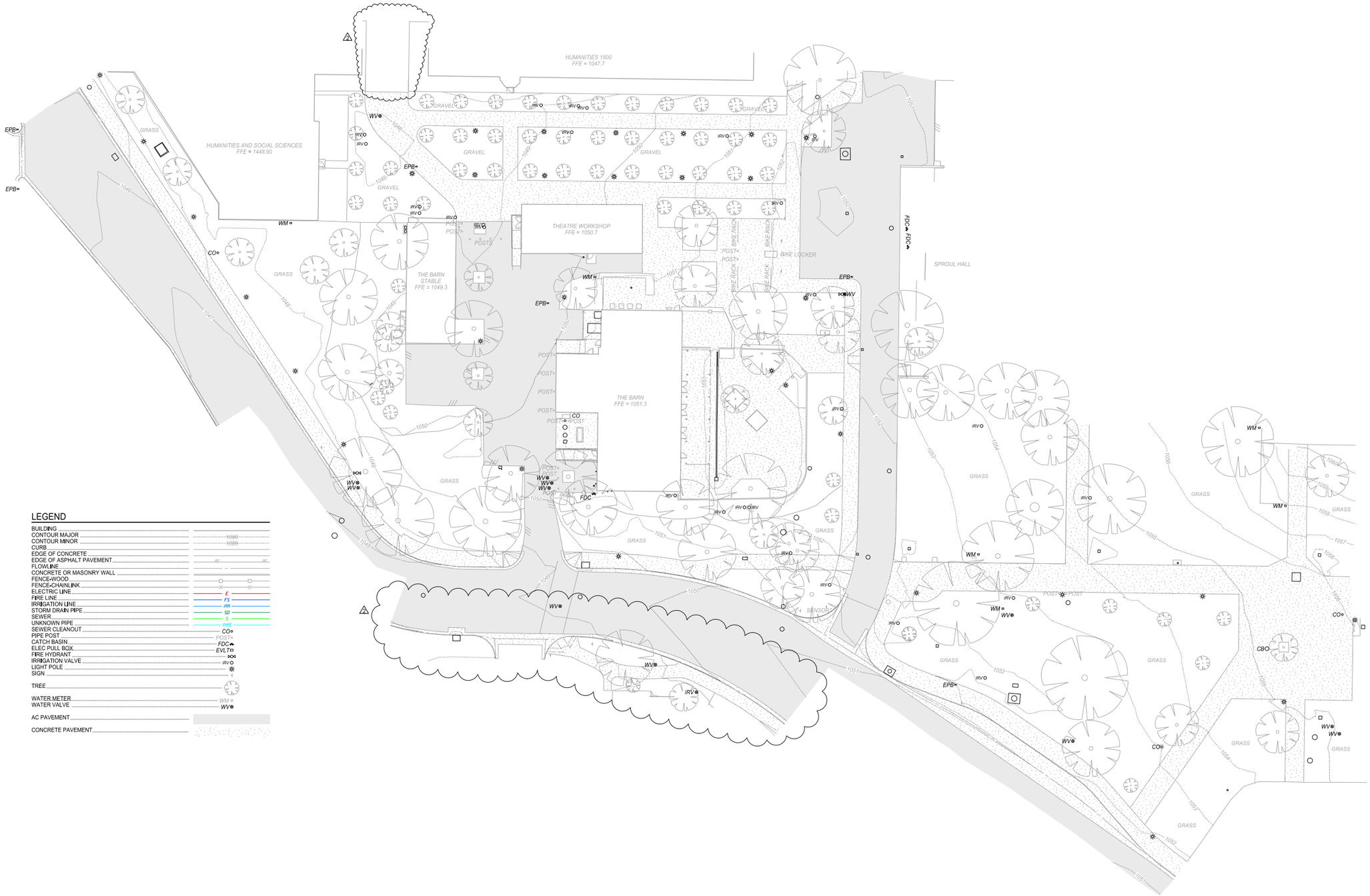

LEGEND

- BUILDING
- CONTOUR MAJOR 1090
- CONTOUR MINOR 1089
- CURB
- EDGE OF CONCRETE
- EDGE OF ASPHALT PAVEMENT
- FLOWLINE
- CONCRETE OR MASONRY WALL
- FENCE-WOOD
- FENCE-CHAINLINK
- ELECTRIC LINE E
- FIRE LINE FS
- IRRIGATION LINE IRR
- STORM DRAIN PIPE SD
- SEWER S
- UNKNOWN PIPE PIPE
- SEWER CLEANOUT CO
- PIPE POST POST
- CATCH BASIN FDC
- ELEC PULL BOX EVLT
- FIRE HYDRANT
- IRRIGATION VALVE IRV
- LIGHT POLE
- SIGN
- TREE
- WATER METER WM
- WATER VALVE WV
- AC PAVEMENT
- CONCRETE PAVEMENT

Source: MTH2 Engineering, Inc. 2016

Site Survey

UCR Barn Expansion

Figure 4

PSOMAS

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Vehicular trips generated by existing operations at the Barn Group are primarily associated with food, beverage, and other deliveries. There are currently eight vendors that make deliveries and most of these deliveries occur during the morning hours; however, there is a minimal number of deliveries each day (estimated to be approximately 10 daily deliveries). Customer/guest vehicular trips are minimal as most daytime guests walk to the facility. The peak period for current operations at the Barn Group is between 11:30 AM and 1:20 PM.

Existing adjacent parking is limited to four spaces for service and delivery vehicles and three Americans with Disabilities Act (ADA) spaces. Event parking is directed to larger parking lots that have available capacity during the day and time of the event. Parking Lot 4, south of the project site, provides 70 parking spaces (50 permitted, 4 motorcycle, 8 metered, and 8 accessible spaces) but is not used extensively by individuals (employees or guests) of the Barn Group.

The topography of the project site is relatively flat and generally slopes from east to west with elevations from approximately 1,047 feet above msl in the western portion of the project site to approximately 1,052 feet above msl in the eastern portion. Due to the minimal change in topography across the site and surrounding areas and the presence of mature trees and adjacent development, views of the project area are limited to vantage points from adjacent structures, roadways, and areas that are internal to the campus (refer to additional discussion of viewsheds provided in Section V.1, Aesthetics, of this IS/MND). The concrete wall along I-215/SR-60 obstructs views into the East Campus from vantage points to the west. The H&SS building, Sproul Hall, and mature trees are prominent visual features in the project area.

Vegetation within the project area consists of tree species, shrubs, and ornamental vegetation. Tree species identified within the project area include one species that is native to California: western sycamore (*Platanus racemosa*). Tree species are further discussed in Section V.4, Biological Resources, of this IS/MND. There are no sensitive hydrologic or biological resources within the project site. Based on review of Figure 3.0-8 of the 2005 LRDP Amendment 2 EIR, there is no designated “natural open space” in the vicinity of the project site; however, the Carillon Mall located north of the H&SS building is a “campus landmark open space” area, which is accessed from the future Barn Walk. The future Barn Walk is identified as a “mall and linear open space”, along with other walkways in the vicinity of the project site (Eucalyptus Walk, Library Mall, and Citrus Mall).

The project site is underlain by approximately two feet of artificial fill materials. The fill materials consist of silty sand and are underlain by old alluvial fan deposits that are composed primarily of silty sands and poorly graded sands. Groundwater was not encountered at the project site within the maximum exploratory drilling depth of 26.5 feet below ground surface (bgs). Currently, storm water from the eastern portion of the site drains south to an existing curb inlet along the north side of West Campus Drive, and storm water from the western portion of the site drains west via sheet flow to the curb and gutter in West Campus Drive.

Regionally, as with all of Southern California, the UCR campus lies within a seismically active area. There are no known active or potentially active faults within the project site or the immediate vicinity. The nearest active fault is the San Jacinto Fault Zone located approximately 4.9 miles to the northeast.

3. BACKGROUND AND NEED FOR THE PROPOSED PROJECT

The Barn Group was built around 1916 and originally served as the operational center for The University of California Citrus Experiment Station’s agriculture activities. When UCR opened in 1954, three remaining field buildings were converted to campus uses. The Barn was transformed from a horse stable to a dining hall and subsequently became a hub for campus activities as well

as a prominent place for entertainment. The existing Barn Stable is currently used for storage, and the Barn Theater is used by the College of Humanities and Social Sciences (CHASS) for coursework and research in music, dance, theatre, poetry, and film. Club organizations also use the space for rehearsals.

The Barn has been and continues to be one of the most popular campus dining venues and is a social gathering place for UCR's campus community. The Barn Group offers a quiet, relaxed dining atmosphere and is a place for entertainment to the campus and community. However, the current Barn dining program is at capacity and constrained due to the size and configuration of the kitchen and limited seating. This has resulted in dining deficiencies in the southwest part of the East Campus. Notably, the dining room contains an inefficient service system configuration that results in slow customer service and line rejection, and opportunities for events are limited due to the Barn's restricted size. The present configuration does not support food and beverage sales during events. Additionally, there is currently no faculty club on campus that offers faculty and staff a place to meet and interact in a relaxed environment. Further, the Barn Theater requires attention to extend the useful life of the building and to support the academic and student organizations that utilize the space. Improvements to the mechanical, electrical, and building structures are needed to improve the functionality of the building.

The proposed project is the result of an extensive planning effort that has been ongoing since 2009. A Detailed Project Program (DPP) was prepared in May 2010 (*The Barn Project Phases 1 & 2 Detailed Project Program)* (Fernau & Hartman Architects 2010). The 2010 DPP identified that the Barn Project would be developed in three phases and would ultimately include the renovation of the Barn and construction of the Kitchen Addition; the relocation, renovation, and addition to the Barn Stable; the relocation and renovation of the University Cottage, the East Courtyard, the University Cottage South Patio, and the loading dock area and drive aisle along West Campus Drive; and construction of the new facility for KUCR and the West Courtyard, the Barn Theater Addition and Renovation, and major utility connections.

Subsequently, in an effort to ensure that UCR's campus dining program (for UCR Housing, Dining Services and Residential Services) is positioned to provide best practice services in support of the University's long-range development objectives, the University commissioned preparation of the *2011 Dining Services Master Planning Study* (Envision Strategies 2011). The master planning study was based on extensive research and analysis, including stakeholder interviews; an off-campus competitive market assessment; a quantitative survey issued to the entire UCR community; an assessment of the existing dining program at the time the study was prepared; and an evaluation of the impact of the campus master planning and housing master planning studies on future dining needs. A key goal of the *2011 Dining Services Master Planning Study* was to determine locations for expanding on-campus dining opportunities. The study identified large population clusters (students, faculty, and staff) that are within a three-minute walk to the Highlander Union Building (HUB), which is the primary food venue and gathering place, and the Barn. With respect to future additional development on campus, the 2011 Study identified that the expansion and renovation of the Barn is warranted to significantly increase its capacity and improve customer throughput. The Barn is ideally located near the campus' Canyon Crest entrance and the largest student parking lot, which is an area of campus that is significantly underserved relative to the potential demand for food service.

In September 2011, UCR requested that the *2010 Barn Project Phase 1 & 2 DPP* be revised to respond to new programmatic changes by developing a concise DPP Update. In summary, the following programmatic changes were included in the 2012 DPP Update: remove KUCR from the plan; program a new faculty/staff dining space; improve the West Courtyard to support outdoor events in all kinds of weather; and provide acoustic control that limits disruptions to the surrounding area (Fernau & Hartman Architects 2012).

In March 2016, a program verification was completed to review and verify the 2012 DPP Update and to incorporate changes made to the project scope as a result of intensive budget and business plan reviews since preparation of the 2012 DPP Update. The key changes made to the project in the 2016 Addendum to the 2012 DPP Update include removal of the Barn Stable and the University Cottage;[2] addition of the Campus Meeting Room; addition of the Barn Theater Renovation/Upgrade; and revisions to the entertainment program.

In summary, the vision for the proposed project is to dramatically enhance the dining, gathering, and entertainment capacities of the Barn facilities while maintaining the importance of the Barn to the campus community. The overall project expands the dining capabilities to accommodate students, faculty, and staff as identified in the *2011 Dining Services Master Planning Study* and provides a larger exterior stage for shows. Improvements to the Barn Theater are necessary to address building deficiencies.

4. PROJECT GOALS/OBJECTIVES

The goals and objectives of the proposed project are

1. Address dining deficiencies in the southeast part of Campus. The current Barn dining program is at capacity and constrained due to the size and configuration of the kitchen and limited seating.
2. Enhance entertainment programming abilities. The Barn's entertainment capabilities are also at capacity and are hindered by the existing facility size and limited seating. The present configuration does not support food and beverage sales during events.
3. Establish a Faculty/Staff Dining Room to provide food and beverage service, and to create a place for faculty and staff to meet and interact in a relaxed environment. The dining room will function as a crossroad and furnishes opportunities to promote intellectual, cultural and social interaction across disciplines. This dining room is significant to the Campus as there is currently no faculty club which usually serves this purpose.
4. Continue a campus tradition. The Barn has a history of providing dining and entertainment to the campus community.
5. Improve studio space used by academic programs and student organizations.
6. Plan, design, and implement the proposed project in a manner consistent with the University of California Policy on Sustainable Practices.

5. PROPOSED PROJECT COMPONENTS

The following project components are described below:

- Building Construction, Renovation, and Expansion
- Operations
- Employee and Guest Populations
- Circulation and Parking
- Courtyards, Landscape/Hardscape, and Lighting
- Utilities/Infrastructure

2 The Barn Stable will be demolished as part of the project. The University Cottage will be retained but not included as part of the proposed Project.

- Sustainable Building Features
- Construction Activities

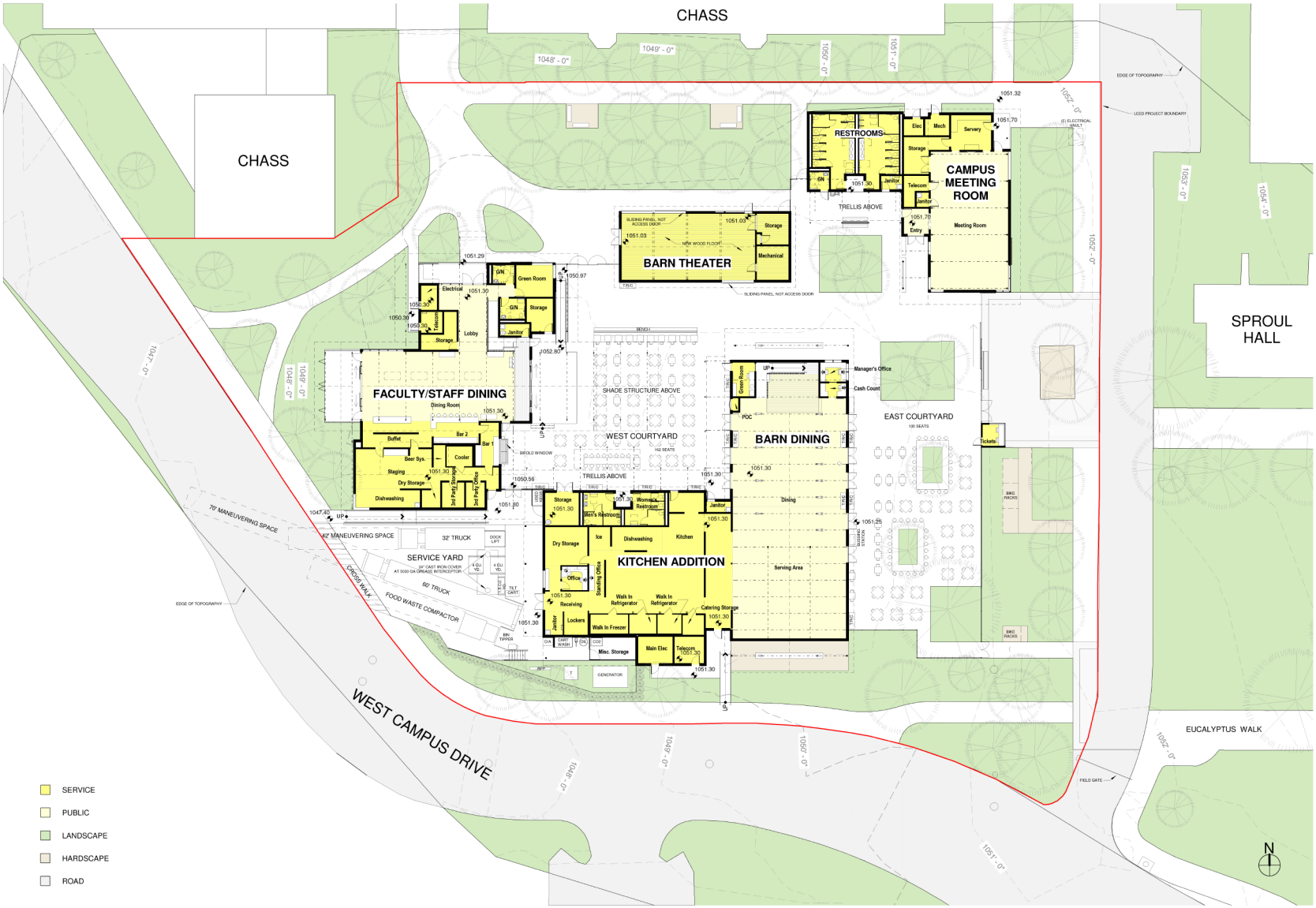
Building Construction, Renovation, and Expansion

As previously identified, the proposed project would involve the demolition of the existing Barn Stable; the renovation/expansion of the Barn Dining building (i.e., new Kitchen Addition, serving area, and seating); the construction of a Faculty/Staff Dining facility; the construction of a Campus Meeting Room (for meetings and private event space) and Restroom building; and renovation of the Barn Theater. Figure 5 provides the conceptual site plan for the proposed project. Table 1 provides a summary comparison of the existing and future conditions with respect to on-site buildings. A description of the proposed new buildings and building renovations and expansions follows.

TABLE 1
PROPOSED BARN EXPANSION
BUILDING STATISTICAL SUMMARY

Building	Existing (gsf)	Proposed (gsf)	Net Change (gsf)
Buildings to be Expanded/Renovated			
Barn Dining and Kitchen Addition	4,820	8,680	+3,860
Barn Theater	1,650	1,700	+50
Subtotal	*6,470*	*10,380*	*+3,910*
New Buildings to be Constructed			
Campus Meeting Room and Restrooms	0	3,435	+3,435
Faculty/Staff Dining Facility	0	4,900	+4,900
Ticketing Tower	0	80	+80
Subtotal	*0*	*8,415*	*+8,415*
Building to be Demolished			
Barn Stable	1,625	0	-1,625
Total	**8,095**	**18,795**	**+10,700**
gsf: gross square feet.			

It should be noted that due to the extensive work required for the existing Barn Theater building foundation and due to the non-optimal location of this existing building, UCR is considering an option to replace the Barn Theater completely, as a building that would also house the restrooms. The decision to renovate or replace the Barn Theater will ultimately be based on budgetary considerations. However, because demolition and replacement of the Barn Theater would result in potentially greater impacts than the proposed project (during construction), the impacts of the Barn Theater Replacement Option are evaluated in this IS/MND, as relevant. A conceptual site plan for the Barn Theater Replacement Option is provided in Figure 6, and Table 2 provides a summary comparison of the existing and future conditions with respect to on-site buildings with this Option. As identified in the table, with implementation of this Option, there would be a slight increase of 65 gsf in overall square footage added to the project site (10,765 gsf compared to 10,700 gsf).



Source: Fernau & Hartman Architects, 2017

Conceptual Site Plan – Proposed Project

Figure 5

UCR Barn Expansion

N W E S

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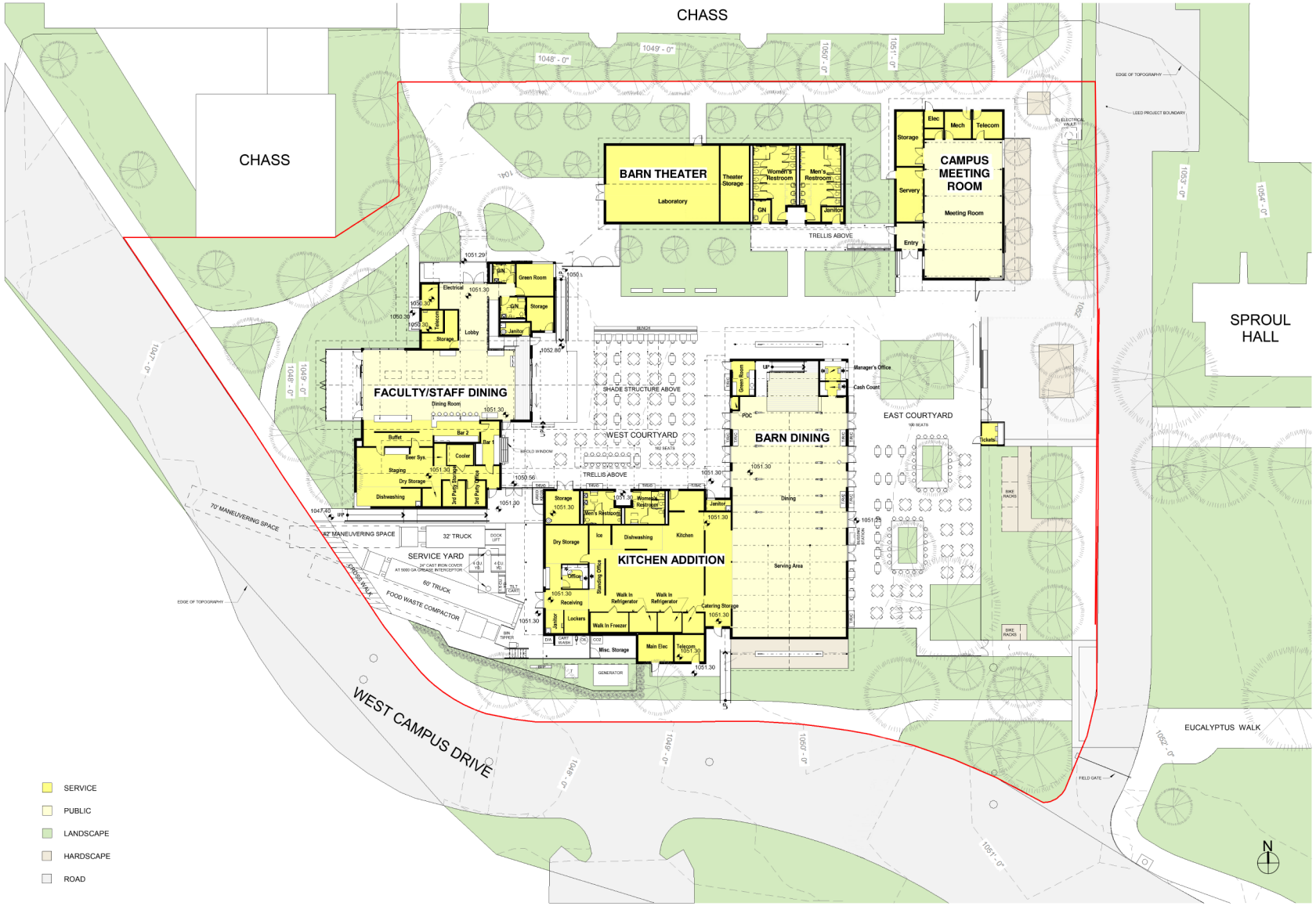

Source: Fernau & Hartman Architects, 2017

Conceptual Site Plan – Barn Theater Replacement Option

Figure 6

UCR Barn Expansion

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TABLE 2
PROPOSED BARN EXPANSION
BARN THEATER REPLACEMENT OPTION
BUILDING STATISTICAL SUMMARY

Building	Existing (gsf)	Proposed (gsf)	Net Change (gsf)
Buildings to be Expanded/Renovated			
Barn Dining and Kitchen Addition	4,820	8,680	+3,860
New Buildings to be Constructed			
Campus Meeting Room	0	2,415	+2,415
Faculty/Staff Dining Facility	0	4,900	+4,900
Barn Theater and Restrooms	0	2,785	+2,785
Ticketing Tower	0	80	+80
Subtotal	0	*10,180*	*+10,180*
Building to be Demolished			
Barn Stable	1,625	0	-1,625
Barn Theater	1,650	0	-1,650
Subtotal	*3,275*	*0*	*-3,275*
Total	**8,095**	**18,860**	**+10,765**

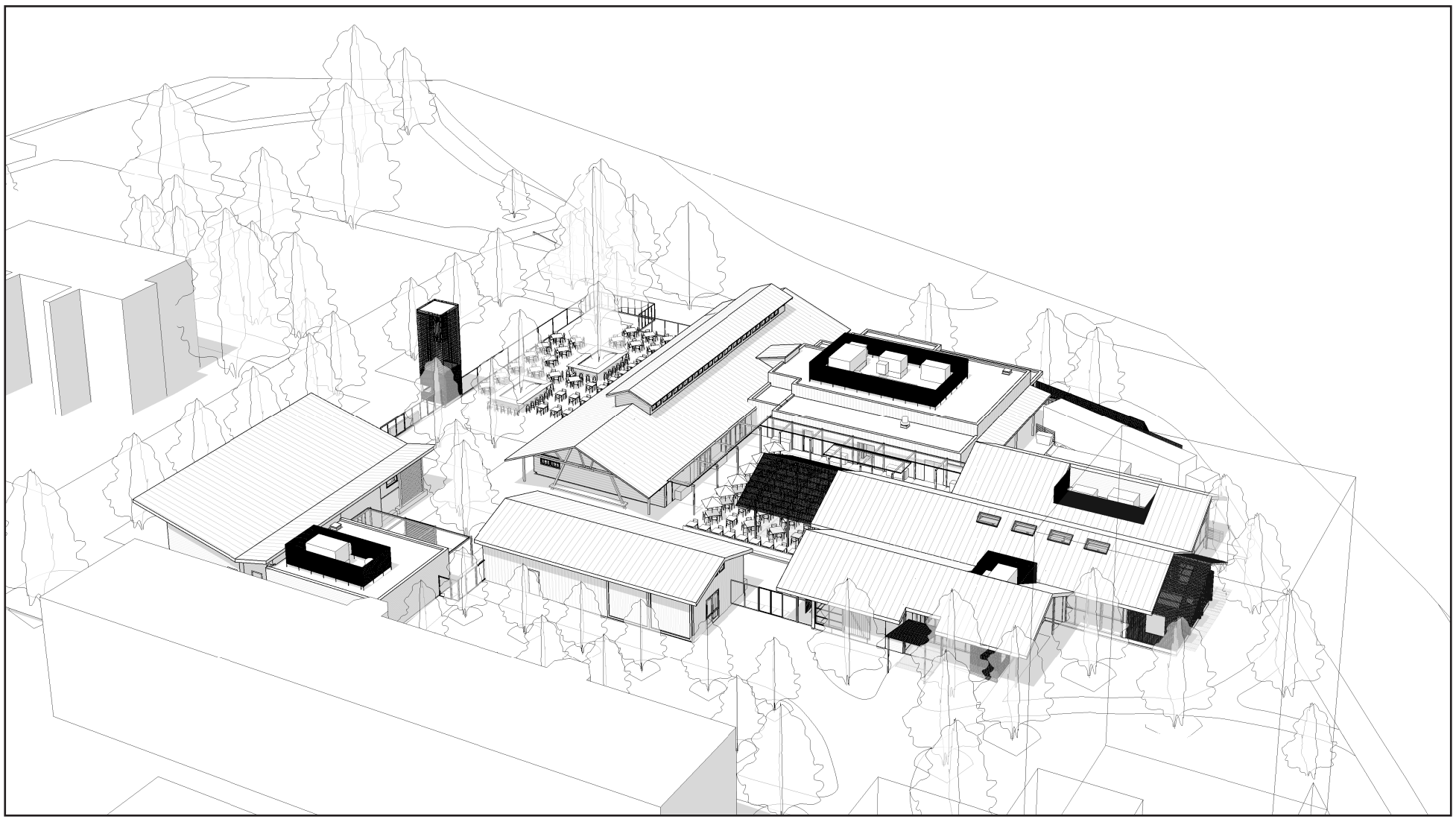
gsf: gross square feet.

The proposed project has been designed to enhance the awareness of the campus' agrarian heritage. In order to accomplish this and for the Barn facilities to be perceived as a complex of related structures and activities, the material choices, massing strategies, and connecting structures have been considered as a whole. A coordinated hierarchy of building elements is proposed, including primary, secondary, and tertiary elements. The overall character of the proposed project has been developed to revive and repurpose the Barn Dining and Barn Theater, with these buildings as the central elements. Each of the buildings would be one level. A new ticketing tower would also be constructed. The existing buildings to be retained and new buildings to be constructed would be interconnected through the outdoor spaces, including the East and West Courtyards. Conceptual renderings of the proposed project are provided on Figure 7, and Figure 8 provides a conceptual rendering for the Barn Theater Replacement Option.

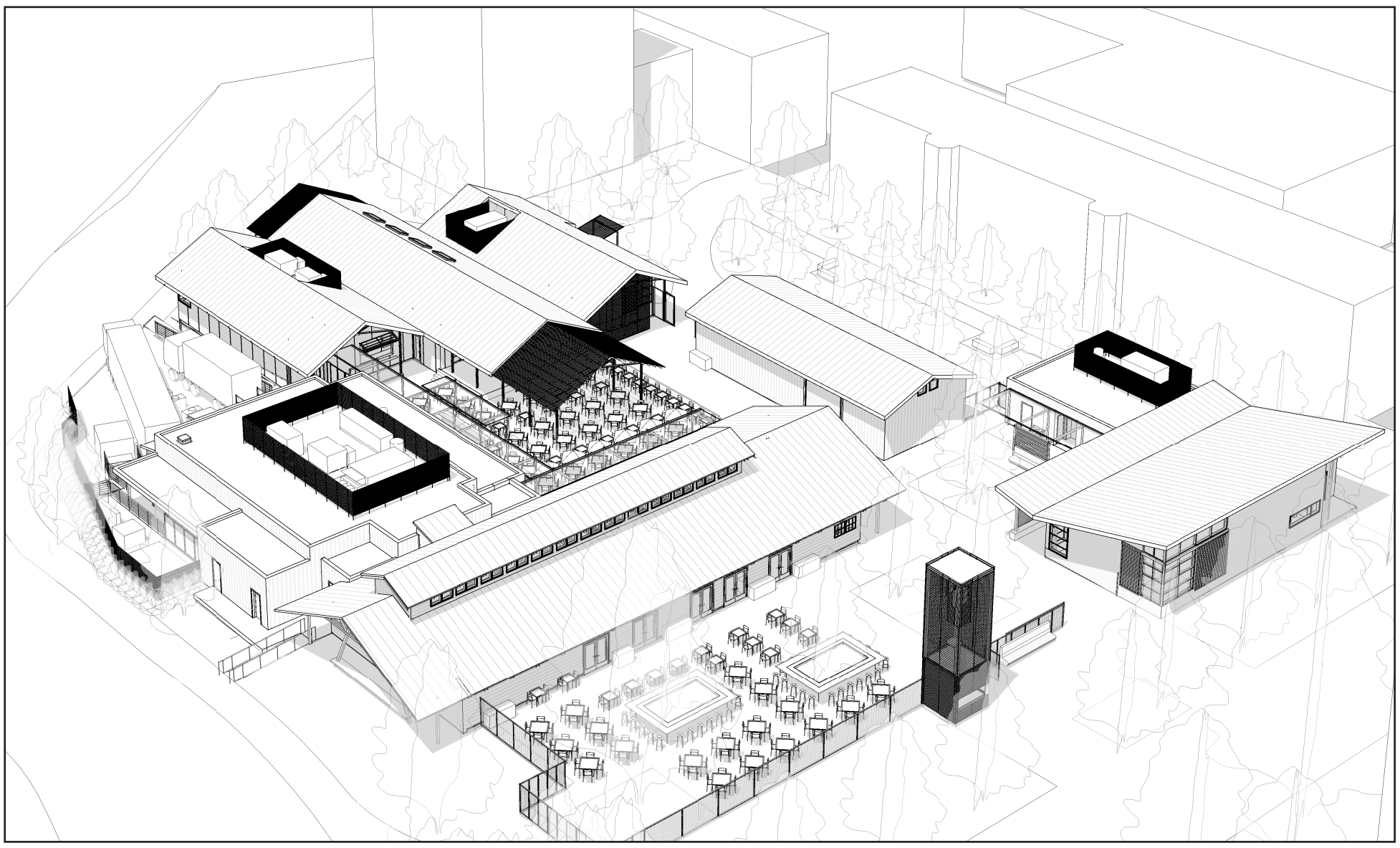
The final selection of building materials and color palette would adhere to the UCR Campus Design Guidelines to be visually harmonious with the UCR campus as well as the immediately surrounding buildings.

All new construction under the proposed project (and Barn Theater Replacement Option) would be designed and constructed in compliance with applicable requirements of the California Building Code (CBC) and California Fire Code. Specifically, fire sprinklers, fire alarm systems, emergency lighting, emergency response notification systems, and illuminated signage would be installed. Following is a description of the proposed buildings (new and renovated/expanded):

- **Barn Dining and Kitchen Addition.** Figure 9a provides conceptual building elevations for the Barn Dining and Kitchen Addition; the buildings would have a maximum height of approximately 24 feet, 3 inches. The existing Barn building, a primary element, is a wood-framed structure on concrete slab, with painted wood siding. As part of the proposed project, the approximately 690-sf existing west wing on the Barn Dining building (referred



SOUTHEAST



NORTHWEST

Source: Fernau & Hartman Architects, 2017

Conceptual Rendering – Proposed Project

Figure 7

UCR Barn Expansion

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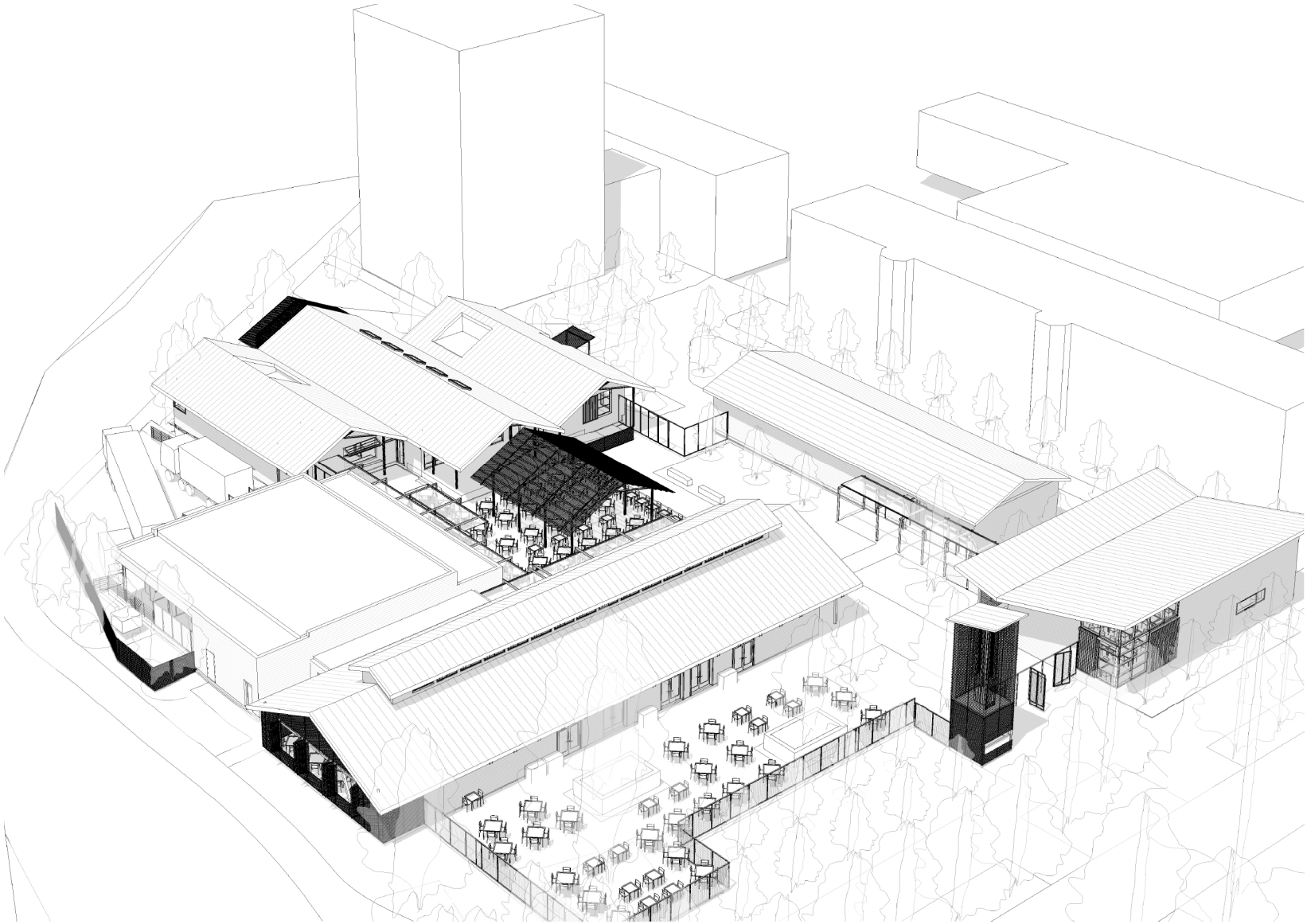

Source: Fernau & Hartman Architects, 2016

Conceptual Rendering – Barn Theater Replacement Option

Figure 8

UCR Barn Expansion

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to as the University Club Room) would be demolished. Additionally, the enclosed area of the building would be extended to the south to create room for a new servery.

The existing gable would be extended to the north and south, and a truss would be extended in each direction as well. This would provide useful covered outdoor spaces for socializing. A clerestory would be added at the ridge of the gable inside, to bring in natural light and to raise the profile of the building on the site. The angled truss structure, an iconic element of this building, would be brought to the outside to support the new extended roofs. To bring the building up to seismic code, work is required on the foundations at the north end and the new south end. Wall sheathing would be added at those ends as well. At the south end of the existing Barn, slab demolition and replacement is expected. Elsewhere, the intent is to keep the slab once stem walls are added.

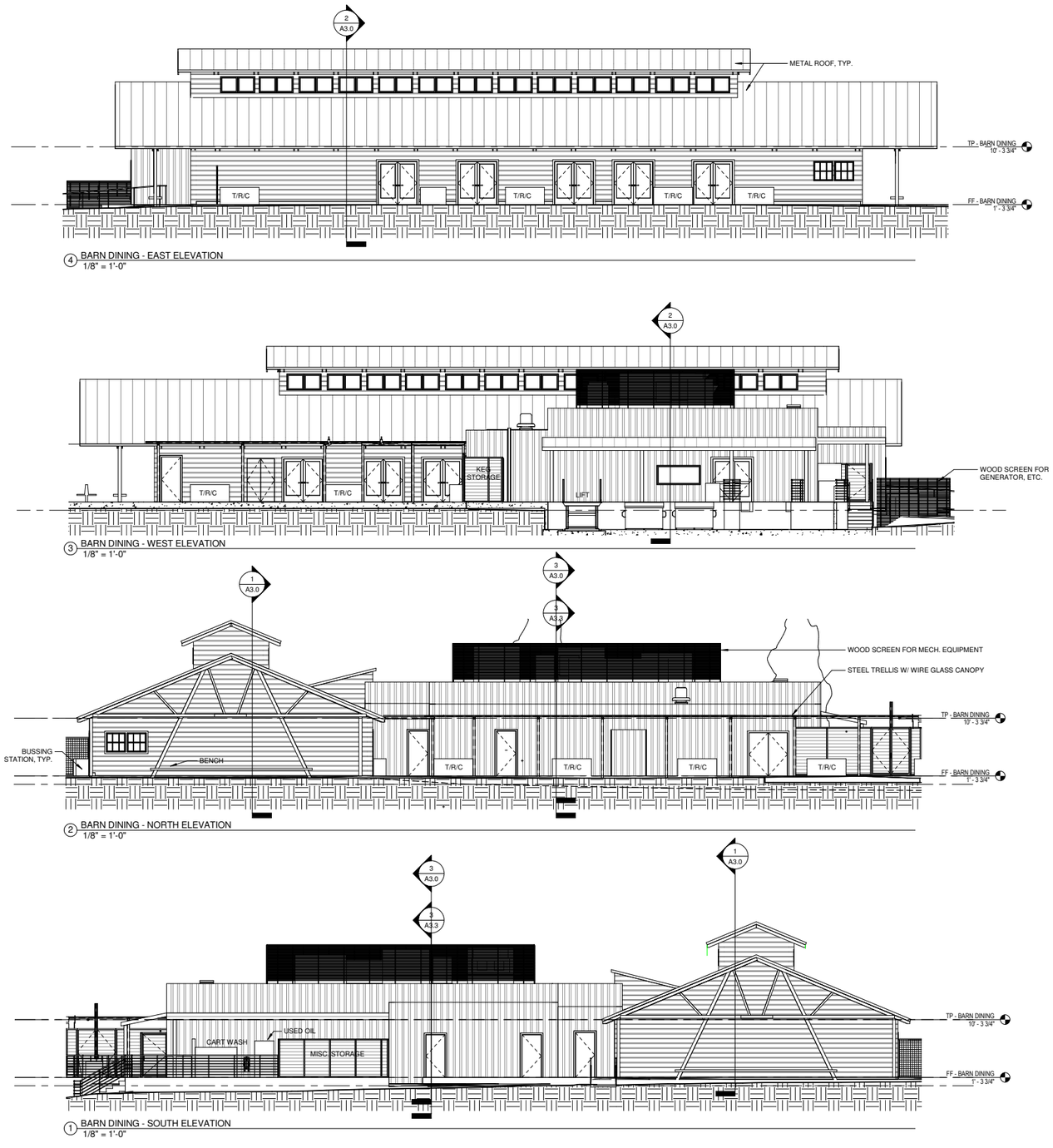
New double-glazed wood windows would be added to the building, and the roof would be replaced with metal roofing. Cool roof materials would be utilized to minimize the site's heat-island effect. The exterior siding would be repaired and reused to the extent feasible based on the condition of the siding.

The Kitchen Addition is proposed to provide service to the Barn Dining servery, Faculty/Staff Dining lunch buffet, and scheduled events in the Campus Meeting Room. This building would be compatible with the Barn Dining building but would be a distinct addition and secondary to the Barn. This building would be a wood-framed structure on a concrete slab; however, to contrast with the Barn, metal or a different pattern and scale of wood siding would be used. The Kitchen Addition would have a flat roof, with mechanical equipment on the roof. As shown in Figure 7, the roof has different levels. Minor additions on the south (for electrical, telecommunications, and dock storage) would be under a lower pitched shed roof. The covered portion of the proposed loading dock, on the west, would consist of a light framed steel structure with a shed roof.

- **Faculty/Staff Dining.** Figure 9b provides building elevations for the proposed new Faculty/Staff Dining facility. This building would have a maximum height of approximately 19 feet, 5 inches. This building includes the stage, which is the primary focus of the West Courtyard and the key to the identity of the Barn compound as an entertainment and performance venue. The building would have a modern agrarian aesthetic, a contemporary take on the gable vernacular. The building is organized in three generally equal programmatic segments, each with a gabled roof. Gable 1 (northern) would be the main entry (off the southerly extension of the Arts Walk, facing the H&SS building to the north), with a lobby, restrooms, and a private dining/green room. Gable 2 (center) would be an open volume space, and would contain the dining room, which would open to the Stage on the east, and a covered and screened outdoor dining area on the west. Gable 3 (southern) contains the support spaces for the dining room and two bars (one a full bar for Faculty/Staff Dining and one for serving beer and wine to the West Courtyard). These simple gabled forms would be developed with wood or metal siding and metal roofs.

  This building would have an expressed framing system consisting of paired channel steel columns, trusses from steel angles, and a gabled ceiling. This system would be used in the prominent spaces (e.g., dining room, lobby, and stage) and would extend to the perimeter covered outdoor spaces, overhangs, and the shade structure at the West Courtyard. There would be two portions of hidden flat roof wells to hide the mechanical equipment.

- **Barn Theater.** Figure 9c provides building elevations for the existing Barn Theater that would be renovated as part of the proposed project. This existing building, a primary element, is also a wood-framed structure on a concrete slab, and the wood framing currently touches grade. This building is 17 feet, 5 inches high. A new stem wall would need to be added, since the framing currently touches grade. The stem wall would be



Source: Fernau & Hartman Architects, 2017

Conceptual Building Elevations

Figure 9a

UCR Barn Expansion

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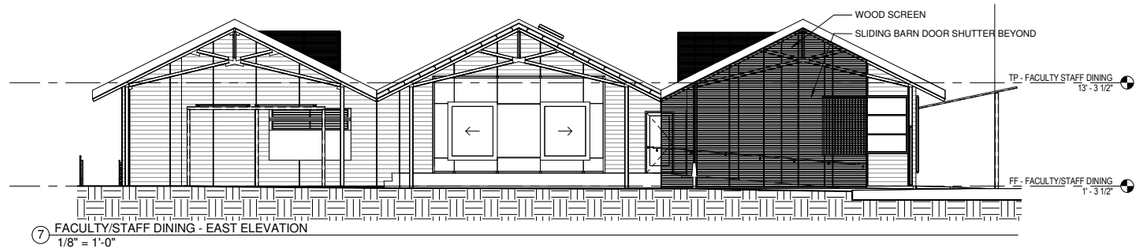
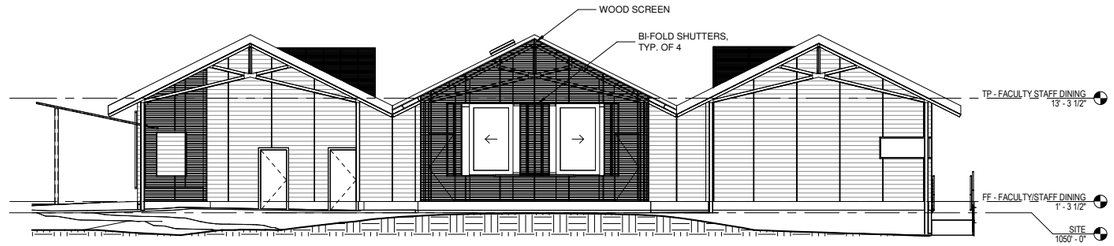
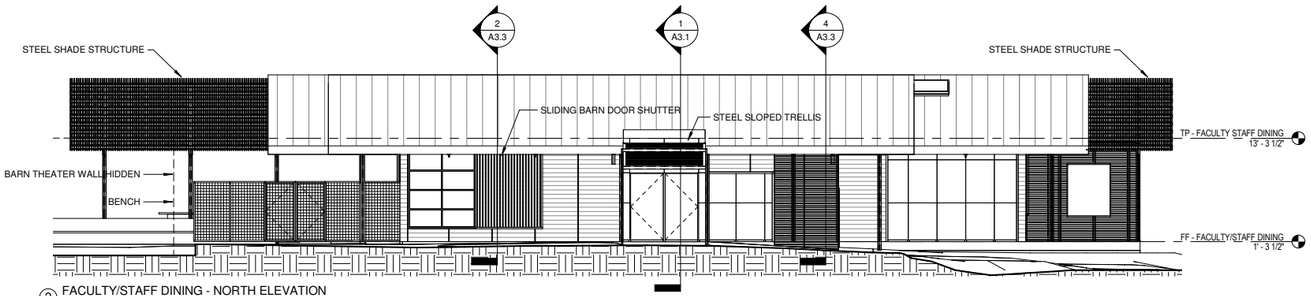


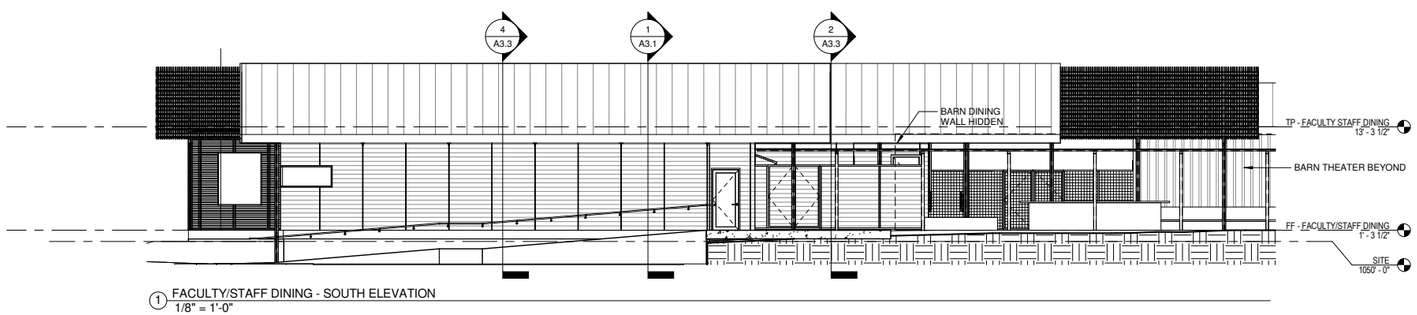
7 FACULTY/STAFF DINING - EAST ELEVATION
1/8" = 1'-0"



3 FACULTY/STAFF DINING - WEST ELEVATION
1/8" = 1'-0"



2 FACULTY/STAFF DINING - NORTH ELEVATION
1/8" = 1'-0"



1 FACULTY/STAFF DINING - SOUTH ELEVATION
1/8" = 1'-0"

Source: Fernau & Hartman Architects, 2017

Conceptual Building Elevations

Figure 9b

UCR Barn Expansion

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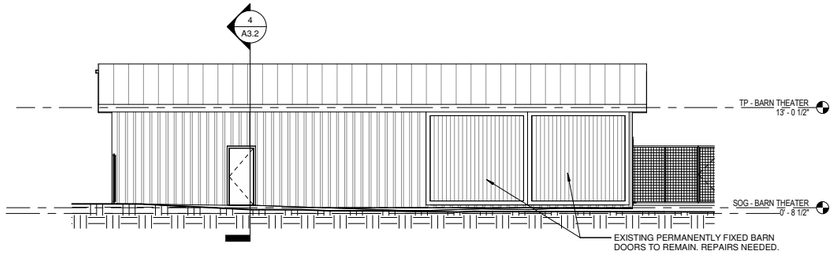
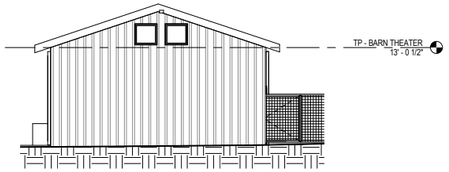
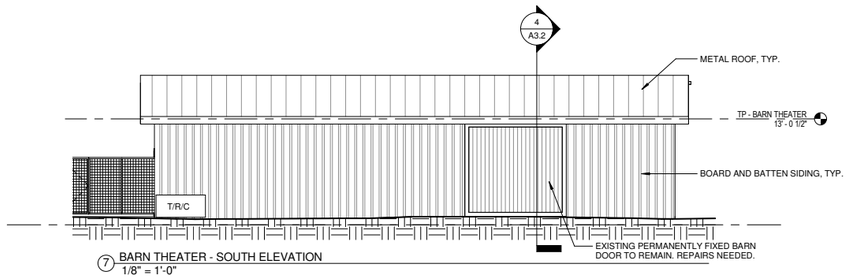


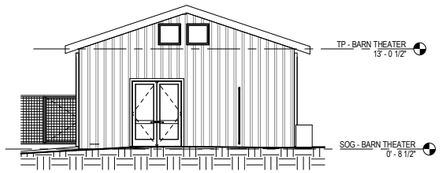
8 BARN THEATER - NORTH ELEVATION
1/8" = 1'-0"



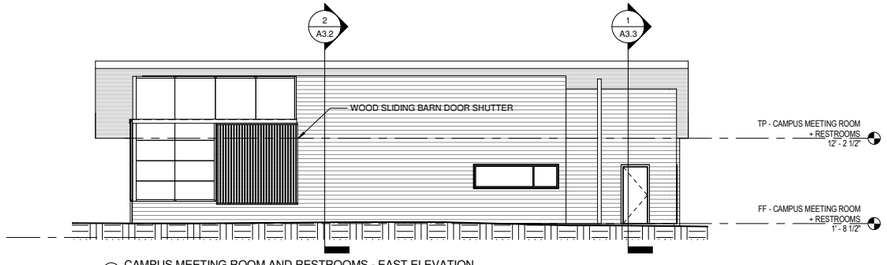
4 BARN THEATER - EAST ELEVATION
1/8" = 1'-0"



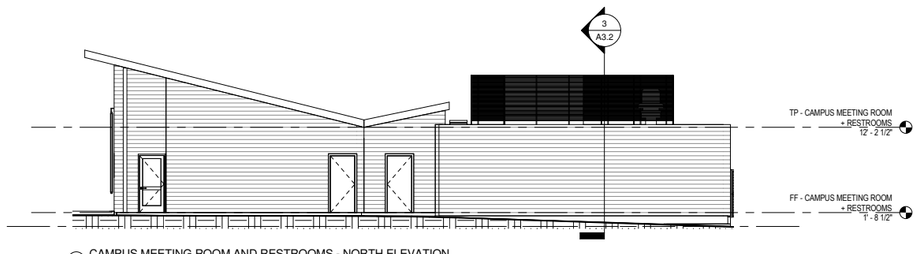
7 BARN THEATER - SOUTH ELEVATION
1/8" = 1'-0"



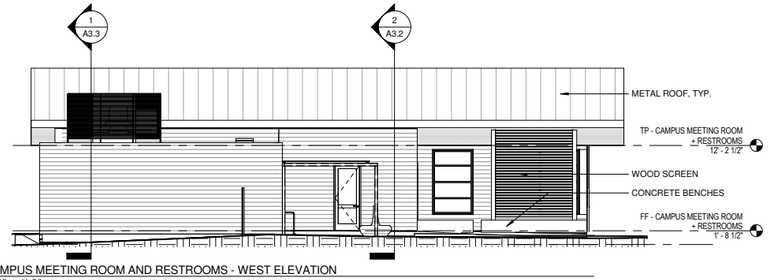
3 BARN THEATER - WEST ELEVATION
1/8" = 1'-0"



6 CAMPUS MEETING ROOM AND RESTROOMS - EAST ELEVATION
1/8" = 1'-0"



2 CAMPUS MEETING ROOM AND RESTROOMS - NORTH ELEVATION
1/8" = 1'-0"



5 CAMPUS MEETING ROOM AND RESTROOMS - WEST ELEVATION
1/8" = 1'-0"

1 CAMPUS MEETING ROOM AND RESTROOMS - SOUTH ELEVATION
1/8" = 1'-0"

Source: Fernau & Hartman Architects, 2017

Conceptual Building Elevations

Figure 9c

UCR Barn Expansion

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approximately ten inches. This allows for level transitions at doors and allows adjustments to the surrounding grades to meet other site grading requirements. A second exit would also be added. Improvements to structure, finishes, insulation, and mechanical/electrical equipment would be made as feasible, based on budgetary constraints.

The board and batten siding is in poor shape and would likely need to be replaced. The window openings are currently covered in plywood and this condition is expected to remain. The large, permanently fixed barn doors would remain in place but would not be made operable.

No changes to the existing wood-framed post and trusses or wood-framed walls are proposed. The roof overhang and rafters would be kept. If a new roof is installed, it would be either standing seam metal (to fit with the rest of compound) or composite shingle. A raised wood dance floor is needed on top of the existing concrete slab to meet programmatic requirements; the existing wood floor would either be repaired or replaced.

As identified above, due to the extensive work required on the foundation (stem wall and possibly a new foundation) and due to the non-optimal location of this building on site, this IS/MND is also addressing the potential impacts associated with replacement of the Barn Theater north of its existing location.

- **Campus Meeting Room and Restroom.** Figure 9c provides building elevations for the proposed new Campus Meeting Room and Restroom. The Campus Meeting Room, a primary element, has a prominent location at the eastern gateway to the Barn Complex from the future Barn Walk, and the Citrus Grove to the north. It is a transitional building (programmatically serving the larger campus and as part of the Barn Complex). It is defined by a butterfly roof with a dominant shed roof that lifts to the east and a secondary shed that lifts to the west. This building would have a maximum height of approximately 20 feet. The building design would be a hybrid between the vernacular wood framing of Barn Dining and the more modern agrarian/market hall framing of Faculty/Staff Dining. The exterior materials would be wood siding, aluminum windows and doors, and a metal roof. Wood slatted sliding sunshades protect the occupants from sun and provide privacy from the future Barn Walk on the east and south.

  The Restroom building would be a secondary element and would be attached to the west side of the Campus Meeting Room. This building would have a maximum height of 17 feet, 4 inches. This would be a slab on grade, wood-framed building, with a flat roof and simple hidden framing. The building would have metal or a different pattern and scale of wood siding compared to the Campus Meeting Room. There would be aluminum windows and louvers and hollow metal doors. Mechanical equipment on the roof would be surrounded by a screen.

- **Ticketing Tower.** In addition to meeting the programmatic need for ticket sales, the proposed ticketing tower would serve as a prominent visual feature at the project site, which is a gateway to the campus (refer to the conceptual renderings presented in Figures 7 and 8). This building would be a single room structure, with slab on grade, wood framing, and some steel. The ticket office would be located at ground level, with mechanical equipment on the roof directly above the ticket office. This building would have a maximum height of approximately 30 feet, 9 inches. The walls above the mechanical equipment would be clad with slatted material, either wood or steel slats. The walls would extend upward above the waterproofed roof to hide the mechanical equipment. As described below, the tower would have lighting and signage to help it fulfill its gateway and “lantern” role.

Tertiary elements included with the proposed project to provide a cohesive sense of place include shade structures, covered pergolas, fencing, and gates as further discussed below under Courtyards, Landscape/Hardscape, and Lighting.

Operations

As identified previously, the proposed project is intended to expand and enhance the existing Barn Group to provide a unique dining, gathering, and entertainment center on campus. Following is a description of existing and planned operations with implementation of the proposed project.

The operations would not differ between the proposed project and the Barn Theater Replacement Option. Additionally, as noted previously, the Barn Theater is currently used by the CHASS for coursework and research in music, dance, theatre, poetry, and film. Club organizations also use the space for rehearsals. The proposed improvements to the Barn Theater are necessary to address building deficiencies; the proposed project and Barn Theater Replacement Option do not involve any components that would modify the operations at this building.

Hours of Operation

Under existing conditions, the Barn Dining is open Monday through Friday from 8:00 AM to 3:00 PM. The building is also open nights and weekends for scheduled special events. With implementation of the proposed project, facilities within the Barn Complex would be open from 7:30 AM to 8:00 PM for dining (breakfast, lunch, lite lunch, and dinner). Evening programming would extend past 8:00 PM for scheduled events.

Seating Capacity and Events

Approximately 80 events were held at the Barn Group during the 2015/2016 fiscal year; historically, approximately 80 to 130 events are scheduled per year. Events are currently constrained by the existing size of the Barn Group. Under existing conditions, there is seating capacity for approximately 340 individuals in the Barn Dining, West Wing and East Courtyard (outdoor). For events, there is a maximum capacity of 250 people (standing) for shows at the Barn.

As discussed previously, the proposed project would involve a renovation and expansion of the Barn Dining to include the new Kitchen Addition (increasing the current 120 meals per hour capacity to 320 meals per hour), an expanded serving area, and additional seating. The new Faculty/Staff Dining building would accommodate food and beverage service and create a place for faculty and staff to meet and interact. The new Campus Meeting Room would accommodate meetings and catered dining; a servery/buffet would be provided for serving food prepared in the Barn Kitchen.

It is estimated that the number of events held at the Barn Complex would increase from between 80 and 130 annual events under existing conditions to approximately 540 events/meetings and approximately 60 band/entertainment events. The increase in events would primarily occur during the weekday evenings and weekends.

The amount of available seating at the Barn Complex would increase from approximately 340 to 490 seats (an increase of approximately 150 seats). While the seating inside the Barn Dining building and at the East Courtyard would be reduced (approximately 80 and 70 seats, respectively), there would be new seating added with the Faculty/Staff Dining building (60 seats), Campus Meeting Room (approximately 75 seats), and the West Courtyard (approximately 160 seats). It should be noted that the estimated number of seats at the West Courtyard assumes

programs using tables and chairs; this area would have a maximum event capacity for approximately 350 people standing. It is estimated that the maximum attendance would occur at band/entertainment events (up to approximately 500 guests).

Amplification Systems

A permanent amplification system is currently installed inside the Barn Dining; for outdoor events, temporary sound amplification is utilized based on individual event needs. Amplification ends at 10:00 PM in consideration of the campus community, and no amplification occurs during the day Monday through Friday due to the proximity of classrooms. Music is played inside the building during lunch on weekdays.

With implementation of the proposed project, a permanent amplification system would be installed in the West Courtyard. This system would be designed and installed by a qualified sound engineer. Additionally, sound-absorbing ceiling treatment would be installed in spaces that would host amplified music performances to attenuate noise.

Employee and Guest Populations

Employee Population

Currently, there are 45 individuals employed at the Barn Group, including career staff (8 individuals) and students (37 individuals). With implementation of the proposed project, it is estimated there would be up to 17 career staff, including managers, supervisors, cooks/bakers, storekeepers, and custodians. Therefore, there would be a potential increase of nine career staff, which could be new employees on campus.

There are currently 37 students employed at the Barn Group. With implementation of the proposed project, there would be up to 128 students employed including for events (78 without events). Student positions include, but are not limited to, managers and supervisors; front- and back-of house for the Barn Dining and Kitchen Addition; event/concert staff; Faculty/Staff Dining; and Campus Meeting Room. Therefore, there would be a potential increase of 91 student employees at the Barn Complex (41 student employees not including events). These positions would be filled by students already on campus.

It should be noted that the number of career and student staff at the Barn Complex at any given time would vary based on work shifts and the events being held.

Guests

Under existing conditions, the majority of guests at the Barn Dining for general dining activities (not events) are affiliated with UCR (estimated to be approximately 65 percent staff and faculty and 35 percent students). A negligible number of guests are not affiliated with UCR. The current guest counts at the Barn Dining vary by quarter. Following is the dining guest count for the 2015/2016 fiscal year (with a total of 52,593 guests):

- June 15 through September 30, 2015 – 9,197 guests
- October 1 through December 23, 2015 – 13,816 guests
- January 4 through March 22, 2016 – 14,509 guests
- March 25 through June 13, 2016 – 15,071 guests

For events, it is estimated that 80 percent of the guests are affiliated with UCR (faculty, staff, and students), with the remaining 20 percent being composed of off-campus individuals not affiliated

with UCR. The types of events held on campus range from performances and social events to department meetings. During the 2015/2016 fiscal year, there were approximately 3,900 individuals that attended events at the Barn Group.

As previously discussed, the proposed project addresses existing deficiencies at the Barn Group that limit its use. The Barn Dining program is at capacity and constrained due to the size and configuration of the kitchen and limited seating, resulting in dining deficiencies in this portion of the campus. The ability to promote shows and events is limited due to the Barn's restricted size. The present configuration does not support food and beverage sales during events. Additionally, there is currently no faculty club on campus. With implementation of the proposed project, it is estimated that the dining guest count at the Barn Complex would increase compared to existing conditions; however, the guests would continue to be primarily individuals already on campus. It is estimated that up to 20,000 individuals would attend meetings and events throughout the year, compared to approximately 3,900 under existing conditions. It is also estimated that the percentage of off-campus guests at events would increase from 20 percent to 25 to 30 percent.

Circulation and Parking

The proposed circulation system for the Barn Complex with implementation of the proposed project is described below and has been designed to take into consideration existing and planned vehicular and non-vehicular circulation movement surrounding the project site. Figures 5 and 6, which provide the conceptual site plans for the proposed project and the Barn Theater Replacement Option, depict the proposed circulation in and surrounding the project site.

Vehicular Circulation

Under existing conditions, delivery and service vehicles access the project site and loading dock from West Campus Drive. A restricted-access vehicular service drive is also located east of the project site (refer to Figure 4, Site Survey).

With the exception of the access to the service yard and loading dock, there would be no vehicular circulation within the project site with implementation of the proposed project or the Barn Theater Replacement Option. As shown on Figure 5, a new service yard and loading dock would be constructed west of and adjacent to the new Kitchen Addition. Access would continue to be from West Campus Drive; however, from a location farther to the west. The new loading dock would be expanded to handle a 10-cubic-yard (cy) trash compactor and would be of sufficient size to accommodate 2 simultaneous truck deliveries (by a 32-foot truck and a 60-foot truck). Maneuvering space would be provided on West Campus Drive. A new curb cut and curb ramps would be constructed to allow service vehicles access to the new service yard and loading dock; the existing curb cut and curb ramps for the Barn Dining's existing entrance drive would be removed.

The existing service drive east of the project site would be maintained for access to Sproul Hall service area and as a fire access lane and meets current California Fire Code requirements.

Non-Vehicular Circulation

The 2005 LRDP identified the need to enhance physical connections across campus, including adding and widening walkways and bike paths and limiting vehicular circulation. As shown on Figure 5 and 6, the proposed project and Barn Theater Replacement Option have been organized to facilitate campus pedestrian circulation. Pedestrians arriving to the site would have access from all directions. The entry/gateway to the east is located at the future Barn Walk, and is accessible from various pedestrian paths to the north, east and south, including the Eucalyptus Walk and the

sidewalk along West Campus Drive. A new walkway would be constructed west of the project site, with access from West Campus Drive and the pedestrian path west of the H&SS building. A proposed new walkway within the Barn Complex, between the Barn Dining and Kitchen Addition to the south and the Barn Theater and Campus Meeting Room to the north would be the main pedestrian pathway within the project site and would provide access to all existing and proposed facilities in the Barn Complex. All pedestrian paths would be ADA accessible.

Bicycle storage would be provided east of the East Courtyard and would accommodate approximately 20 bicycles.

Parking

Existing adjacent parking includes four spaces for service and delivery vehicles and three ADA-accessible spaces. Parking Lot 4, south of the project site, provides 70 parking spaces (50 permitted, 4 motorcycle, 8 metered, and 8 accessible spaces) but is primarily employee parking and not used extensively by individuals (employees or guests) of the Barn Group. Most guests walk to the site. Event parking is directed to larger parking lots that have available capacity during the day and time of the event, including Parking Lots 1 and 6.

With implementation of the proposed project, there would be no vehicular parking provided at the project site. Short-term parking for Kitchen delivery trucks would be provided in the new service yard. These deliveries primarily occur in the morning, and the service yard accommodates two delivery trucks simultaneously unloading. Short-term parking for loading and unloading for a produced event in West Courtyard would also take place in the service yard; this would occur at different hours than the Kitchen deliveries so there would be no conflict.

The existing restricted-access service and delivery spaces for Sproul Hall, on the east side of the project site, would be retained.

Consistent with current conditions, it is expected that most guests to the Barn Complex during the day would walk to the facility and there would not be a need for additional parking. ADA-accessible parking would be provided in Parking Lot 4; the amount of parking needed would be determined in conjunction with the campus-wide Accessible/Disabled parking distribution plan.

Parking for new events or those moving from a current location on campus to the Barn Complex would be parked under the same protocol as they are under existing conditions (primarily Parking Lots 1 and 6).

Courtyards, Landscape/Hardscape, and Lighting

Courtyards

The existing East Courtyard and proposed West Courtyard are shown on the conceptual site plans presented on Figures 5 and 6. The East Courtyard, east of the Barn Dining, is an existing outdoor dining area at the Barn Group. Proposed improvements include the installation of tables and two bar-height planters with ledges that can accommodate high seating; approximately 100 seats would be provided.

The proposed West Courtyard would be constructed between the Barn Dining and new Faculty/Staff Dining. The West Courtyard would be used daily as an outdoor eating area. It would also regularly be part of site-wide ticketed events, in which up to 350 attendees can simultaneously be in the West Courtyard (with an additional allowance for 20 staff in that area). The proposed Stage is connected to Faculty/Staff Dining, and, when it is being used for a

performance, the Faculty/Staff Dining building would not be used. As shown on the conceptual site plans, a shade structure would be installed in the West Courtyard.

Covered pergolas would shelter the walkways north of the Kitchen Addition, west of the Barn Dining, at the high seating near the proposed bar area in the West Courtyard, and at the north entry to the Faculty/Staff Dining. A shade pergola would also connect the Campus Meeting Room to the proposed Restroom building. The pergolas would be a painted steel structure and frame with frosted wire glass for rain protection.

Landscape/Hardscape

As shown on Figure 10, Conceptual Landscape Plan, landscape and hardscape features would be installed throughout the project site. The proposed landscape has been designed to support the programmed exterior uses at the Barn Complex and to address connections with the UCR campus as a whole. The plant palette for on-site landscaping is developed using drought-tolerant native and adapted plants. Drought-tolerant landscaping combined with a high-efficiency drip irrigation system/smart weather-based controller would meet or exceed the State of California Model Water Efficient Landscape Ordinance (MWELO) requirements for low water use landscapes.

As shown on Figure 10, various trees, shrubs, and groundcover would be planted throughout the project site. Along the south and west sides of the project site, plant materials would be used to both screen patio spaces and provide a pleasant, unified landscape edge along West Campus Drive. Along the eastern edge of the project site, a row of new trees and groundcovers would be planted to be compatible with the future. As identified previously, the East Courtyard would be broken up by raised planters with bar-height tables and chairs built in.

The existing landscape on the project site consists of numerous western sycamore trees and a citrus tree grove to the north (refer to Figure 15 provided in Section V.4, Biological Resources, of this IS/MND). Where feasible, the existing sycamore trees would be preserved and new sycamore trees would be planted to maintain and enhance the overall landscape character of the project site. A large portion of the citrus grove, established with the construction of the H&SS building, would also be preserved; however, portions of the grove would be removed with construction of new facilities, including the Campus Meeting Room and Restroom building. As further discussed in Section V.4, Biological Resources, there are potentially 50 trees that would be removed during construction (including up to 27 citrus trees); tree replacement would be required in accordance with the mitigation established in the LRDP EIR.

With respect to hardscape, paving types would include integral color concrete with topcast finish, enhanced plaza paving, natural gray concrete, and decomposed granite (refer to Figure 11). Six-foot-high fencing would be installed between each of the buildings and at the west entrance in order to provide security and access control for events, and would consist of two-inch steel tubing posts, with infill panels of painted welded wire mesh (two-inch square spacing). Four-foot swinging gates would be provided at various entrance and exit locations.

Interior and Exterior Lighting

The proposed project's lighting design would provide sufficient lighting to ensure visual performance and safety. The quantity of lighting would be determined by adherence to recommended illuminance levels derived from the latest industry standards and Campus Design Guidelines and any applicable code requirements. Indoor and outdoor lighting control systems would conform to California Administrative Code Title 24 (Title 24) energy efficiency requirements.

LEGEND

HARDSCAPE:

- INTEGRAL COLOR CONCRETE WITH TOPCAST FINISH
- ENHANCED PLAZA PAVING - TBD
  - CONCRETE AND PAVERS
- NATURAL GRAY CONCRETE
- DECOMPOSED GRANITE
- RAISED PLANTER WITH BUILT-IN BAR HEIGHT TABLE
- B — BIKE RACK (5 BIKES PER RACK) UCR STANDARD 'LR RACK' BY CREATIVE PIPE)
- PREFABRICATED WOOD BENCH

PLANTING:

TREES

- EXISTING CITRUS X LIMON / LEMON TREE
  - PROTECT IN PLACE
- EXISTING PLATANUS RACEMOSA / CALIFORNIA SYCAMORE
  - PROTECT IN PLACE
- PLATANUS RACEMOSA / CALIFORNIA SYCAMORE - 48" BOX SIZE
- ULMUS PARVIFOLIA / DRAKE ELM - 48" BOX SIZE
- BARN WALK TREE - TBD - 48" BOX SIZE

SHRUBS

- HEDGE (15 GALLON SIZE)
- PLANTING AREA WITH DRIP IRRIGATION

Source: Fernau & Hartman Architects, 2017

Conceptual Landscape Plan

Figure 10

UCR Barn Expansion

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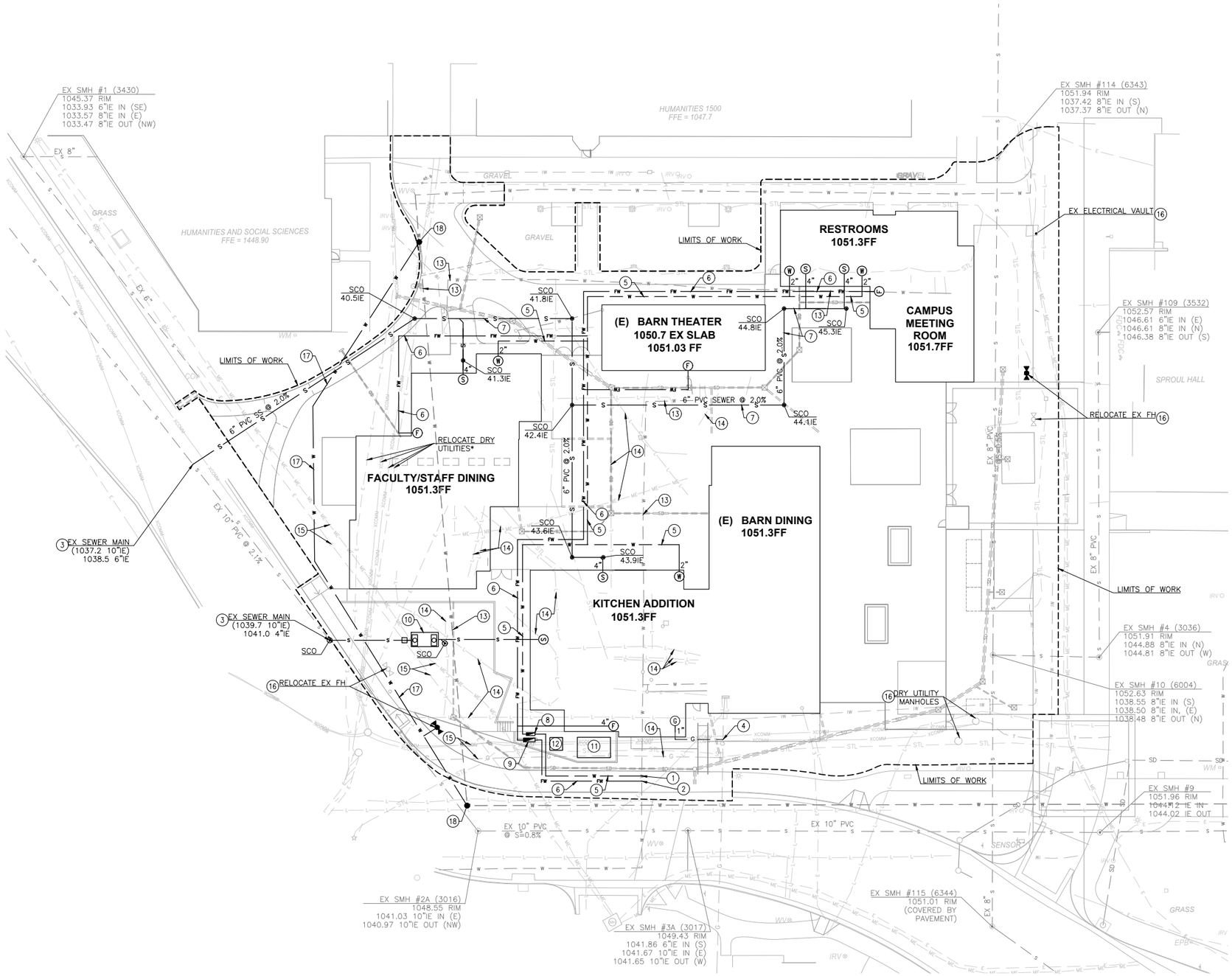

LEGEND

EXISTING UTILITIES

- SANITARY SEWER
- STORM DRAIN
- WATER*
- MAIN ELECTRIC*
- ELECTRIC*
- STREET LIGHT*
- COMMUNICATIONS*
- TELEPHONE*
- IRRIGATION WATER
- NATURAL GAS*
- UNKNOWN*
- AREA LIGHT

PROPOSED UTILITIES

- SANITARY SEWER
- STORM DRAIN
- WATER LINE **
- 4" FIRE SERVICE
- BACKFLOW PREVENTER
- SEWER POC
- WATER POC
- FIRE RISER
- GAS POC

KEY NOTES

1. 3" WATER SERVICE CONNECTION TO EX WATER MAIN
2. 4" FIRE SERVICE CONNECTION TO EX WATER MAIN
3. 6" SEWER SERVICE CONNECTION TO EX SEWER MAIN
4. 1" GAS SERVICE CONNECTION TO EX GAS MAIN*
5. 3" PVC WATER SERVICE
6. 4" PVC FIRE SERVICE
7. 6" SEWER SERVICE
8. 3" DOMESTIC WATER BFP
9. 4" FIRE SERVICE BFP W/ FDC
10. GREASE INTERCEPTOR
11. GENERATOR*
12. TRANSFORMER*
13. DEMOLISH AND REMOVE EXISTING WATER LINE**
14. DEMOLISH AND REMOVE/RELOCATED EXISTING UNKNOWN UTILITY*
15. RELOCATE EXISTING DRY UTILITIES PER DRY UTILITY PLANS
16. RELOCATE FH BEHIND SIDEWALK
17. 12" PVC WATER MAIN
18. 12" PVC WATER CONNECTION TO EX WATER MAIN**

ABBREVIATIONS

BFP	BACK FLOW PREVENTOR
CLARIFIER MH	CLARIFIER MANHOLE
CLARIFIER HH	CLARIFIER HANDHOLE
COM VLT	COMMUNICATION VAULT
COM MH	COMMUNICATION MANHOLE
E HH	ELECTRICAL HANDHOLE
E VLT	ELECTRIC VAULT
E MH	ELECTRIC MANHOLE
EX	EXISTING
FDC	FIRE DEPARTMENT CONNECTION
FF	FINISH FLOOR
FH	FIRE HYDRANT
FS	FIRE SERVICE
FW	FIRE WATER MAIN
GAS HH	GAS HANDHOLE
IE	INVERT ELEVATION
IRR HH	IRRIGATION HANDHOLE
SCO	SEWER CLEANOUT
SD MH	STORM DRAIN MANHOLE
SMH	SEWER MANHOLE
SS	SANITARY SEWER
POC	BUILDING POINT OF CONNECTION
TELE MH	TELEPHONE MANHOLE
TRANS PAD	TRANSFORMER PAD
W VLT	WATER VAULT
W HH	WATER HANDHOLE
W VLV	WATER VALVE

UTILITY NOTES:

*DRY UTILITY DEMOLITION AND RELOCATION DESIGN TO BE PROVIDED BY OTHERS. PROPOSED ROUTING OF FACILITIES WILL BE SHOWN ON THIS PLAN FOR REFERENCE ONLY.

**EXISTING WATER LOCATION SIZE & TYPE UNKNOWN.

–THRUST BLOCKS SHALL BE INSTALLED AS PER NFPA 10.8.2 FOR ALL WATER AND FIRE SERVICES 4" AND LARGER.

Source: Fernau & Hartman Architects, 2017

Conceptual Utility Plan

UCR Barn Expansion

Figure 11

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The interior lighting design would include general illumination for restrooms and office spaces, dimmable illumination for event spaces, and illumination as required by the health code for food service. All interior lighting control strategies would be designed to comply with Title 24 requirements for automatic daylighting controls and occupancy sensors.

With respect to exterior lighting, at the West Courtyard, pendant-mounted fixtures with uplight/downlight optics would be installed below the shade structure, with dimmable drivers and a control system that allows for astronomical clock operation and for local controls during performance events. At the East Courtyard dining area, low-level general illumination would be provided from cable-mounted lighting fixtures. Wall-mounted sconces may be considered along the perimeter walls. Linear light-emitting diode (LED) tape light would be used below tree planter dining counters. At the service yard, wall-mounted fixtures with cutoff optics would be used. Local timer switches would be provided at docks for after-hours unloading. Along walkways, low-level bollards and pedestrian-scale poles would be installed. Where pergolas or canopies occur, lights would be integrated into the structure for general illumination. Where walkways occur immediately adjacent to buildings, low-level wall-mounted path lights would be used. Lighting would comply with applicable cut-off requirements, and an average of at least one footcandle would be maintained along egress paths.

As previously identified, the proposed project is intended to be a gateway for this portion of the campus, and the proposed ticketing tower located near the northeast corner of the East Courtyard is intended to serve as a beacon for the project site and a marker for this gateway. To accomplish this, the tower would include specialty lighting to illuminate the unique architectural elements.

Utilities/Infrastructure

The proposed project would require connections to existing campus utilities, including domestic water, sewer, storm drains, natural gas, and electric systems that are currently located in or adjacent to the project site, as described below. Figure 11 depicts the conceptual utility plan for the proposed project, including existing utilities that would need to be removed or relocated, new utilities to be installed with the proposed project, and the anticipated location of utility connections to serve the proposed project. The final sizing and design of on-site facilities would occur during final building design. Following is a description of proposed utility systems, including water quality Best Management Practices (BMPs).

- **Domestic, Fire, and Irrigation Water.** The proposed project includes separate domestic and fire water systems, with backflow preventers located along the south side of the project site where the connections to the existing 12-inch water main in West Campus Drive would be made. The existing 12-inch water main extends north-south from West Campus Drive through the western portion of the project site; approximately 250 feet of the existing on-site water main would be demolished and relocated along the western edge of the project site. New 3-inch water lines would be installed throughout the site and would connect with the existing water main just south of the Kitchen Addition.

  New 4-inch fire water lines would be installed parallel to the domestic water lines and would feed the hydrants, sprinkler systems for the buildings, and the Fire Department Connection (FDC) assemblies. Additionally, two fire hydrants, one on the eastern edge and one on the southwestern edge of the project site, would be relocated.

  There are no recycled water facilities that serve the project site. Potable water would be used for irrigation and new irrigation system would be installed.

- **Sewer.** Sanitary sewer service would be provided from an existing 10-inch sewer main in West Campus Drive. New 6-inch sewer lines would be installed on site to serve proposed

uses. A grease interceptor would be installed west of the Kitchen Addition to accommodate dining facility uses.

- **Storm Water and Water Quality.** All storm water runoff would be managed for both quality and quantity as required by current regulations (as further discussed in Section V.9, Hydrology and Water Quality, of this IS/MND). Conveyance facilities would be designed in compliance with Riverside County Flood Control and Water Conservation District requirements in effect at the time of permit issuance.

  The on-site storm drain system would collect roof runoff and surface drainage via a series of drain inlets. Runoff from the project site would continue to discharge at two locations along West Campus Drive. However, the basin areas would be slightly altered to include the loading dock and service yard in Basin A. As shown on Figure 12, Conceptual Grading and Drainage Plan, runoff from the easterly and southerly portions of the project site would be conveyed via a combination of storm drain piping and vegetated swale to the existing curb inlet on the north side of West Campus Drive. The westerly portion of the site would drain west via storm drain piping and vegetated swales and discharge through a curb outlet on West Campus Drive. Grading of the site would be designed to allow for overland flow of storm events greater than a ten-year storm without flooding of existing and new structures.

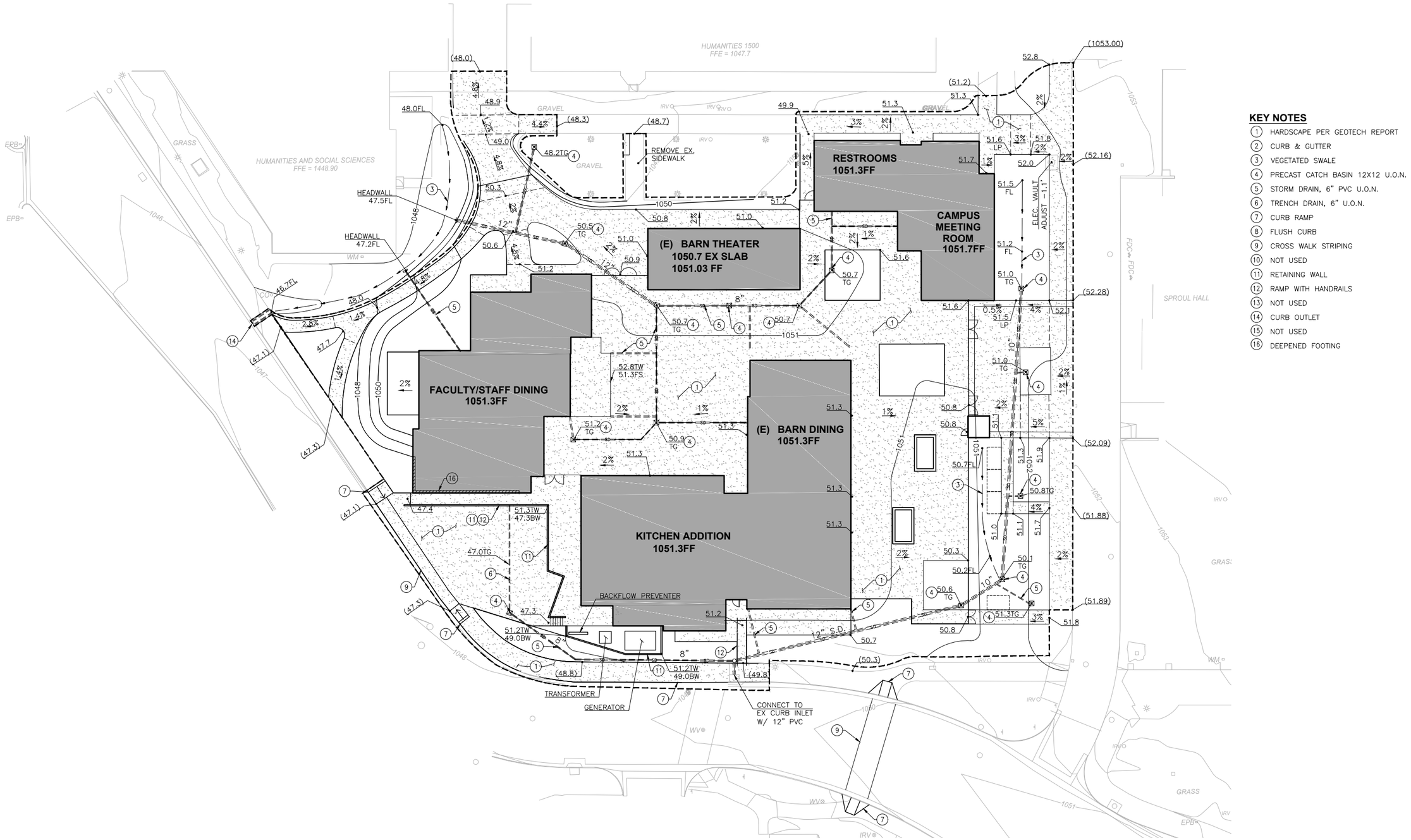
  The following source-control BMPs would be implemented as part of the proposed project:

  - Drain or wash water from the service yard would be directed into the sewer system via an automatic switch/diversion control valve downstream of the trench drain. Storm water would enter the storm drain system, while non-storm water would enter the sanitary sewer system.
  - Interior floor drains would be directed to the sanitary sewer system.
  - Loading dock drainage would be isolated to the maximum extent practical. Dry weather flows would be directed to the sanitary sewer system.
  - Outdoor storage of equipment or materials would be covered to the maximum extent practical to reduce the potential of storm water contact.

  Additionally, the following site design measures would be implemented to reduce project site runoff: (1) soil quality improvement and maintenance, (2) tree planting and preservation, (3) rooftop and impervious area disconnection, and (4) vegetated swales.

- **Electricity and Natural Gas.** Electrical service would be supplied from connections to existing conduit and wiring extending from Manhole No. 12, south of the project site. A transformer would be installed on the south side of the Kitchen Addition. Additionally, a connection would be made to the existing generator on the west side of the H&SS building; trenching for this connection would occur in the sidewalk along the east side of West Campus Drive. Natural gas would be used for the gas cooking equipment in the Kitchen Addition; all other equipment is electric. Natural gas would be supplied via a connection to an existing gas line along the south side of the Barn Dining and Kitchen Addition building. Existing electric and natural gas lines would need to be relocated on site as necessary to accommodate construction of the new buildings.

- **Telecommunications.** Telecommunications infrastructure would be supplied to the proposed project via connections to relocated telecommunications lines that currently serve the Barn Group.



KEY NOTES

1. HARDSCAPE PER GEOTECH REPORT
2. CURB & GUTTER
3. VEGETATED SWALE
4. PRECAST CATCH BASIN 12X12 U.O.N.
5. STORM DRAIN, 6" PVC U.O.N.
6. TRENCH DRAIN, 6" U.O.N.
7. CURB RAMP
8. FLUSH CURB
9. CROSS WALK STRIPING
10. NOT USED
11. RETAINING WALL
12. RAMP WITH HANDRAILS
13. NOT USED
14. CURB OUTLET
15. NOT USED
16. DEEPENED FOOTING

Source: Fernau & Hartman Architects, 2017

Conceptual Grading and Drainage Plan

Figure 12

UCR Barn Expansion

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Sustainable Building Features

The proposed project would comply with the University of California Policy on Sustainable Practices (Sustainable Practices Policy) and adopt the principles of energy efficiency and sustainability to the fullest extent possible, consistent with budgetary constraints and regulatory and programmatic requirements. Leadership in Energy and Environmental Design (LEED®) is a green building rating system that contains prerequisites and credits in five areas: (1) environmentally sensitive site planning; (2) water conservation; (3) energy efficiency; (4) conservation of materials and resources; and (5) indoor air quality. The Sustainable Practices Policy establishes a minimum standard of a LEED "Silver" for new buildings and identifies that new buildings will strive to achieve certification at a U.S. Green Building Council (USGBC) LEED "Gold" rating or higher, whenever possible within the constraints of program needs and standard budget parameters.

Renovation of the Barn Dining and Barn Theater would be considered Major Renovations and would be implemented in compliance with Section III.A.6, Green Building Design for Building Renovations, which requires that the minimum standard of LEED Silver be met, as required for new buildings. It should be noted that under the Barn Theater Replacement Option, the new Barn Theater and Restroom would be subject to requirements for a new building.

The design, construction, and operation of the proposed project would include a series of green building strategies under development, along with mandatory strategies required by the 2016 California Green Building Standards Code (CalGreen) and the Sustainable Practices Policy to exceed California Building Code Title 24 energy efficiency requirements by 20 percent or greater (for new buildings). Additionally, the proposed project would comply with applicable Sustainable Practices Policy goals for climate protection, recycling and waste management, and sustainable food services (e.g., food procurement, education, engagement with external stakeholders, and sustainable operations).

Construction Activities

Construction of the proposed project is anticipated to begin in November 2017 and be completed by March 2019 (construction duration of approximately 17 months). The generalized construction phasing is projected as follows, with some overlap between phases:

- Demolition (3 weeks)
- Site Preparation/Grading (4 weeks);
- Building Construction and Utility Installation (12 months);
- Paving (approximately 2 weeks total throughout the construction period);
- Architectural Coatings (approximately 8 weeks).

The project site encompasses approximately 1.7 acres, and, with the exception of the existing buildings to remain and trees to be protected in place, the analysis in this IS/MND assumes that the entire site area would be subject to ground disturbance. It should be noted that for analysis purposes, the Barn Theater Replacement Option would have the greatest amount of construction impacts due to the additional demolition and construction needed (compared to renovation of the existing building). Therefore, the construction description below assumes implementation of the Barn Theater Replacement Option; the impacts from the proposed project would be less.

Figure 13, Construction Impact Limits, illustrates the boundaries of the areas that would be impacted by construction activities for the proposed project and the Barn Theater Replacement Option, as analyzed in this IS/MND. Additionally, Figure 13 identifies areas that would be subject to temporary construction-related impacts associated with construction staging and equipment laydown, implementation of a temporary dining facility, and utility installation.

As shown, construction staging/equipment laydown would occur in Parking Lot 4, south of the project site (south of West Campus Drive). The parking lot, which has 70 parking spaces, would be closed during construction, with the exception of accommodation for Accessible/Disabled parking adjacent to the southern access drive.

The temporary dining facility would be located east of the project site and south of Sproul Hall. Specifically, a temporary dining deck would be constructed in the turf area southeast of the project site and food trucks would park at the concrete plaza located at the intersection of Eucalyptus Walk and Library Mall. Access for the food trucks to this area would occur from West Campus Drive. The temporary dining deck would be approximately 700 sf and would be elevated on temporary piers (no grading or permanent features). The deck would be installed around the existing tree in this area, which would provide shade for the tables to be located on the deck. Construction activities for the deck would not impact the tree's root system.

As described above, utility lines to serve the proposed project would connect to existing facilities in the vicinity of the project site. Utility connections, and a connection to the generator on the west side of the H&SS Building would involve temporary disturbance of the travel lanes and sidewalk along West Campus Drive.

Building demolition activities would involve the existing 1,625-sf Barn Stable, 1,650-sf Barn Theater (assuming implementation of the Barn Theater Replacement Option), and 690-sf University Club Room, for a total of approximately 3,965 sf. Assuming 3 to 4 cubic feet (cf) of demolition material per sf, up to approximately 15,860 cf of demolition materials would be generated (587 cy). Assuming use of 16 cy trucks, approximately 37 one-way truck trips would be generated but would be spread out over the 3-week building demolition period. Other demolition would include the concrete walkways within the project limits, the existing service area/loading dock and parking area (approximately 30,000 sf), and existing utility infrastructure to be relocated.

Limited earth-moving activities (grading/excavation) would be required to accommodate the new building pads, and the earthwork would balance on site (approximately 7,000 cy each of cut and fill). Therefore, no import or export or soil is required. The area under the new buildings would be over-excavated and recompacted. The maximum depth of excavation would be up to five feet for building foundations.

Depending on the construction phase, implementation of the proposed project would require common equipment, such as a dozer, tractor/loader/backhoe, grader, crane, forklift, compressor, welder, concrete trucks and pumps, and cement and mortar mixers. Because of the limited size of the site, the number of pieces of equipment on site at any given time would also be limited. As required by existing regulations, soil erosion from the project site during construction would be controlled through the use of several BMPs, including the use of sandbags as barriers. The construction site would be encircled by stacks of sandbags, and stabilized driveways would be provided at construction entrances and exits. Existing catch basins would also be protected with appropriate BMPs to minimize sedimentation entering the storm drain system.

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Construction Impact Limits

Figure 13

UCR Barn Expansion

N W E S

120 60 0 120 Feet

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Vehicular and Pedestrian Circulation during Construction

With the exception of existing vehicular and pedestrian access within the project site, during construction, existing vehicular, emergency, and pedestrian access, including access to buildings that surround the Barn Group, would be maintained. While there would be temporary sidewalk and travel lane closures along West Campus Drive, at least one travel lane would be maintained and pedestrian travel would be re-routed to avoid the construction area. No vehicular or pedestrian access would occur on site during construction.

Construction traffic would use I-215, University Avenue or Martin Luther King Boulevard to Canyon Crest Drive, and West Campus Drive to access the project site. Pursuant to PP 4.14-2 from the 2005 LRDP Amendment 2 EIR, the construction schedules of major projects would be coordinated to adjust construction schedules, work hours, and access routes to the extent feasible in order to reduce construction-related traffic congestion.

It is estimated there would be a range of approximately 8 to 60 construction workers per day at the project site during construction, with a substantial number of months having 30 to 40 construction workers. Construction workers would park on campus, within a short walking distance of the project site (e.g., Lot 4, Lot 30 and/or Lot 32).

6. RELATIONSHIP TO THE 2005 LONG RANGE DEVELOPMENT PLAN AMENDMENT 2

Figure 13 of the 2005 LRDP Amendment 2 provides the current Land Use Plan for the UCR campus. As shown, the project site and surrounding uses are in an area designated as "Academic". The Land Use Section of the 2005 LRDP Amendment 2 identifies that Academic support uses, such as the dining facilities provided at the Barn, "should be located near the center of the academic core on both the East and West Campuses," and "be located on and near primary pedestrian circulation routes and in central, accessible locations, where informal gathering and interaction can occur easily." As previously discussed, the project is located adjacent to the future Barn Walk, and is accessible from various pedestrian paths to the north, east and south, including the Eucalyptus Walk and the sidewalk along West Campus Drive.

The 2005 LRDP Amendment 2, approved in November 2011, projected total building space on campus to be approximately 14.9 million gsf by 2020/2021, including approximately 3.1 million gsf allocated to the SOM. As identified in Table 3.0-5 of the 2005 LRDP Amendment 2 EIR, of this amount, there is a total of 5.5 million gsf allocated to "Academic" uses (which includes the Barn Group). The existing on-campus development is approximately 7.0 million gsf, and approximately 190,000 gsf of new development has been approved but not yet built.[3] Therefore, there is approximately 7.71 million gsf of development allocation remaining on campus. The proposed project involves a net increase of approximately 10,700 gsf of development on campus, and the Barn Theater Replacement Option would involve a net increase of approximately 10,765 gsf. The increase in development with the proposed project and the Barn Theater Replacement Option are well within the remaining building allocation.

Additionally, the 2005 LRDP, as amended, projected a total enrollment of 25,000 students and 16,393 associated faculty, staff, and visitors, for a total campus population of 41,393 by the academic year 2020/2021 (refer to Table 3.0-4 of the 2005 LRDP Amendment 2 EIR). The projected population for the campus (less SOM) is 35,540 individuals. Excluding the category of "other individuals",[4] there are projected to be 32,916 students, faculty and academic staff, and

3 Approved but not yet built development includes the 190,000 gsf Multidisciplinary Research Building 1 (MRB1), which was approved by the Regents in July 2016.

4 Includes campus visitors, patients, childcare students, student family members (living on campus), daytime extension students, ASUCR, KUCR, and Highlander non-student staff, vendors, and construction workers.

non-academic staff. For comparison, the current student population on campus based on the fall 2016 enrollment is 22,921 students (including 19,799 undergraduate students and 3,122 graduate students) (UCR 2017). Additionally, there are approximately 8,306 faculty, staff, and staff personnel, for a total population of 31,227 individuals (not including other individuals). Therefore, the remaining projected growth on campus (not including SOM and other individuals) is 1,689 individuals. The proposed project would provide expanded dining and event space on campus and would increase career staff and student employment opportunities at the Barn Complex. As previously discussed, there would be a potential increase of 91 student employees at the Barn Complex (41 student employees not including events); however, these positions would be filled by students already on campus. There would also be a potential increase of 9 career staff, which could be new employees on campus. This potential increase in population is within the remaining projected growth on campus, as identified in the 2005 LRDP, as amended.

With respect to "other individuals", the campus population projections presented in Table 3.0-4 consider the average weekday number of other individuals, not evening or weekend visitors. Because the most notable increase in guests at the Barn Complex that would involve individuals not affiliated with UCR would be events occurring in the evenings and weekends, the proposed project would not conflict with the projections for other individuals on campus.

As further discussed in Section V.10, Land Use and Planning, of this IS/MND, the 2005 LRDP Amendment 2 includes Planning Strategies for the following issues to guide expansion and development of the UCR Campus: land use, circulation and parking, open space and landscape, and campus and community. These planning strategies are required to be implemented with each development project on campus and have been specifically identified in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR, along with general development strategies. The Planning Strategies that are applicable to the proposed project have been incorporated into the project as identified for each topical issue in this IS/MND.

7. ANTICIPATED DISCRETIONARY APPROVALS

The Regents, or its delegate, will consider the proposed Barn Expansion project, the tiered IS/MND, and UCR's request for project approval. Delegates of The Regents include, but are not limited to, the UCR Chancellor. UCR and the responsible agencies identified below are expected to use the information contained in this tiered IS/MND for consideration of approvals related to and involved in the implementation of the proposed project. This tiered IS/MND has been prepared to inform all State, regional, and local government approvals needed for construction and/or operation of the proposed project, whether or not such actions are known or are explicitly listed. Anticipated approvals required from UCR and the responsible agencies to implement the proposed project include, but are not limited to, those listed below.

University of California Board of Regents, or its Designee

- Adoption of the Final Tiered Initial Study/Mitigated Negative Declaration
- Approval of the project Budget
- Approval of External Financing
- Approval of the Design of the Barn Expansion

III. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

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

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

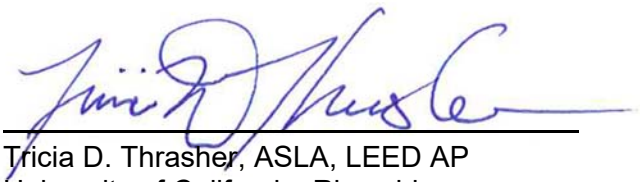
IV. DETERMINATION (TO BE COMPLETED BY THE LEAD AGENCY)

On the basis of this initial evaluation:

☐ I find that the proposed project WOULD NOT have a significant effect on the environment, and recommend that a NEGATIVE DECLARATION be adopted.

☒ I find that although the proposed project could have a significant effect on the environment, the project impacts were adequately addressed in an earlier document or there will not be a significant effect in this case because revisions in the project have been made or project-specific mitigation measures have been proposed that will avoid or reduce any potential significant effects to a less than significant level and recommend that a MITIGATED NEGATIVE DECLARATION be adopted.

☐ I find that the proposed project MAY have a significant effect on the environment and recommend that an ENVIRONMENTAL IMPACT REPORT be certified.



Tricia D. Thrasher, ASLA, LEED AP
University of California, Riverside
Principal Environmental Planner

4/24/2017
Date

V. EVALUATION OF ENVIRONMENTAL IMPACTS

The University has defined the column headings in the IS checklist as follows:

A) "**Potentially Significant Impact**" is appropriate if there is substantial evidence that the project's effect may be significant even with the incorporation of Planning Strategies (PSs), Programs and Practices (PPs), and Mitigation Measures (MMs) identified in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR. If there are one or more "Potentially Significant Impacts" a Project EIR will be prepared.

B) "**Project Impact Adequately Addressed in LRDP EIR**" applies where the potential impacts of the proposed project were adequately addressed in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR, and the PSs, PPs, and MMs identified in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR will mitigate any impacts of the proposed project to the extent feasible. All applicable MMs identified in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR are incorporated into the project as proposed. The impact analysis in this document summarizes and cross references the relevant analysis in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR.

C) "**Less Than Significant With Project-level Mitigation Incorporated**" applies where the incorporation of project-specific mitigation measures will reduce an effect from "Potentially Significant Impact" to a "Less Than Significant Impact". All project-level mitigation measures must be described, including a brief explanation of how the measures reduce the effect to a less than significant level.

D) "**Less Than Significant Impact**" applies where the proposed project will not result in any significant effects. The effects may or may not have been discussed in the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR. The project impact is less than significant without the incorporation of UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR or project-level mitigation.

E) "**No Impact**" applies where the proposed project would not result in any impact in the category or the category does not apply. "No Impact" answers need to be adequately supported by the information sources cited, which show that the impact does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

IMPACT QUESTIONS AND RESPONSES

1. Aesthetics

The analysis of Aesthetics is tiered from the 2005 LRDP EIR and was addressed in Section 4.1, Aesthetics, of that document. As described previously in Section II, Project Description, of this IS/MND, relevant elements of the proposed project related to aesthetics/visual change include demolition of the existing Barn Stable; the renovation and expansion of the Barn Dining building; renovation of the Barn Theater; and the construction of a Faculty/Staff Dining building, Campus Meeting Room and Restroom building, and Ticketing Tower. As an option to the proposed project, the Barn Theater would be demolished and replaced just north of its current location; all other project components would remain the same. With the exception of the ticketing tower, which would be up to 30 feet, 9 inches high, all buildings would be single level. The proposed project also involves the installation of new or updated landscaping (including tree replacement), hardscape, and exterior lighting fixtures. Unless otherwise noted, the analysis of aesthetic impacts is applicable to the proposed project and the Barn Theater Replacement Option.

The following applicable PSs, PPs, and MM were adopted as part of the UCR 2005 LRDP EIR as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR and are incorporated as part of the proposed project and assumed in the analysis presented in this section.

PS Development Strategy 1 Establish a design review process to provide regular review of building and landscape development on campus.

PS Open Space 4 Provide landscaped Open Space buffers and setbacks along campus edges, such as Valencia Hill Drive and its extension south of Big Springs Road, Martin Luther King Jr. Boulevard, and the I-215/SR-60 freeway.

PP 4.1-1 The Campus shall provide design professionals with the 2007 Campus Design Guidelines and instructions to implement the guidelines, including those sections related to use of consistent scale and massing, compatible architectural style, complementary color palette, preservation of existing site features, and appropriate site and exterior lighting design. *(This is identical to Land Use PP 4.9-1[a].)*

PP 4.1-2(a) The Campus shall continue to provide design professionals with the 2007 Campus Design Guidelines and instructions to develop project-specific landscape plans that are consistent with the Guidelines with respect to the selection of plants, retention of existing trees, and use of water conserving plants, where feasible. *(This is identical to Land Use PP 4.9-1[b].)*

PP 4.1-2(b) The Campus shall continue to relocate, where feasible, mature “specimen” trees that would be removed as a result of construction activities on the campus. *(This is identical to Land Use PP 4.9-1[c].)*

MM 4.1-3(a) Building materials shall be reviewed and approved as part of project-specific design and through approval of

construction documents. Mirrored, reflective glass is prohibited on campus.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project have a substantial adverse effect on a scenic vista?	☐	☐	☐	☐	☒

Discussion

As discussed on page 4.1-13 of the 2005 LRDP EIR, scenic vistas may generally be described in two ways: panoramic views (visual access to a large geographic area, for which the field of view can be wide and extend into the distance) and focal views (visual access to a particular object, scene, setting, or feature of interest). The 2005 LRDP EIR concluded that scenic vistas for the campus are limited to panoramic views of the Box Springs Mountains from publicly accessible viewpoints. Views of these mountains from many vantage points on the East Campus are partially blocked by buildings, mature trees, and landscaping. Notably, there are panoramic views of the Box Springs Mountains from Carillon Mall and the Athletic Fields (east of Canyon Crest Drive) within the East Campus; however, views in some portions of the Carillon Mall are obstructed by a large number of mature trees. While views of the adjacent mountains are generally available from locations on the West Campus, these locations are not publicly accessible with the exception of Parking Lot 30. There are no identified focal views for the UCR campus.

The analysis of Impact 4.1-1 in Section 4.1, Aesthetics, of the 2005 LRDP EIR concluded that with implementation of PS Open Space 5 (retaining Carillon Mall as a major campus Landmark Open Space) and PP 4.1-1 (developed in compliance with the Campus Design Guidelines), development under the 2005 LRDP would result in a less than significant impact to scenic vistas.

Figure 4.1-1 of the 2005 LRDP EIR indicates that views of the Box Springs Mountains are available from the Carillon Mall if looking eastward. The Carillon Mall is north of the project site, and there are intervening buildings, including the H&SS Building. Implementation of the proposed project would not affect public views of the Box Springs Mountains from vantage points in Carillon Mall. Additionally, views of the Box Springs Mountains from the project site are obstructed by the mature trees and buildings on the project site and in the areas to the east. Therefore, the proposed project would not impact a scenic vista.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

There would be no impact on scenic vistas.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☐	☒

Discussion

As identified in the IS for the 2005 LRDP EIR, the UCR campus is bisected by the I-215/SR-60 freeway and is generally bound by University Avenue, Canyon Crest Drive, Blaine Street, Watkins Drive, Valencia Hill Drive, Le Conte Drive, and Chicago Avenue, none of which are officially designated or identified as eligible for designation as a State scenic highway (Caltrans 2011). Therefore, development under the 2005 LRDP was determined to have no impact related to State scenic highways. While there are no scenic highways in the campus vicinity, the 2005 LRDP includes the provision to retain the southeast hills and associated rock outcroppings, considered a scenic resource, as an Open Space Reserve. The proposed project is not located in proximity to the southeast hills. Therefore, there would be no impact from implementation of the proposed project on scenic resources, including within a State scenic highway, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

There would be no impact to scenic resources within a scenic highway.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒	☐

Discussion

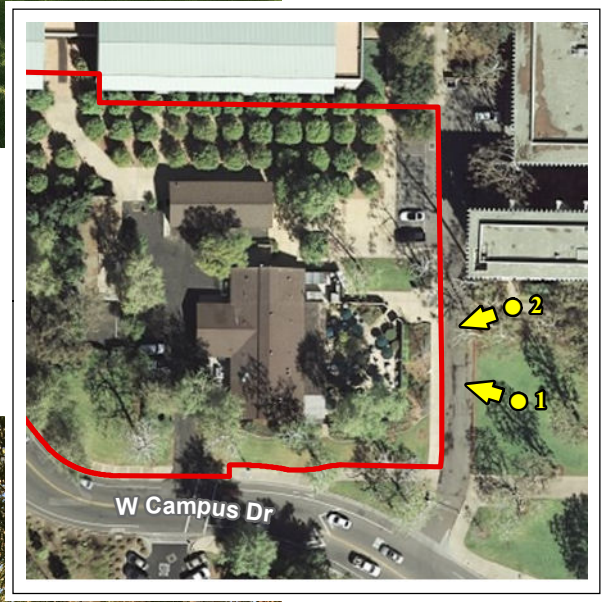
The analysis of Impact 4.1-2 in the 2005 LRDP EIR concluded that, with implementation of PS Land Use 1 through 3, PS Open Space 1 through 7, PS Conservation 1 through 4, PS Campus & Community 1, PS Development Strategy 1 through 3, and PP 4.1-2(a) through PP 4.1-2(d), development under the 2005 LRDP would result in a less than significant impact to the visual character or quality of the campus and the immediately surrounding area. As discussed above, relevant PSs and PPs have been incorporated into the proposed project.

The project area is surrounded by existing multilevel buildings to the north and northeast, primarily landscaped areas to the east, West Campus Drive to the west and south, with parking areas and the freeway farther to the west and south. The University Cottage is located south of the project

site in Parking Lot 4 and would be retained with implementation of the proposed project. The primary views of the project area are from immediately adjacent vantage points; views from more distant vantage points are obstructed by intervening buildings and landscaping. The existing visual character of the project site and immediate surrounding areas is depicted in the site photographs provided in Figures 14a through 14f and are described below.

- **Views 1 and 2 – Views from east of the project site.** These photographs depict the existing condition of the project site as viewed from vantage points east of the project site and south of Sproul Hall (refer to Figure 14a). The Barn Dining facility and associated block wall are in the middle ground of these views. Partially obstructed views of the H&SS Building are in the background; existing mature trees on and surrounding the project site are prominent visual features. There are no distant background views from these vantage points.
- **Views 3 and 4 – Views from northeast and northwest of the project site.** These photographs depict views from pedestrian facilities that enter the Barn Group from the northeast and northwest at the east and west sides of the existing citrus grove (refer to Figure 14b). The existing parking lot northeast of the project site is in the foreground of View 3, and obstructed views of existing buildings in the Barn Group are in the middleground of View 4. As shown in these photographs, the existing western sycamore and citrus trees along the northern portion of the project site are prominent visual features from these vantage points, and these trees largely obstruct views into the project site. There are no distant background views from these vantage points.
- **Views 5 and 6 – Views from the west and southwest from West Campus Drive.** View 5 represents the view looking south from the sidewalk along West Campus Drive near the southwest edge of the H&SS Building. The photograph is representative of the view for pedestrians and motorists traveling south along West Campus Drive (refer to Figure 14c). Views of Barn Group buildings on the project site are obstructed by mature trees and landscaping; however, the University Cottage (in Parking Lot 4) is visible in the background. There are distant views (right side of the photograph); however, distant views are partially obstructed by intervening development, trees, and the wall along the freeway. View 6 represents the view looking northeast from the southwestern edge of the project site; this is representative of the pedestrian view from West Campus Drive looking north. The H&SS Building is a prominent visual feature in the background; however, views of this building are partially obstructed by mature trees.
- **Views 7 and 8 – View to the north from West Campus Drive.** These photographs depict the views from the north and south sides of West Campus Drive looking into the existing service yard for the Barn Group (refer to Figure 14d). The existing buildings in the Barn Group are visible from these vantage points and the H&SS Building is visible in the background. Mature trees and other landscaping are prominent features in both views and obstruct views of the majority of the Barn Stable. There are no distant views from these vantage points.
- **Views 9 and 10 – Views to the northwest and northeast from the Parking Lot 4 exit.** These photographs depict the views from motorists and pedestrians exiting Parking Lot 4 and show the alignment of West Campus Drive in relation to the project site (refer to Figure 14e). Mature trees are prominent visual features in these photographs. The H&SS Building is visible in the background of View 9 but is mostly obstructed. The concrete wall along the freeway is visible on the left side of the photograph. View 10 shows the direct views of the Barn Dining building and the wall around the existing East Courtyard. Views into the campus are obstructed by intervening buildings and mature trees and vegetation; obstructed views of Sproul Hall can be seen.

View 1



View 2

Aerial Source: ESRI, NAIP 2014

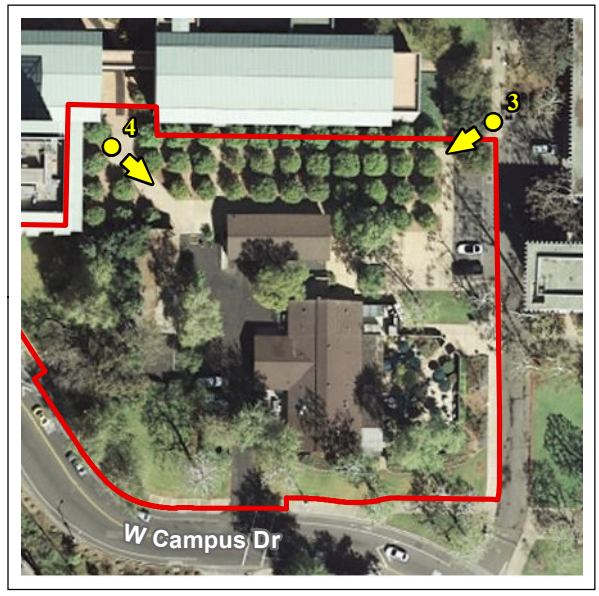
Existing Site Views

Figure 14a

UCR Barn Expansion

PSOMAS

View 3



View 4

Aerial Source: ESRI, NAIP 2014

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Existing Site Views

Figure 14b

UCR Barn Expansion

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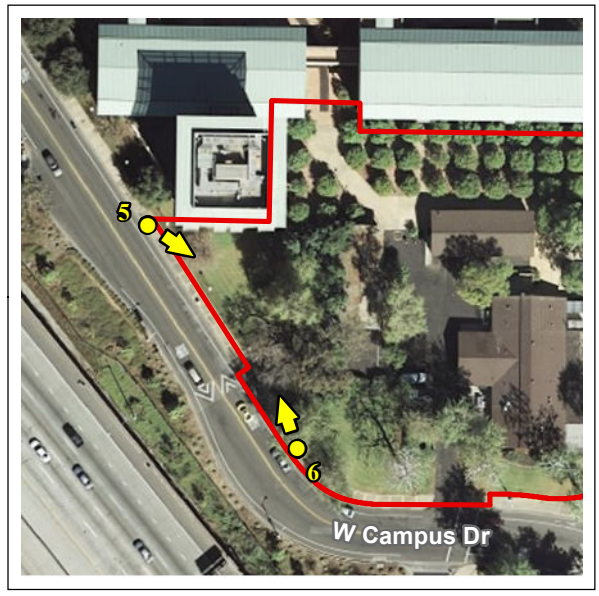
View 5



View 6

Aerial Source: ESRI, NAIP 2014

Existing Site Views

Figure 14c

UCR Barn Expansion

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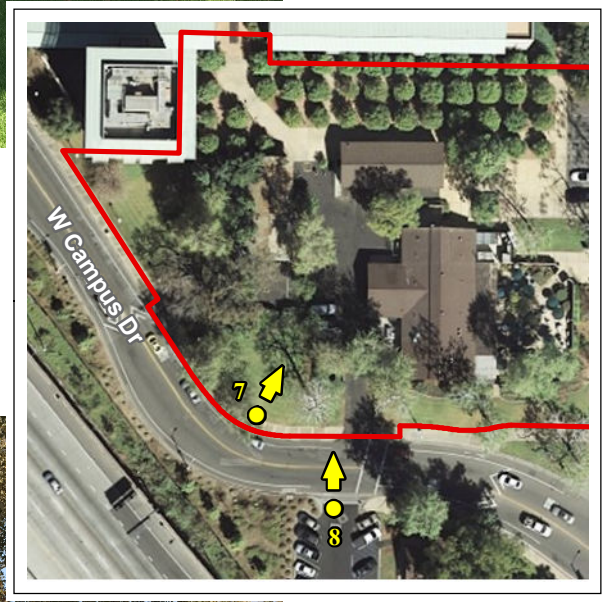
View 7



View 8

Aerial Source: ESRI, NAIP 2014

Existing Site Views

Figure 14d

UCR Barn Expansion

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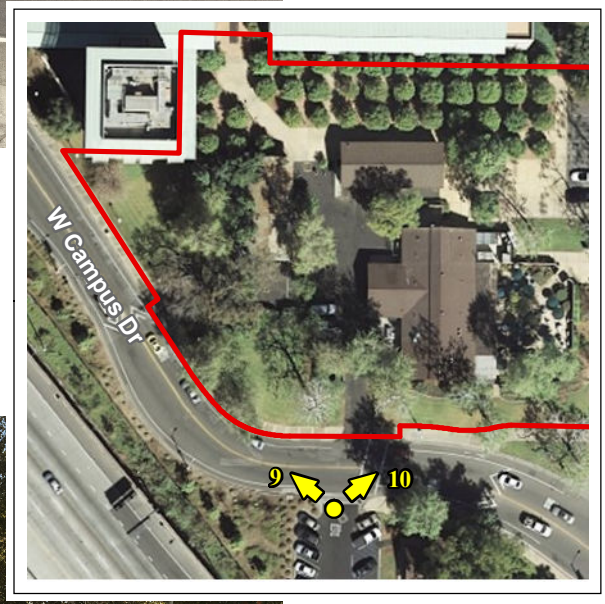
View 9



View 10

Aerial Source: ESRI, NAIP 2014

Existing Site Views

Figure 14e

UCR Barn Expansion

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View 11

View 12

Aerial Source: ESRI, NAIP 2014

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Existing Site Views

Figure 14f

UCR Barn Expansion

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- **Views 11 and 12 – Views to the north and northwest from the West Campus Drive.** These photographs depict the views of the project site and adjacent area from vantage points southeast of the project site along West Campus Drive (refer to Figure 14f). View 11 represents views looking north along the sidewalk and access road east of the project site. Sproul Hall is visible east of the project site; however, views of buildings in the Barn Group are obstructed by mature trees. The table umbrellas in the East Courtyard are visible. View 12 is representative of the pedestrian view from West Campus Drive walking northwest. The lawn area that would be used for the interim dining area is visible in the right side of the photograph. There are obstructed views of the Barn Group, the H&SS Building, and Sproul Hall. The mature trees on and surrounding the project site are prominent visual features. There are no distant views from these vantage points.

To address visual changes associated with implementation of the proposed project and to address the relationship between the proposed project and the existing land uses surrounding the project site, conceptual renderings and building elevations are provided in Figures 7, 8, and 9a through 9c in Section II, Project Description, of this IS/MND. The conceptual Landscape Plan is provided in Figure 10.

The overall character of the proposed project has been developed to revive and repurpose the Barn Dining and Barn Theater, with these buildings as the central elements. As shown in the conceptual building elevations (Figures 9a through 9c), each of the buildings would be a single level, consistent with existing conditions, with the Barn Dining and Kitchen Addition being the tallest building (24 feet, 3 inches). The new Faculty Staff/Dining room west of the Barn Dining and Kitchen Addition would be 19 feet, 5 inches and the new Campus Meeting Room in the northeast portion of the site would be 20 feet high. The Barn Theater is currently 17 feet, 5 inches and would be a similar height if it is replaced. The proposed ticketing tower is designed to be a prominent visual feature, serving as a gateway to the Barn Complex, and would have a maximum height of 30 feet, 9 inches. All of the buildings would be shorter than the multilevel structures to the north and east of the project site, including the Humanities and Social Sciences Building and Sproul Hall.

As discussed above, PSs and PPs relevant to project design and visual character have been incorporated into the proposed project. The proposed project has been designed to enhance the awareness of the campus' agrarian heritage. In order to accomplish this and for the Barn facilities to be perceived as a complex of related structures and activities, the material choices, massing strategies, and connecting structures have been considered as a whole. The existing buildings to be retained and new buildings to be constructed would be interconnected through at-grade connections to the existing and proposed pedestrian paths and outdoor spaces, including the East and West Courtyards.

The building materials and color palette to be used would adhere to the Campus Design Guidelines to be visually harmonious with the UCR campus as well as the immediately surrounding buildings (as required by PP 4.1-1) and would be reviewed as part of the project-specific design review process and through approval of construction documents (refer to MM 4.1-3[a]). The existing buildings in the Barn Group consist of wood framed buildings in need of repair. The proposed Kitchen Addition would also be a wood-framed structure on a concrete slab; however, to contrast with the Barn Dining building, metal or a different pattern and scale of wood siding would be used. The existing roof at the Barn Dining building would be replaced with a metal roof. The proposed Faculty/Staff Dining building would have a modern agrarian aesthetic, a contemporary take on the gable vernacular. The framing system would consist of paired channel steel columns, trusses from steel angles, and a gabled ceiling. This system would be used in the prominent spaces (e.g., dining room, lobby, and stage) and would extend to the perimeter covered outdoor spaces, overhangs, and the shade structure at the West Courtyard. The proposed

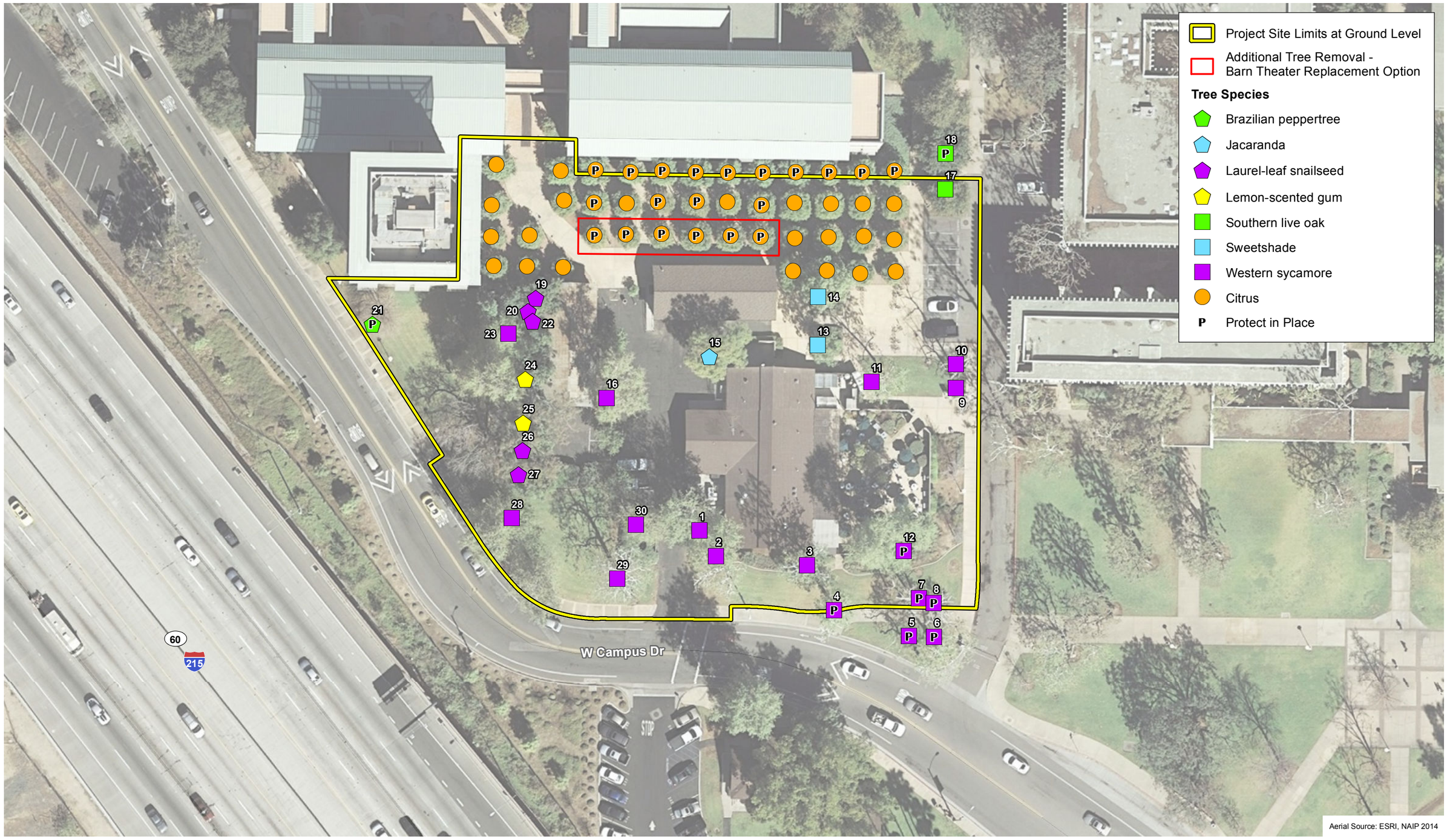
Campus Meeting Room would be a hybrid between the vernacular wood framing of Barn Dining and the more modern agrarian/market hall framing of Faculty/Staff Dining. The exterior materials would be wood siding and aluminum windows and doors. The Restroom building would also be a wood-framed building with a flat roof. Should the Barn Theater be replaced, it would also be a wood-framed building. Mechanical equipment would be screened. The ticketing tower would be a single-room structure, with wood framing and some steel.

As a result of the proposed project (refer to Figure 13, Construction Impact Area), existing landscaping, primarily trees and shrubs, would be removed, changing the existing visual character. Potential impacts to trees are discussed in detail in Section V.4, Biological Resources, of this IS/MND and are shown on Figure 15, Tree Impacts. The proposed project includes PP 4.1-2(a), which ensures that project-specific landscape plans are consistent with the Campus Design Guidelines with respect to, among other items, retention of existing trees.

As shown in Figure 10 in Section II, Project Description, of this IS/MND, the proposed project involves installation of new landscaping. The proposed landscape has been designed to support the programmed exterior uses at the Barn Complex and to address connections with the UCR campus as a whole. As shown on Figure 10, various trees, shrubs, and groundcover would be planted throughout the project site. Along the south and west sides of the project site, plant materials would be used to both screen patio spaces and provide a pleasant, unified landscape edge along West Campus Drive. Along the eastern edge of the project site, a row of new trees and groundcovers would be planted along the future Barn Walk. In addition, the proposed project incorporates PP 4.1-2(b) and would preserve certain mature trees in place or plant replacement trees within the project site. In summary, there are 73 mature trees located within or immediately adjacent to the project site and it is estimated that up to 51 of these trees would be removed during construction of the Barn Theater Replacement Option (up to 45 trees would be removed with implementation of the proposed project). The remaining trees would be protected in place. Notably, the existing western sycamore trees at the southeast corner of the project site along West Campus Drive (refer to View 12) and many of the citrus trees along the northern boundary of the project site (refer to Views 3 and 4) would be retained with the proposed project. Implementation of the Barn Theater Replacement Option would require the removal of additional citrus trees compared to the proposed project, but citrus trees would be retained along the perimeter of the building to retain the visual character. Replacement trees would be positioned to visually complement the proposed project, gathering spaces, and hardscape areas.

Additionally, the proposed project, which is generally located at the western perimeter of the East Campus, incorporates PS Open Space 4. The proposed project would not alter the setbacks and landscaping provided along the I-215/SR-60 freeway, west and south of West Campus Drive, including Parking Lot 4, which would be used for construction staging. In addition to the retention of some trees along West Campus Drive, as discussed above, new landscaping would be installed to maintain a landscape buffer in this area. Consistent with existing conditions, vehicular access to the new service yard and load dock would be from West Campus Drive, and the relocation of the access point would not alter the visual character of the area.

In summary, the proposed project, outdoor gathering spaces, and landscaping have been designed in consideration of the Campus Design Guidelines (PPs 4.1-1 and 4.1-2[a]) and will be subject to design review by the Campus Design Review Board (PS Development Strategy 1). The height, massing, site design, materials, and other aspects of the visual character of the proposed project would be consistent with and complementary to the existing surrounding structures and uses and would not degrade the existing visual quality of the project site and surroundings consistent with the findings of the 2005 LRDP EIR. There would be a less than significant impact, and no mitigation is required.



Aerial Source: ESRI, NAIP 2014

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Tree Impacts

UCR Barn Expansion

Figure 15

N W E S

50 25 0 50 Feet

PSOMAS

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Additional Project-Level Mitigation Measures

None required.

Level of Significance

There would be a less than significant impact to the existing visual character or quality of the site and its surroundings.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.1-3 in the 2005 LRDP EIR concluded that implementation of PS Land Use 3, PS Open Space 1 through 4, PS Conservation 1 and 2, PS Campus & Community 1, PS Development Strategy 1, PP 4.1-1, PP 4.1-2(a), PP 4.1-2(b), and MM 4.1-3(a) through MM 4.1-3(c) would ensure that light and glare impacts on adjacent land uses resulting from development under the 2005 LRDP would be reduced or avoided, resulting in a less than significant impact.

The 2005 LRDP EIR identifies that the primary sources of light and glare on the UCR campus include recreation facilities and surface parking lots. There are no recreation facilities in the vicinity of the project site; however, there are surface parking lots. Parking Lot 4 is located south of the project site, and there is a parking area northeast of the project site accessed from a drive aisle adjacent to and east of the project site. Other light sources in and surrounding the project site include, but are not limited to, street lights along West Campus and I-215/SR-60, exterior lighting at existing buildings, and lighting along pedestrian pathways.

The proposed project is at the western edge of the East Campus and is not in the vicinity of any light-sensitive uses. The lighting design would provide sufficient lighting to ensure visual performance and safety. As further described in Section II, Project Description, of this IS/MND, with respect to the primary exterior lighting, lighting would be installed below the shade structure in the West Courtyard; cable-mounted lighting fixtures would be installed at the East Courtyard dining area; wall-mounted fixtures with cutoff optics would be installed at the service yard; and low-level bollards and pedestrian-scale poles would be installed along walkways. Where pergolas or canopies occur, lights would be integrated into the structure for general illumination. Where walkways occur immediately adjacent to buildings, low-level wall-mounted path lights would be used. Lighting would comply with applicable cutoff requirements, and an average of at least one footcandle would be maintained along egress paths. As previously identified, the proposed project is intended to be a gateway for this portion of the campus; the proposed ticketing tower is intended to serve as a beacon for the project site and a marker for this gateway. To accomplish this, the tower would include specialty lighting to illuminate the unique architectural elements.

Based on the level of lighting currently present on and near the project site and the existing level of ambient nighttime illumination at the UCR campus, the proposed project would not noticeably increase the intensity of nighttime ambient light from the campus. Therefore, the lighting associated with the proposed project would not adversely affect any existing land uses, which are not considered light-sensitive (such as residential uses).

The proposed project also incorporates MM 4.1-3(a) to ensure there is no glare from the proposed structure. Building materials for the proposed project comply with the UCR Design Guidelines, and exterior finishes would include primarily wood, aluminum, steel, and metal. Double-glazed windows would also be installed.

Implementation of PS Development Strategy 1 (design review), PP 4.1-1 (design in compliance with the Campus Design Guidelines), and MM 4.1-3(a) (use of non-reflective building materials), as part of the proposed project, would ensure that impacts are less than significant. The proposed project would not result in a substantial new source of light or glare, and there would be less than significant impacts related to new sources of daytime or nighttime light and glare, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

There would be a less than significant impact associated with the creation of a new source of substantial light or glare affecting day or nighttime views in the area.

2. Agricultural and Forest Resources

The analysis of agricultural and forest resources is tiered from the UCR 2005 LRDP Amendment 2 EIR and was addressed in Section 4.2, Agriculture, of that document. There are no relevant elements of the proposed project related to agricultural or forestry resources, and no PSs, PPs, or MMs are applicable. There are no agricultural or forestry resources on or near the project area. The analysis of agricultural resources is applicable to the proposed project and the Barn Theater Replacement Option.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project 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 nonagricultural use?	☐	☐	☐	☐	☒
b) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☐	☒
c) Would the project 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))?	☐	☐	☐	☐	☒
d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☐	☒
e) Would the project involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland, to nonagricultural use?	☐	☐	☐	☐	☒

Discussion

The analysis of Impact 4.2-1 in Section 4.2, Agriculture, of the 2005 LRDP Amendment 2 EIR concluded that, even with implementation of PS Land Use 1, PS Land Use 2, and PS Land Use 3, development under the 2005 LRDP, as amended, would result in a significant and unavoidable impact due to conversion of Prime Farmland to non-agricultural uses.

The 2005 LRDP Amendment 2 EIR identified the distribution of Farmland, as designated by the California Farmland Mapping and Monitoring Program (FMMP), on the UCR campus at that time. The UCR campus was mapped as having 481.7 acres of Prime Farmland and Farmland of Statewide Importance (collectively, "Farmland") primarily located on the West Campus with an isolated area of Farmland of Statewide Importance located along the eastern boundary of the East Campus. Review of the 2014 Important Farmland Map indicates a similar distribution of Farmland, primarily on the West Campus with an isolated area near the eastern boundary of the East Campus (FMMP 2016). The project area is designated as Urban Built-Up Land and, as such, implementation of the proposed project would not convert Farmland to non-agricultural resources (FMMP 2016). Therefore, the proposed project would have no impact on agricultural resources.

As identified in the IS prepared for, and summarized in, the 2005 LRDP Amendment 2 EIR, no portion of the UCR campus is zoned for forest land, timberland, or agricultural use; it does not contain any forest land or timberland, nor is it under Williamson Act Contract. Therefore, implementation of the proposed project would result in no impacts related to conflict with existing zoning for forest land, timberland, or agriculture; it would not conflict with a Williamson Act Contract; and it would not result in the loss or conversion of forest lands, consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Implementation of the proposed project would not involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use. Therefore, the proposed project would result in no impacts related to indirect conversion of Farmland to non-agricultural use, consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

There would be no impacts to Farmland, forest land, timberland, or Williamson Act Contracts.

3. Air Quality

The analysis of air quality is tiered from the 2005 LRDP Amendment 2 EIR and was addressed in Section 4.3, Air Quality, of that document. As described previously in Section II, Project Description, of this IS/MND, relevant elements of the proposed project related to air quality include the demolition of the Barn Stable and Barn Theater (with the Barn Theater Replacement Option); removal of the construction spoils from the project site; and the use of diesel-powered and other construction equipment that would contribute to local and regional emissions (refer to discussion of "Construction Activities" in Section II, Project Description, of this IS/MND).[5] With implementation of the proposed project, there would ultimately be up to 18,795 gsf of building development in the Barn Complex (and up to 10 18,860 gsf with the Barn Theater Replacement Option. As described in Section II, Project Description, of this IS/MND, because demolition and replacement of the Barn Theater would result in potentially greater impacts than the proposed project (during construction), the construction-related impacts of the Barn Theater Replacement Option are evaluated in this IS/MND as a potential worst-case.

The proposed project would increase Monday through Friday Barn Dining hours from approximately 7 hours per day (8:00 AM to 3:00 PM) to 12.5 hours per day (7:30 AM to 8:00 PM); dining capacity from 120 to 320 meals per hour; and the number of events held at the Barn Complex from between 80 and 130 annual events to approximately 540 events/meetings and approximately 60 band/entertainment events. It is estimated that the proposed project could increase the UCR campus employee population by approximately nine persons. The operations of the proposed project and the Barn Theater Replacement Option would be the same.

The following applicable PSs, PPs, and MMs were adopted as part of the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR; they are incorporated as part of the proposed project and are assumed in the analysis presented in this section.

PS Campus and Community 4 Provide strong connections within the campus and its edges to promote walking, bicycling, and transit use, rather than vehicular traffic.

PS Transportation 3 Provide a continuous network of bicycle lanes and paths throughout the campus, connecting to off-campus bicycle routes.

5 As described in Section II, Project Description, of this IS/MND, because demolition and replacement of the Barn Theater would result in potentially greater impacts than the proposed Project (during construction), the impacts of the Barn Theater Replacement Option are evaluated in this IS/MND as a potential worst-case.

PS Transportation 5 Provide bicycle parking at convenient locations.

PP 4.3-1 The Campus shall continue to implement a Transportation Demand Management program that meets or exceeds all trip reduction and AVR requirements of the SCAQMD. The TDM program may be subject to modification as new technologies are developed or alternate program elements are found to be more effective. *(This is identical to Transportation and Traffic PP 4.14-1.)*

PP 4.3-2(a) Construction contract specifications shall include the following:

(i) Compliance with all SCAQMD rules and regulations

(ii) Maintenance programs to assure vehicles remain in good operating condition

(iii) Avoid unnecessary idling of construction vehicles and equipment

(iv) Use of alternative fuel construction vehicles

(v) Provision of electrical power to the site, to eliminate the need for on-site generators

PP 4.3-2(b) The Campus shall continue to implement dust control measures consistent with SCAQMD Rule 403—Fugitive Dust during the construction phases of new project development. The following actions are currently recommended to implement Rule 403 and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the source of the dust generation. The Campus shall implement these measures as necessary to reduce fugitive dust. Individual measures shall be specified in construction documents and require implementation by construction contractor:

(i) Apply water and/or approved non-toxic chemical soil stabilizers according to manufacturer's specification to all inactive construction areas (previously graded areas that have been inactive for 10 or more days)

(ii) Replace ground cover in disturbed areas as quickly as possible

(iii) Enclose, cover, water twice daily, or apply approved chemical soil binders to exposed piles with 5 percent or greater silt content

(iv) Water active grading sites at least twice daily

(v) Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour over a 30-minute period

(vi) All trucks hauling dirt, sand, soil, or other loose materials shall be covered or maintain at least two feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer), in accordance with Section 23114 of the *California Vehicle Code*

(vii) Sweep streets at the end of the day if visible soil material is carried over to adjacent roads

(viii) Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip

(ix) Apply water three times daily or chemical soil stabilizers according to manufacturers' specifications to all unpaved parking or staging areas or unpaved road surfaces

(x) Post and enforce traffic speed limits of 15 miles per hour or less on all unpaved roads

(This is identical to Geology PP 4.6-2(a) and Hydrology PP 4.8-3[c].)

MM 4.3-1(a) For each construction project on the campus, the project contractor will implement Programs and Practices 4.3-2(a) and 4.3-2(b). In addition, the following PM10 and PM2.5 control measure shall be implemented for each construction project:

- Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The phone number of the District shall also be visible to ensure compliance.

MM 4.3-1(b) For each construction project on the campus, the University shall require that the project include a construction emissions control plan that includes a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that will be used for an aggregate of 40 or more hours during any portion of the construction project. During construction activity, the contractor shall utilize CARB certified equipment or better for all on-site construction equipment according to the following schedule:

- January 1, 2011 to December 31, 2011: All off-road diesel-powered construction equipment greater than 50 hp shall meet Tier 2 off-road emissions standards. In addition, all construction equipment shall be outfitted with the BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 2 or Level 3 diesel

emissions control strategy for a similarly sized engine as defined by CARB regulations.[6]

- January 1, 2012 to December 31, 2014: All off-road diesel-powered construction equipment greater than 50 hp shall meet Tier 3 off-road emissions standards. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.[7]
- Post January 1, 2015: All off-road diesel-powered construction equipment greater than 50 hp shall meet the Tier 4 emission standards, where available. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.
- A copy of each unit's certified specification, BACT documentation and CARB or SCAQMD operating permit shall be provided at the time of mobilization of each applicable unit or equipment.
- Encourage construction contractors to apply for AQMD 'SOON" funds. Incentives could be provided for those construction contractors who apply for AQMD "SOON" funds. The "SOON" program provides funds to accelerate clean-up of off-road diesel vehicles, such as heavy duty construction equipment. More information on this program can be found at the following website: http://www.aqmd.gov/tao/implementation/soonprogram.htm

The contractor shall also implement the following measures during construction:

- Prohibit vehicle and engine idling in excess of 5 minutes and ensure that all off-road equipment is compliant with the California Air Resources Board's (CARB) in-use off-road diesel vehicle regulation and SCAQMD Rule 2449.
- Configure construction parking to minimize traffic interference.

6 The time frame for this component of MM 4.3-1(b) has passed and the more restrictive requirements defined are applicable.

7 Although the time frame for this component has passed, the use of Tier 3 equipment is required where Tier 4 equipment is not available.

- Provide temporary traffic controls such as a flag person, during all phases of construction to maintain smooth traffic flow.
- Provide dedicated turn lanes for movement of construction trucks and equipment on- and off site.
- Schedule construction activities that affect traffic flow on the arterial system to off-peak hour to the extent practicable.
- Improve traffic flow by signal synchronization, and ensure that all vehicles and equipment will be properly tuned and maintained according to manufacturers' specifications.
- Use diesel-powered construction vehicles and equipment that operate on low-NOx fuel where possible.
- Reroute construction trucks away from congested streets or sensitive receptor areas.
- Maintain and tune all vehicles and equipment according to manufacturers' specifications.

MM 4.3-1(c) To minimize VOC emissions from the painting/finishing phase, for each construction project on the campus, the project contractor will implement the following VOC control measures:

- Construct or build with materials that do not require painting, or use pre-painted construction materials.
- If appropriate materials are not available or are cost-prohibitive, use low VOC-content materials more stringent than required under SCAQMD Rule 1113.

MM 4.3-2(b) UCR shall continue to participate in greenhouse gas (GHG) reduction programs such as the American College and University Presidents' Climate Commitment (ACUPCC) and shall adhere to the UC Policy on Sustainable Practices. The measures adopted by UCR are presented in Tables 4.16-9 and 4.16-10 in Section 4.16 Greenhouse Gas Emissions of the 2005 LRDP Amendment 2 EIR. While these measures are typically targeted at GHG emissions, many act to reduce energy consumption and vehicle use on campus and would consequently also reduce air pollutant emissions from both area and mobile sources. In accordance with the ACUPCC and the UC Policy on Sustainable Practices and through implementation of its Climate Action Plan, UCR shall commit to reducing GHG emissions to 1990 levels by 2020, which would require significant reductions (on the order of 70 percent) from these sources in terms of GHG and therefore reductions in other air pollutants as well.

Regulatory Framework

A detailed discussion of the regulatory framework for air quality is provided in Section 4.3 of the 2005 LRDP Amendment 2 EIR. In summary, both the federal and State governments have established ambient air quality standards for outdoor concentrations of specific pollutants, referred to as "criteria pollutants", in order to protect public health. The national and State ambient air quality standards have been set at concentration levels to protect the most sensitive persons from illness or discomfort; these levels are given with a margin of safety. The criteria pollutants for which federal standards have been promulgated and that are most relevant to this air quality impact analysis are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), and particulate matter (PM10 and PM2.5). Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM10. Fine particulate matter (PM2.5) is a subgroup of particulate matter that consists of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less. O_3 is a gas that is formed when VOCs and nitrogen oxides (NOx)—both byproducts of internal combustion engine exhaust—undergo slow photochemical reactions in the presence of sunlight. Thus, VOCs and NOx are O_3 precursors.

The campus is located within the South Coast Air Basin (SoCAB), which was named as such since its geographical formation is that of a basin with the surrounding mountains trapping the air and its pollutants in the valleys (or basins) below. This area includes all of Orange County and the non-desert portions of Los Angeles, San Bernardino, and Riverside Counties. The South Coast Air Quality Management District (SCAQMD) is responsible for ensuring that the SoCAB meets the national and State ambient air quality standards.

Subsequent to the preparation of the air quality study for the 2005 LRDP Amendment 2 EIR, there have been changes to the attainment status in the SoCAB. These changes include federal designation of the SoCAB as a PM10 attainment area and federal designation of Los Angeles County as a nonattainment area for lead. The current federal and State attainment designations are shown in Table 3.

TABLE 3
ATTAINMENT STATUS OF CRITERIA POLLUTANTS
IN THE SOUTH COAST AIR BASIN

Pollutant	State	Federal
O_3 (1 hour)	Nonattainment	No Standard
O_3 (8 hour)		Extreme Nonattainment
PM10	Nonattainment	Attainment/Maintenance
PM2.5	Nonattainment	Moderate Nonattainment
CO	Attainment	Attainment/Maintenance
NO_2	Attainment	Attainment/Maintenance
SO_2	Attainment	Attainment
Lead	Attainment	Attainment/Nonattainment*
All others	Attainment/Unclassified	No Standards

O_3: ozone; PM10: respirable particulate matter 10 micrometers or less in diameter; PM2.5: fine particulate matter 2.5 micrometers or less in diameter; CO: carbon monoxide; NO_2: nitrogen dioxide; SO_2: sulfur dioxide.

* The Los Angeles County portion of the South Coast Air Basin (SoCAB) is designated nonattainment for lead; the remainder of the SoCAB is designated attainment.

Source: CARB 2016.

In December 2012, the SCAQMD adopted the 2012 Air Quality Management Plan (AQMP), which is a regional and multiagency effort (SCAQMD, California Air Resources Board [CARB], Southern California Association of Governments [SCAG], and the U.S. Environmental Protection Agency [USEPA]). The 2012 AQMP incorporated the latest scientific and technical information and planning assumptions, including SCAG's 2012–2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS); updated emission inventory methods for various source categories; and SCAG's latest growth forecasts. The primary purposes of the 2012 AQMP are to demonstrate attainment of the federal 24-hour PM2.5 standard by 2014 and to update the USEPA-approved 8-hour Ozone Control Plan. On December 20, 2012, the 2012 AQMP was submitted to CARB and the USEPA for concurrent review and approval for inclusion in the State Implementation Plan (SIP) (SCAQMD 2013). CARB approved the 2012 AQMP on January 25, 2013.

On March 3, 2017, the SCAQMD adopted the 2016 AQMP (CARB 2017). The 2016 AQMP includes strategies and measures to meet the following National Ambient Air Quality Standards (NAAQS) (SCAQMD 2017):

- 8-hour O_3 (75 parts per billion [ppb]) by 2031[8]
- Annual PM2.5 (12 micrograms per cubic meter [µg/m^3]) by 2025
- 8-hour O_3 (80 ppb) by 2023
- 1-hour O_3 (120 ppb) by 2022
- 24-hour PM2.5 (35 µg/m^3) by 2019

Air Quality Sensitive Receptors

The SCAQMD defines typical sensitive receptors as residences, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. The sensitive receptor nearest the project site is the Amy R. Harrison Athletic Field and UCR Soccer Field, approximately 1,300 feet to the north. The nearest on-campus residences are approximately 2,300 feet to the northeast and northwest of the project site. The nearest off-campus residences are on North University Drive, approximately 2,200 feet south of the Barn Complex and west of I-215/SR-60. The closest buildings to the Barn Complex are academic and administrative facilities, which are not air quality sensitive receptors. Potential impacts to sensitive receptors from construction emissions are assessed under the analysis of Threshold d below.

Methods

The SCAQMD recommends that projects be evaluated in terms of their quantitative thresholds, which have been established to assess both the regional and localized impacts of project-related air pollutant emissions. The significance thresholds are updated, as needed, to appropriately represent current ambient air quality standards and attainment status. As identified in Section 4.3.4, Impacts and Mitigation Measures, of the 2005 LRDP Amendment 2 EIR, UCR utilizes the SCAQMD-recommended thresholds that are in place at the time development projects are proposed in order to assess the significance of quantifiable emissions. The current SCAQMD thresholds are identified in Table 4 and are applied to the proposed project.

8 On October 1, 2015, the USEPA lowered the 8-hour O_3 standard to 0.070 parts per million (ppm) (70 ppb). The SIP (or AQMP) for the 70 ppb standard will be due 4 years after the attainment/nonattainment designations are issued by the USEPA, which is expected in 2017. Thus, meeting the 70 ppb standard will be addressed in a 2021 AQMP.

TABLE 4
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT AIR QUALITY SIGNIFICANCE THRESHOLDS

Mass Daily Thresholds[a]		
Pollutant	**Construction**	**Operation**
NOx	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
PM2.5	55 lbs/day	55 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
Toxic Air Contaminants, Odor, and Greenhouse Gas Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic and Acute Hazard Index ≥ 1.0 (project increment)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
GHG	10,000 MT/yr CO_2eq for industrial facilities	
Ambient Air Quality Standards for Criteria Pollutants[b, c]		
NO_2 1-hour average annual arithmetic mean	The SCAQMD is in attainment; the project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (State) 0.03 ppm (State) and 0.0534 ppm (federal)	
PM10 24-hour average annual average	10.4 µg/m^3 (construction)[c] and 2.5 µg/m^3 (operation) 1.0 µg/m^3	
PM2.5 24-hour average	10.4 µg/m^3 (construction)[c] and 2.5 µg/m^3 (operation)	
SO_2 1-hour average 24-hour average	0.25 ppm (State) and 0.075 ppm (federal – 99th percentile) 0.04 ppm (State)	
Sulfate 24-hour average	25 µg/m^3 (State)	
CO 1-hour average 8-hour average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20.0 ppm (State) and 35 ppm (federal) 9.0 ppm (State/federal)	
Lead 30-day average Rolling 3-month average	1.5 µg/m^3 (State) 0.15 µg/m^3 (federal)	

NOx: nitrogen oxides; lbs/day: pounds per day; VOC: volatile organic compound; PM10: respirable particulate matter with a diameter of 10 micrometers or less; PM2.5: fine particulate matter with a diameter of 2.5 micrometers or less; SOx: sulfur oxides; CO: carbon monoxide; TACs: toxic air contaminants; SCAQMD: South Coast Air Quality Management District; GHG: greenhouse gases; MT/yr CO_2eq: metric tons per year of carbon dioxide equivalents; NO_2: nitrogen dioxide; ppm: parts per million; µg/m^3: micrograms per cubic meter.

[a] Source: SCAQMD California Environmental Quality Act Handbook (SCAQMD 1993).
[b] Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.
[c] Ambient air quality threshold is based on SCAQMD Rule 403.

Source: SCAQMD 2015.

Existing Emissions

The existing Barn Group buildings located at the project site include the Barn Dining, Barn Theater, and Barn Stable. Pollutant emissions sources include natural gas used for cooking; emissions from landscape maintenance equipment; and mobile source emissions from delivery trucks, service vehicles, and vehicles used by general dining users and event attendees. Estimated emission calculations for existing conditions are discussed in the impact analysis below (refer to Threshold b).

It is noted that walking is the main form of transportation for staff, faculty, and students using the dining facilities and attending events in the Barn Complex. While most, if not all, of the dining guests are already on campus, it is estimated that 80 percent of the events guests are affiliated with UCR (faculty, staff, and students), with the remaining 20 percent being composed of off-campus individuals.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☐	☒

Discussion

The analysis of Impact 4.3-6 in the 2005 LRDP Amendment 2 EIR concluded that, even with implementation of PS Land Use 4 and 5, PS Transportation 1 through 6, and MM 4.3-6 (which implements MM 4.3-1 and MM 4.3-2[b]), development under the 2005 LRDP would likely conflict with SCAQMD AQMPs for O_3 and particulate matter, and there would be a significant and unavoidable impact. This conclusion was based on the forecasted construction emissions that exceed SCAQMD CEQA significance mass daily thresholds for VOC, NOx, and PM10 and operational emissions that exceed the mass daily thresholds for VOC, NOx, PM10, and PM2.5.

The two principal criteria for conformance to the AQMP are whether (1) the project would result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations or delay timely attainment of air quality standards and (2) whether the project would exceed the assumptions in the AQMP (SCAQMD 1993).

With respect to the first criterion, with incorporation of the identified PSs, PPs, and MMs, the forecasted proposed project construction and operational emissions, as detailed in Threshold b, would not exceed the SCAQMD CEQA significance mass daily thresholds, which demonstrates that the proposed project and Barn Theater Replacement Option would not result in a long-term increase in the frequency or severity of existing regional air quality violations; cause or contribute to new violations; or delay timely attainment of air quality standards. With respect to the second criterion, the increase in faculty and staff to accommodate a student population of 25,000 was anticipated in the 2005 LRDP. As stated in Section 4.9 of the 2005 LRDP Amendment 2 EIR, “The projected growth in campus population by 2020 is within the SCAG projections for the City of Riverside. Therefore, the 2005 LRDP population increase would be consistent with AQMP attainment forecasts”. The current 2012 and 2016 AQMPs would have included the projected growth associated with the 2005 LRDP, including the increase in population resulting from the

proposed project. Further, the proposed project would increase campus population by up to approximately nine employees, a negligible increase when considering pollutant emissions. Therefore, the proposed project would not exceed the assumptions in the AQMP. Based on these criteria, it is concluded that the proposed project would not conflict with or obstruct the SCAQMD AQMP; there would be no impact.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not conflict with or obstruct implementation of the applicable air quality plans; there would be no impact.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☐	☒	☐

Discussion

The analysis of Impacts 4.3-1 and 4.3-2 in the 2005 LRDP Amendment 2 EIR concluded that, even with implementation of PP 4.3-1, PP 4.3-2(a), PP 4.3-2(b), MM 4.3-1(a) through MM 4.3-1(c), MM 4.3-2(a), and MM 4.3-2(b), development under the 2005 LRDP could result in significant and unavoidable impacts related to

- construction emissions of VOC, NOx, and PM10 (Impact 4.3-1) and
- operational emissions of VOC, NOx, CO, PM10, and PM2.5 (Impact 4.3-2).

Following is an analysis of the short-term construction-related and long-term operational emissions that would result from implementation of the proposed project.

Construction Emissions

Construction-related emissions are described as short-term (or temporary) in duration. Construction activities associated with the proposed project and Barn Theater Replacement Option would result in emissions of criteria air pollutants (i.e., PM10, PM2.5, CO, and the O_3 precursors VOC and NOx) from (1) construction equipment that performs demolition, excavation, grading, paving, and building construction; (2) material handling and transport (i.e., removal of demolished materials and trucking of building materials to the project site); and (3) other miscellaneous activities, including worker commuting vehicles and application of architectural coatings.

As described further in Section II.5, Proposed Project Components, of this IS/MND under "Construction Activities", the total construction period is anticipated to extend from November 2017 to March 2019, for a period of approximately 17 months. The generalized construction phasing used for the air quality analysis is as follows, with some overlap between phases:

demolition (3 weeks), site preparation and grading (4 weeks), building construction and utility installation (12 months), paving (2 weeks), and architectural coating consisting of interior and exterior painting (8 weeks).

Demolition would include the existing 1,625-sf Barn Stable, 1,650-sf Barn Theater (assuming implementation of the Barn Theater Replacement Option), and 690-sf University Club Room, for a total of approximately 3,965 sf of buildings and an estimated 30,000 sf of pavement. It is estimated that demolition would require approximately 71 round trips to a construction and demolition waste disposal site.

Construction and operational emissions for the proposed project were calculated by using the California Emissions Estimator Model (CalEEMod), Version 2016.3.1. CalEEMod is a computer program developed in collaboration with SCAQMD and other California Air Districts (CAPCOA 2016). CalEEMod is used to estimate anticipated emissions associated with land development projects in California. The CalEEMod model input was based on the established construction assumptions (described above and in Section II.5, Proposed Project Components). Where specific information was not known, engineering judgment and default CalEEMod settings and parameters were used. Compliance with SCAQMD Rules is required and included as part of the proposed project (PP 4.3-2[a]). Additionally, the proposed project includes PPs and MMs that serve to reduce construction-related emissions and have been assumed in the analysis. Specifically, construction would be performed in accordance with Rule 403, Fugitive Dust (SCAQMD 2005) (PP 4.3-2[b]) and Rule 1113, Architectural Coatings (SCAQMD 2007) (MM 4.3-1[c]). Additionally, Tier 3 or better construction equipment would be used (MM 4.3-1[b]).[9]

Table 5 summarizes the modeled emissions for construction of the Barn Theater Replacement Option. Construction-related regional air quality impacts were determined by comparing these modeling results with applicable SCAQMD significance thresholds, as shown.

TABLE 5
MAXIMUM DAILY REGIONAL CONSTRUCTION EMISSIONS FOR THE PROPOSED PROJECT

	Emissions in Pounds per Day				
Year	**VOC**	**NOx**	**CO**	**PM10**	**PM2.5**
2017	1	15	16	3	1
2018	1	7	11	3	1
2019	5	7	10	1	1
Maximum Daily Emissions	***5***	***15***	***16***	***3***	***1***
SCAQMD Significance Thresholds (Construction)	75	100	550	150	55
Significant Impact?	**NO**	**NO**	**NO**	**NO**	**NO**

VOC: volatile organic compound; NOx: nitrogen oxides; CO: carbon monoxide; PM10: respirable particulate matter less than 10 micrometers in diameter; PM2.5: fine particulate matter less than 2.5 micrometers in diameter; SCAQMD: South Coast Air Quality Management District.

Note: Calculations assume compliance with SCAQMD Rules 403 and 1113.

CalEEMod model data sheets are included in Appendix A.

The maximum daily regional emissions of NOx and CO would occur for a period of approximately three weeks during demolition. The maximum daily regional emissions of PM10 and PM2.5 would

9 In the CalEEMod method, measures such as dust control, the use of Tier 3 construction equipment, and energy efficiency are input as “mitigation”.

occur for approximately four weeks as a result of grading activities. Maximum VOC emissions would occur for approximately eight weeks during painting activities. Estimated regional construction emissions would be less than the SCAQMD CEQA significance thresholds; therefore, construction emissions from the Barn Theater Replacement Option (and the proposed project, which would have less impact) would be less than significant.

Operational Emissions

Operational emissions are composed of area source, energy source, and mobile source emissions. Area source emissions would result from use of landscape maintenance equipment, periodic painting, and use of consumer products. The energy source for criteria pollutants is the natural gas used for cooking in the dining facility. Because the proposed project would not add to the campus student population and would add only approximately nine employees, and most guests are already on campus and walk to the Barn Complex, it is assumed that mobile source emissions would not increase. Additionally, while there would be an overall increase in events at the Complex, this increase would be spread over the entire year, and the increase in off-campus guests on a daily basis would be nominal. Therefore, mobile source emissions are not expected to measurably increase and are not calculated.

It should be noted that the Campus implements PS Campus and Community 4 (promote campus-wide non-vehicular transportation), PS Transportation 3 (campus-wide bicycle network to connect to off-campus bicycle routes), PS Transportation 5 (provide bicycle parking), and PP 4.3-1 (campus-wide implementation of a transportation demand management program), which all serve to reduce vehicular trips.

The peak daily operational emissions associated with operation of the proposed project were calculated using CalEEMod and are shown in Table 6. The data shown in Table 6 are estimated gross area source and energy source emissions for the completed project. As shown in Table 6, the operational emissions for the proposed project would be substantially less than the SCAQMD CEQA significance thresholds. Net emissions attributable to the proposed project would be less because the existing facilities generate area source and energy source emissions. Because the gross emissions are very small, the net emissions are not calculated. The operational impact of the proposed project on regional emissions would be less than significant, and no mitigation is required.

TABLE 6
PEAK DAILY OPERATIONAL EMISSIONS FOR THE PROPOSED PROJECT

Sources	Emissions in Pounds per Day				
	VOC	**NOx**	**CO**	**PM10**	**PM2.5**
Area Sources	<0.5	<0.5	<0.5	<0.5	<0.5
Energy Sources	<0.5	1	1	<0.5	<0.5
Maximum daily operational emissions	***1***	***1***	***1***	***<0.5***	***<0.5***
SCAQMD Significance Thresholds (Operational)	55	55	550	150	55
Significant Impact?	**NO**	**NO**	**NO**	**NO**	**NO**

VOC: volatile organic compound; NOx: nitrogen oxides; CO: carbon monoxide; PM10: respirable particulate matter less than 10 micrometers in diameter; PM2.5: fine particulate matter less than 2.5 micrometers in diameter; SCAQMD: South Coast Air Quality Management District.

Totals may not add due to rounding.

Values are the higher of summer or winter.
Note: CalEEMod model data sheets are included in Appendix A.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project has a less than significant potential to violate any air quality standard or contribute substantially to an existing or projected air quality violation.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.3-7 in the 2005 LRDP Amendment 2 EIR concluded that, with implementation of MM 4.3-7 (implements MM 4.3-2[b], which will reduce traffic associated with campus operations), development under the 2005 LRDP would result in a less than significant impact related to a cumulatively considerable net increase of pollutants for which the project region is in nonattainment.

The Riverside County portion of the SoCAB is a federal and State nonattainment area for O_3 and PM2.5 and a State nonattainment area for PM10. Therefore, cumulative regional emissions of VOCs and NOx (which are O_3 precursors) as well as PM10 and PM2.5 are addressed in the following analysis of cumulative criteria pollutant emissions (during construction and operation).

Construction

As identified in Table 4.3-8 of the 2005 LRDP Amendment 2 EIR, construction of the remaining development on campus would include individual projects that would have construction emissions that would exceed the SCAQMD VOC, NOx, and PM10 mass emissions thresholds in some years. Because of the short duration of peak emissions and the relatively low VOC, NOx, and PM10 emission rates compared to the SCAQMD CEQA significance thresholds (Table 5), the cumulative contributions to construction emissions on campus from project-related construction emissions would not be considerable, and the impact would be less than significant.

Operations

The increase in long-term emissions of all nonattainment pollutants resulting from the proposed project would be very small relative to SCAQMD CEQA significance thresholds (Table 6) and would not be cumulatively considerable. The impact would be less than significant.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

Construction and operation of the proposed project would result in a less than significant cumulatively considerable net increase of criteria pollutants for which the proposed project region is in nonattainment under an applicable federal or State ambient air quality standard (O_3, PM10, and PM2.5).

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒	☐

Discussion

The analysis of Impacts 4.3-3 and 4.3-4 in the 2005 LRDP Amendment 2 EIR concluded that development under the 2005 LRDP would result in a less than significant impact related to exposure of sensitive receptors to substantial concentrations of CO and toxic air contaminants (TACs). Exposure to substantial concentrations of construction emissions is a project-specific and site-specific analysis and was not evaluated in the 2005 LRDP Amendment 2 EIR.

Carbon Monoxide

Exposure of sensitive receptors to CO is of concern if the project contributes substantial traffic to severely congested, high-volume, signalized intersections with an associated potential increase in local CO concentrations (i.e., CO hotspots). Because the proposed project would not generated traffic on a daily basis, it would not increase delays at any intersections that would operate at level of service (LOS) E or F. Therefore, there would be no potential to generate a CO hotspot. Consistent with the conclusion of the 2005 LRDP Amendment 2 EIR, implementation of the proposed project would not result in exposure of sensitive receptors to substantial concentrations of CO, and there would be no impact. No mitigation is required.

Toxic Air Contaminants

TACs are airborne substances that are capable of causing chronic (i.e., of long duration) and acute (i.e., severe but of short duration) adverse effects on human health. A human health risk assessment (HHRA) was prepared as part of the 2005 LRDP Amendment 2 EIR to estimate the potential off-campus and on-campus health risks associated with TACs generated by current and projected campus-wide operations. The emissions sources analyzed in the HHRA included natural gas combustion sources, boilers and kitchen equipment, gasoline dispensing operations, emergency generators driven by internal combustion engines (ICEs), painting operations, and laboratory fume hoods (chemical usage). The HHRA concluded that full development of the campus under the 2005 LRDP Amendment 2 would not generate toxic air emissions that would result in excess human cancer risk from stationary sources or that would result in a cumulative acute or chronic non-cancer Hazard Index that exceeds the established standards.

With the exception of new kitchen equipment, the proposed project would not add facilities or equipment that would emit TACs. However, kitchen equipment emissions are minor and the amount of kitchen equipment added at the project site compared to the total kitchen equipment on campus is relatively small. Further, users of the new and renovated facilities would not be located closer to known generators of TACs than the maximally exposed individual (MEI) identified in the HHRA. Therefore, implementation of the proposed project would not result in exposure of the additional campus population to substantial concentrations of TACs. The impact would be less than significant, which is consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Construction Emissions

The SCAQMD has developed thresholds and methodologies for analyzing the localized air quality effects on a project-specific level. The localized significance thresholds (LST) methodology is a conservative, simple screening methodology for determining impacts to off-site receptors from on-site emissions (SCAQMD 2008a). The LST methodology provides "lookup" tables of emissions limits based on the location of the project site, the size of the project area, and the distance to the off-site receptor. For the LST method, receptor locations include residential, commercial, and industrial land use areas and any other areas where persons can be situated for an hour at a time or longer.

The H&SS building to the north and Sproul Hall to the east are the closest receptors to the proposed project. The distance to the receptors used for analysis is 25 meters,[10] which is the minimum distance prescribed for the LST methodology for all source-to-receptor distances of 25 meters or less. Thresholds are for a one-acre site in Receptor Source Area 23, Metropolitan Riverside County. Based on these parameters, LST emissions and thresholds for the proposed project are shown in Table 7. The emissions shown in Table 7 are less than those in Table 5 because Table 5 includes off-site emissions as well as on-site emissions.

TABLE 7
LOCAL CONSTRUCTION EMISSIONS TO NEAREST SENSITIVE RECEPTORS

Pollutant	Maximum Daily On-Site Emissions[a] (lbs/day)	LST[b] Thresholds (lbs/day)	Exceed Threshold?
NOx	12	118	No
CO	15	602	No
PM10	3	4	No
PM2.5	1	3	No

lbs/day: pounds per day; LST: localized significance threshold; NOx: nitrogen oxides; CO: carbon monoxide; PM10: respirable particulate matter less than 10 micrometers in diameter; PM2.5: fine particulate matter less than 2.5 micrometers in diameter.

[a] CalEEMod model data sheets are included in Appendix A.
[b] LST thresholds from SCAQMD 2009.

The peak on-site NOx and CO emissions would occur during the approximately three weeks of demolition; peak PM10 and PM2.5 emissions would occur during the estimated four weeks of grading activities. As shown, the proposed project's estimated construction emissions would not exceed the SCAQMD LST thresholds, and the impact from exposure to construction emissions

10 The methodology for LST analysis uses the metric system for distance factors.

at the adjacent H&SS and Sproul Hall buildings or elsewhere on or off campus would be less than significant.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

Construction and operation of the proposed project would have a less than significant impact related to exposure of sensitive receptors to substantial pollutant concentrations.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Would the project create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.3-5 in the 2005 LRDP Amendment 2 EIR concluded that development under the 2005 LRDP would result in a less than significant impact related to objectionable odors.

Construction activities may generate some odors, such as diesel exhaust associated with operations of diesel-fueled construction vehicles/equipment, architectural coatings, and asphalt paving. These odors are typical of urbanized environments and would be subject to construction and air quality regulations, including proper maintenance of machinery to minimize engine emissions. These emissions would occur during daytime hours and would be isolated to the immediate vicinity of construction activities. The odors would be of a relatively small magnitude and short duration and would quickly disperse into the atmosphere. These odors are not pervasive enough to cause objectionable odors affecting a substantial number of people. There would be a less than significant impact.

As identified in the 2005 LRDP Amendment 2 EIR, the campus does not contain any facilities that are considered by the SCAQMD to be odor-emitting, and no such facilities would be added. The Kitchen Addition would include exhaust fans. Therefore, long-term operation of the proposed project would not expose substantial numbers of persons to objectionable odors.

In summary, impacts from construction or operation of the proposed project related to odors would be less than significant consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would create a less than significant impact associated with objectionable odors affecting a substantial number of people.

4. Biological Resources

The analysis of biological resources is tiered from the 2005 LRDP EIR and was addressed in Section 4.4, Biological Resources, of that document. As described previously in Section II, Project Description, of this IS/MND, relevant elements of the proposed project related to biological resources include tree removal, replacement, and retention and removal of the limited amount of ornamental vegetation located within the project site. Unless otherwise noted, the analysis of the impacts to biological resources is applicable to the proposed project and the Barn Theater Replacement Option.

The following applicable PS and MMs were adopted as part of the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR and are incorporated as part of the proposed project and assumed in the analysis presented in this section.

PS Conservation 2 — Site buildings and plan site development to minimize site disturbance, reduce erosion and sedimentation, reduce stormwater runoff, and maintain existing landscapes, including healthy mature trees whenever possible.

MM 4.4-4(a) — Prior to the onset of construction activities that would result in the removal of mature trees that would occur between March and mid-August, surveys for nesting special status avian species and raptors shall be conducted on the affected portion of the campus following USFWS and/or CDFG guidelines. If no active avian nests are identified on or within 250 feet of the construction site, no further mitigation is necessary.

MM 4.4-4(b) — If active nests for avian species of concern or raptor nests are found within the construction footprint or a 250-foot buffer zone, exterior construction activities shall be delayed within the construction footprint and buffer zone until the young have fledged or appropriate mitigation measures responding to the specific situation have been developed and implemented in consultation with USFWS and CDFG.

Additionally, PPs 4.1-2(a) and 4.1-2(b) (included under the Aesthetics analysis, which is Section V.1 of this IS/MND) are included in the proposed project. PP 4.1-2(a) requires development of landscape plans that are consistent with the Campus Design Guidelines (including tree retention). PP 4.1-2(b) requires that the campus continue to relocate, where feasible, mature “specimen” trees that would be removed as a result of construction activities on the campus.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☐	☒

Discussion

The analysis of Impact 4.4-1 in the 2005 LRDP EIR concluded that, with implementation of PS Open Space 1 through 4, PS Conservation 1 through 3, PP 4.4-1(a), PP 4.4-1(b), MM 4.4-1(a), and MM 4.4-1(b), development under the 2005 LRDP would result in less than significant impacts on candidate, sensitive, and special status plant and wildlife species.

Based on the land use and open space designations defined in the 2005 LRDP, on-campus plant and wildlife resources can be generally described by four biological resource "associations" as follows:

- **Natural** areas are undeveloped open space and are composed of native and naturally occurring plant species. This association refers to the southeast hills on the East Campus, where the primary plant community is coastal sage scrub.
- **Naturalistic** areas are mostly undeveloped but have been subject to modification and/or the introduction of ornamental trees and shrubs. This association is limited to drainage channels or arroyos, Picnic Hill, and the Botanic Garden.
- **Landscaped** areas are open spaces that have been developed with turf-covered lawn areas, mature trees, and shrubs or groundcover in planting beds, typically around the edges of these spaces. This association dominates the academic core and the residential areas of the East Campus.
- **Agricultural** areas are undeveloped land that is used for agricultural teaching and research and is dominated by row crops and orchards. This association is found on most of the West Campus.

As identified in the 2005 LRDP EIR, a literature search determined that special status plant and animal species have the potential to occur within Natural and Naturalistic areas of the campus; several sensitive wildlife species and one sensitive plant species were observed within the UCR Botanic Gardens (refer to Tables 4.4-1 and 4.4-2 of the 2005 LRDP EIR). Therefore, development within Natural and Naturalistic areas could result in substantial direct and indirect (e.g., removal of foraging habitat) adverse impacts on candidate, sensitive, and/or special status species. The distribution of the campus' Natural and Naturalistic areas is shown on Figure 4.4-1, Existing Campus Biological Resources, of the 2005 LRDP EIR. As shown, there are no Natural or Naturalistic open space areas in the vicinity of the project site. Existing vegetation in the project area is primarily limited to various ornamental plants, shrubs, and trees. The list of trees on site is provided on the Tree Impact Map (Figure 15). Ornamental species on site include, but are not limited to, lawngrass (*Fesuca* sp.), Japanese honeysuckle (*Lonicera japonica*), sacred bamboo

(*Nandina domestica*), African Iris (*Dietes* sp.), and Japanese spurge (*Pachysandra terminalis*). Additionally, as further discussed under Threshold 4d below, there are native trees in the project area (western sycamores). These trees would be protected in place, to the extent feasible.

Wildlife species observed on the project site were limited to house finch (*Haemorhous mexicanus*), oak titmouse (*Baeolophus inornatus*), black phoebe (*Sayornis nigricans*), and western gray squirrel (*Sciurus griseus*). Additionally, there is potential for other common animal species typically found in urban areas to be present, such as small mammals, birds, small reptiles, and insects. There are no natural or sensitive biological resources present on the project site. Therefore, the proposed project would not 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 regulation by the California Department of Fish and Wildlife (CDFW) or by the U.S. Fish and Wildlife Service (USFWS). No impacts would occur, and no mitigation is required.

A discussion of impacts to migratory birds is provided under Threshold 4d below.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact to candidate, sensitive, or special status plant or wildlife species.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☐	☐	☒

Discussion

The analysis of Impact 4.4-2 in the 2005 LRDP EIR concluded that there would be less than significant impacts to the on-campus portion of the USFWS-designated critical habitat area for coastal California gnatcatcher (*Polioptila californica californica*) and on the riparian habitat within the existing arroyos on campus with implementation of PS Open Space 1 through 3, PS Conservation 1, PP 4.4-1(a), PP 4.4-1(b), PP 4.4-2(a), PP 4.4.2-(b), MM 4.4-1(a), and MM 4.4-1(b).

Based on review of Figure 4.4-1, Existing Campus Biological Resources, of the 2005 LRDP EIR, the proposed project does not involve any development within or near designated critical habitat for the coastal California gnatcatcher, and the project area is not traversed by an existing arroyo or other drainage feature. Further, there was no riparian or wetland habitat identified on the project site. Therefore, the proposed project does not have the potential to impact riparian or other sensitive natural communities that may occur in these areas. The proposed project would have no impact.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations by the CDFW or the USFWS.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☐	☒

Discussion

As identified in Section 4.4, Biological Resources, of the 2005 LRDP EIR, development under the 2005 LRDP could involve minor development, such as extension of utility lines or pedestrian or bicycle paths, within Naturalistic open space areas, which can include arroyos that may contain jurisdictional seasonal wetlands or "waters of the U.S.". The analysis of Impact 4.4-3 in the 2005 LRDP EIR concluded that, with implementation of PS Open Space 3, PS Conservation 1 and 2, PP 4.4-1(a), PP 4.4-1(b), PP 4.4-2(a), PP 4.4.2-(b), MM 4.4-3(a), MM 4.4-3(b), and MM 4.4-3(c), there would be less than significant impacts to jurisdictional wetlands.

The project site has been previously disturbed by its development with existing facilities in the Barn Group; it does not include wetlands or other areas under the jurisdiction of the CDFW or U.S. Army Corps of Engineers (USACE). There would be no impact, and no mitigation is required.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact on federally protected wetlands (including, but not limited to, marsh, vernal pool, and coastal) as defined by Section 404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project 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?	☐	☐	☐	☒	☐

Discussion

As identified in Section 4.4, Biological Resources, of the 2005 LRDP EIR, the large undeveloped areas of the southeast hills, including the Botanical Gardens and nearby arroyos, provide opportunities for wildlife connections between the Box Springs Mountains and Sycamore Canyon Park. These undeveloped areas function as potential wildlife corridors as they connect two or more habitat patches that would otherwise be fragmented or isolated from one another. Also, the 2005 LRDP EIR identified that development on campus would result in the removal of mature trees, some of which could be used by migratory birds. Nesting birds and raptors are protected by the Migratory Bird Treaty Act (MBTA); raptors are also protected by the *California Fish and Game Code.* The loss of an occupied nest as a result of construction or demolition activities would constitute a substantial adverse effect (such as "take" or "destruction" under Section 3513 of the *California Fish and Game Code*) and, in the case of raptors, would constitute the "take" or "destruction" of the nest or egg (under Section 3503.5 of the *California Fish and Game Code*).

The analysis of Impact 4.4-4 in the 2005 LRDP EIR concluded there would be less than significant impacts related to wildlife movement with implementation of PS Open Space 1, 2, 3, and 5; PS Conservation 1 and 2; PP 4.4-1(a); PP 4.4-1(b); MM 4.4-4(a); and MM 4.4-4(b).

The proposed project is located in the western portion of the East Campus and would not involve development within or near the southeast hills. Therefore, it would not interfere with wildlife movement through identified corridors. Impacts to wildlife movement would be less than significant, which is consistent with the conclusions of the 2005 LRDP EIR.

The proposed project includes PP 4.1-2(a), which ensures that project-specific landscape plans are consistent with the Campus Design Guidelines with respect to, among other items, retention of existing trees, as further discussed below. Additionally, the proposed project would involve planting new trees within the project site (refer to Figure 10, Conceptual Landscape Plan).

Figure 15, Tree Impacts, identifies the 73 mature trees (trees with a tree trunk diameter at breast height [dbh] of 12 inches or greater) that were surveyed in and around the project site. As shown, there are 17 native western sycamore trees, 43 citrus trees, and 13 ornamental trees of various species. A summary of relevant information for each tree is provided in Appendix B (e.g., type, height, dbh, canopy diameter, health, and aesthetics). Of these trees, up to 28 trees would be protected in place with the implementation of the proposed project, including 6 western sycamores located at the southeast corner of the project site, consistent with PS Conservation 2. Consistent with PP 4.1-2(b), the campus would relocate mature trees removed during construction, where feasible. Replacement of the Barn Theater to a location slightly north of its existing location would require the removal of an additional 6 citrus trees, and new trees would be planted south of the new building (refer to Figure 6, Conceptual Site Plan – Barn Theater Replacement Option). It should also be noted that the proposed temporary dining deck east of the project site would be

designed to protect the existing tree near where the deck would be installed; no trees would be removed with this temporary facility.

As analyzed in the 2005 LRDP EIR, it is anticipated that any migratory birds or raptors using mature trees as perching sites would leave the site upon the initiation of construction activities. However, implementation of the 2005 LRDP, including the proposed project, could still result in the removal of trees and other vegetation that may serve as perching or nesting sites of migratory birds or raptors. This would constitute substantial interference (take or destruction) with a raptor or migratory species of special concern. Therefore, the proposed project incorporates MM 4.4-4(a), which requires a pre-construction survey for nesting special status avian species and raptors, and MM 4.4-4(b), which requires that exterior construction activities be delayed within the construction footprint or a 250-foot buffer zone until the young have fledged or appropriate MMs responding to the specific situation have been developed and implemented in consultation with USFWS and CDFW. Because the proposed project incorporates all relevant PSs, PPs, and MMs, impacts on nesting birds and raptors would be less than significant, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

There would be a less than significant impact to nesting birds and raptors.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Would the project conflict with any applicable policies protecting biological resources?	☐	☐	☐	☐	☒

Discussion

UCR is a part of UC, a constitutionally created unit of the State of California. As a State entity, UC is not subject to municipal plans, policies, or regulations such as the County and City General Plans or local ordinances. However, because UCR values its relationship with the local communities, it voluntarily reviewed the policies in the *City of Riverside General Plan* (General Plan) for consistency. Relevant General Plan policies include preservation of sage scrub habitat, retention of natural ridgeline areas, and preservation of Rare and Endangered Species habitat. The *County of Riverside General Plan* does not apply to the UCR campus as it includes only unincorporated areas of the County. The analysis of Impact 4.4-5 in the 2005 LRDP EIR concluded there would be less than significant impacts related to consistency with *City of Riverside General Plan* goals related to preservation of biological resources with implementation of PS Conservation 1 and PS Open Space 1 through 3.

As discussed under Thresholds 4a through 4d and Threshold 4f, the proposed project incorporates PP 4.1-2(a), PP 4.1-2(b), MM 4.4-4(a), and MM 4.4-4(b) and would have no impacts to sensitive biological resources. Additionally, the proposed project would have less than significant impacts related to removal of mature trees and associated potential for disturbance of protected birds and raptors with implementation of the above-listed measures. Accordingly, the

proposed project would also be consistent with the *City of Riverside General Plan* policies related to biological resources. No impacts would occur.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to conflict with LRDP policies protecting biological resources.

	Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
f)	Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other applicable habitat conservation plan?	☐	☐	☐	☐	☒

Discussion

A Multiple Species Habitat Conservation Plan (MSHCP) was approved and adopted by Riverside County in 2003 as a comprehensive, multijurisdictional Habitat Conservation Plan (HCP) focusing on conservation of both species and associated habitats to address biological and ecological diversity conservation needs in Western Riverside County. In addition to being an HCP pursuant to Section 10(a)(1)(B) of the Federal Endangered Species Act of 1973, this MSHCP also serves as a Natural Communities Conservation Plan under the Natural Communities Conservation Planning (NCCP) Act of 1991. Although sections of Cells 634 and 719 of the MSHCP include portions of the campus, the plan does not identify any portion of UCR for conservation. Therefore, the 2005 LRDP EIR concluded that development under the 2005 LRDP, of which the proposed project is a part, would not conflict with the MSHCP, and there would be no impact. Therefore, the proposed project would have no impact related to conflict with the MSHCP, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to conflict with the Western Riverside County MSHCP.

5. Cultural Resources

The analysis of cultural resources is tiered from the 2005 LRDP EIR and was addressed in Section 4.5, Cultural Resources, of that document. As described previously in Section II, Project Description, of this IS/MND, relevant elements of the proposed project related to cultural resources include earth-moving activities to accommodate the new building pads and for installation of utility infrastructure that could encounter native soils. There are no identified historic

resources within the project area. The analysis of the impacts to cultural resources is applicable to the proposed project and the Barn Theater Replacement Option.

It should be noted that Tribal Cultural Resources are addressed in Section V.17 of this IS/MND.

The following applicable PPs are incorporated as part of the proposed project and assumed in the analysis presented in this section.

PP 4.5-4 Construction specifications shall require that if a paleontological resource is uncovered during construction activities:

(i) A qualified paleontologist shall determine the significance of the find.

(ii) The Campus shall make an effort to preserve the find intact through feasible project design measures.

(iii) If it cannot be preserved intact, then the University shall retain a qualified non-University paleontologist to design and implement a treatment plan to document and evaluate the data and/or preserve appropriate scientific samples.

(iv) The paleontologist shall prepare a report of the results of the study, following accepted professional practice.

(v) Copies of the report shall be submitted to the University and the Riverside County Museum.

PP 4.5-5 In the event of the discovery of a burial, human bone, or suspected human bone, all excavation or grading in the vicinity of the find shall halt immediately and the area of the find shall be protected and the University immediately shall notify the Riverside County Coroner of the find and comply with the provisions of P.R.C. Section 5097 with respect to Native American involvement, burial treatment, and re-burial, if necessary.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	☐	☐	☐	☐	☒

Discussion

The analysis of Impact 4.5-1 in the 2005 LRDP EIR concluded that there would be less than significant impacts associated with modification of historic or potentially historic resources during construction activities with implementation of PS Conservation 4, MM 4.5-1(a), and MM 4.5-1(b);

the analysis of Impact 4.5-2 concluded there would be significant and unavoidable impacts with demolition of historic or potentially historic resources even with implementation of PS Conservation 4, PS Land Use 3, PS Open Space 5, PP 4.5-2, MM 4.5-1(a), and MM 4.5-1(b).

A detailed discussion of the regulatory setting and existing cultural resources is provided in Section 4.4, Cultural Resources, of the 2005 LRDP EIR. As identified, relevant regulatory programs include the National Historic Preservation Act of 1966, California Senate Bill 297, and the California Register of Historic Resources (CRHR). The 2005 LRDP EIR identified a total of 8 campus structures located on both the East Campus and West Campus that are eligible or potentially eligible for listing in the National Register of Historic Places (NRHP) and/or the CRHR; it also identified structures exceeding 45 years of age that were evaluated and determined not to be eligible for listing as a historic resource. In addition, the 2005 LRDP EIR included a compilation of structures that will be of age for evaluation as potentially historic by the end of the 2005 LRDP planning horizon (in 2015–2016). The planning horizon was extended to 2020–2021 as part of the 2005 LRDP Amendment 2 and, as such, would result in additional campus buildings that are potentially historic.

The project site, construction staging area, and other areas that may be disturbed during construction are currently developed, or have been subjected to previous ground disturbing activities associated with adjacent development (refer to Figure 13).

In August 2016, a cultural resources records search and literature review was completed for the proposed project at the Eastern Information Center (EIC) at UCR, one of nine regional clearinghouses for archaeological and historical records in California. This included a search of historic maps and consultation of the NRHP and the California Office of Historic Preservation's Archaeological Determination of Eligibility (ADE) and Historic Property Directory (HPD). The review of records and topographical maps on file at the EIC and provided by UCR indicate there have been 10 investigations within a ½-mile radius, and of these, 3 included a portion of the project site. The records search/literature review conducted for the proposed project reveals that five cultural resources have been recorded within a ½-mile radius of the project site, one of which is the Barn Group. Other resources recorded nearby the subject property include the Gage Canal, approximately ¼ mile west at its closest approach to the subject property; an unidentified historic structure on the southeast side of the campus; the University Cottage south of the project site across West Campus Drive; and an unidentified historic site also on the southeast side of the campus. The Barn Group and University Cottage are further discussed below. The remaining resources are not in the vicinity of the project site and would not be directly or indirectly impacted by the proposed project.

Based on a review of Figure 4.5-1, Potentially Historic Structures on the UCR Campus, in the 2005 LRDP EIR, the Barn Group structures were determined to be potentially historic structures. In compliance with MM 4.5-1(a) of the 2005 LRDP EIR, the historic significance of the Barn Group buildings and the University Cottage south of the project site was evaluated by LSA in 2010 using the significance criteria set forth for historic resources under State CEQA Guidelines Section 15064.5 (LSA 2010); this report is one of the reports listed by EIC in its records search. As part of the Historic Resources Assessment (HRA), LSA conducted historical background research and carried out intensive field surveys. Specifically, LSA reviewed reports previously written for the project area and completed archival research. Sources reviewed included online sources, published literature in local and regional history, news articles, historic aerial photographs, historic maps, and oral interviews. The results of the archival research determined that the history of the Barn Group buildings and University Cottage have been thoroughly documented by reports prepared between 1993 and 2009.

The archival research showed the Barn Group originally consisted of a horse stable, an office/carpenter shop, a hay barn, and two wagon sheds. Only three of the original buildings remain on the project site: the horse stable (now the Barn), wagon shed No. 1 (now the Barn Theater), and wagon shed No. 2 (now the Barn Stable). However, the Barn Group buildings have undergone major changes, with physical alterations beginning in 1954 in order to convert the buildings into facilities for campus activities. Additionally, the altered Barn building was destroyed in a fire in 1970 and was completely rebuilt. The University Cottage has largely retained its architectural integrity despite functioning as a variety of offices since the dedication of the campus in 1954.

LSA conducted an intensive-level field survey of the project area. The survey consisted of site photographs and documentation of the structural and architectural characteristics and condition of the existing buildings and their associated features. Based on the results of the field survey, it was concluded that the Barn Group (not including the University Cottage) retains a low to moderate level of integrity due to alterations that have occurred, including relocation, additions, and at least partial reconstruction. The south elevation of the University Cottage features a small addition where, based on the original 1916 architectural plans, there were originally French doors; however, this building retains a higher degree of integrity.

For a property to be eligible for inclusion in the CRHR, one or more of the following criteria must be met:

1. It is associated with the events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States;
2. It is associated with the lives of persons important to local, California, or national history;
3. It embodies the distinctive characteristics of a type, period, region, or method or construction; represents the work of a master; or possesses high artistic values; and/or
4. It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

In addition to meeting one or more of the above criteria, the California Register requires that sufficient time has passed (estimated at 50 years) since a resource's period of significance to "obtain a scholarly perspective on the events or individuals associated with the resource." The California Register also requires that a resource possess integrity, which is defined as "the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance". To retain integrity, a resource should have its original location, design, setting, materials, workmanship, feeling, and association.

Under Criteria 1 and 2, the Barn Group buildings were originally associated with the Citrus Experiment Station, which played an important role in agricultural research and the eventual development of the UCR campus. However, alterations to the buildings and drastic changes to the setting since the time of the Citrus Experiment Station have severely compromised the historic integrity of the buildings and their ability to convey their association with important events or persons in history. Under Criterion 3, the buildings are associated with notable architects Hibbard and Cody; however, they have sustained alterations and are not distinguished examples of their work. Further, they do not possess distinctive characteristics of a type, period, region, or method or construction or possess high artistic value. Under Criterion 4, they do not appear to have the potential to yield information important to the prehistory or history of the local area, California, or the nation. For these reasons, the Barn Group and University Cottage do not qualify as "historical

resources" for the purposes of CEQA. The proposed project and Barn Theater Replacement Option would have no direct or indirect impacts on historic resources (LSA 2010).

As described in Section II, Project Description, of this IS/MND, the University Cottage is not within the project site and would be retained with implementation of the proposed project. The proposed project has been designed to enhance the awareness of the campus' agrarian heritage, and the overall character has been developed to revive and repurpose the Barn Dining and Barn Theater, with these buildings as the central elements.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to the potential to cause a substantial adverse change to a significant historical resource as defined in Section 15064.5 of the State CEQA Guidelines.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☐	☒	☐	☐

Discussion

The analysis of Impact 4.5-3 in the 2005 LRDP EIR concluded there would be less than significant impacts related to archaeological resources during construction activities with implementation of PS Land Use 2 and 3, PS Open Space 1 through 3 and 5, PS Conservation 1 through 3, and PP 4.5-3.

As discussed in the 2005 LRDP EIR, three archaeological sites have been recorded within the UCR campus: Site CA-RIV-495, a prehistoric site located on a slope in the southeast hills; the 2002 discovery of a previously undocumented prehistoric site located in the southeast hills in the vicinity of Site CA-RIV-495; and Site CA-RIV-4768H, which represents the historic Gage Canal that traverses the West Campus. Also, the cultural resources investigation in support of the 2005 LRDP EIR concluded that the following areas of the UCR campus exhibit moderate sensitivity for unknown archaeological resources: (1) the rolling hills in the southeastern portion of the campus and (2) the agricultural fields on the West Campus.

Regarding the East Campus, the majority of the area has been developed with academic and support uses, and large areas of grading and fill placement underlie these developed areas. Substantial ground disturbance has, therefore, occurred in these areas, and surface evidence of archaeological resources is not likely to be encountered. Further, no archaeological materials have been uncovered during excavation or grading associated with development of the campus core on the East Campus, and this area is not considered sensitive for archaeological resources.

Further, as noted above, a cultural resources records search and literature review was completed at the EIC at UCR. The records search/literature review conducted for the proposed project reveals that no archaeological resources have been recorded on the project site.

The proposed project is an infill development on a currently developed site. Also, the project area is not located within the southeast hills or within the West Campus agricultural fields, where on-campus archeological resources are most likely to be encountered. Based on review of the preliminary geotechnical investigation for the proposed project (Geocon 2017), the project site is underlain by artificial fill materials up to two feet deep, which is underlain by old alluvial fan deposits. Review of the geotechnical boring logs for the project site indicates the presence of very shallow fill materials. Although the estimated depth of excavation would be relatively shallow (up to five feet), construction of the proposed project may disturb native sediments during earth moving necessary to prepare the building pads and for installation of utility infrastructure.

As discussed in the 2005 LRDP EIR, the academic core on the East Campus and areas immediately adjacent to the academic core (except for the southeast hills) present a low potential for encountering unknown, intact archaeological resources. Therefore, although there is a potential to encounter unknown archaeological resources during earth-moving activities that could disturb native sediments, the proposed project's impact to archaeological resources is less than significant, consistent with the findings of the 2005 LRDP EIR. However, UCR's standard contractor specifications address protection and recovery of buried artifacts, including archaeological resources, and the standard requirements are incorporated into the project as MM Barn Cult-1, presented below. This MM identifies steps to be taken if archaeological resources, including Native American cultural resources, are discovered during construction.

Additional Project-Level Mitigation Measure

MM Barn-Cult 1 If a paleontological or archaeological resource is discovered during construction, all soil-disturbing work within 100 feet of the find shall cease and the University Representative shall contact a qualified Archaeologist meeting the Secretary of the Interior standards within 24 hours of discovery to inspect the site. If a resource within the project area of potential effect is determined to qualify as a unique archaeological resource (as defined by the California Environmental Quality Act [CEQA]), the University shall devote adequate time and funding to determine if it is feasible, through project design measures, to preserve the find intact. If it cannot be preserved, the University shall retain a qualified non-University Paleontologist/Archaeologist to 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.

a. If significant Native American cultural resources are discovered, as determined by the consulting Archaeologist for which a Treatment Plan must be prepared, the contractor or his Archaeologist shall immediately contact the University Representative. The University Representative shall contact the appropriate tribal representatives.

b. If requested by tribal representatives, the University, the contractor, or his project Archaeologist shall, in good faith, consult on the discovery and its disposition (e.g., avoidance, preservation, return of artifacts to tribe).

c. In the event of the discovery of a burial, human bone, or suspected human bone, all excavation or grading in the vicinity of the find shall halt immediately and the area of the find shall be protected. The University shall immediately notify the Riverside County Coroner of the find and comply with the provisions of *California Health and Safety Code* Section 7050.5.

Level of Significance

The proposed project would have a less than significant impact related to a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the State CEQA Guidelines.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.5-4 in the 2005 LRDP EIR concluded that there would be less than significant impacts related to paleontological resources during construction activities with implementation of PS Land Use 3; PS Open Space 1, 2, and 5; and PP 4.5-4. As discussed in the 2005 LRDP EIR, the rock and sediment types that underlie the campus are unlikely to be fossil-bearing. However, while the likelihood of encountering paleontological resources is low, the potential for discovery of previously unknown paleontological resources cannot be eliminated.

As discussed under Threshold 4b, construction of the proposed project may disturb native sediments during earth moving necessary to prepare the building pads and for installation of utility infrastructure. Excavation could occur to depths of up to five feet. Therefore, there is a potential to encounter unknown paleontological resources. The proposed project incorporates PP 4.5-4, which requires the preparation of a site-specific analysis and provisional measures in the event that paleontological resources are uncovered during construction activities. Accordingly, the proposed project would result in a less than significant impact to paleontological resources, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to the potential to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.5-5 in the 2005 LRDP EIR concluded that there would be less than significant impacts related to the disturbance of human remains—including those interred outside of formal cemeteries—during construction activities with implementation of PS Land Use 3; PS Open Space 1, 2, and 5; PS Conservation 1 and 2; and PP 4.5-5. As discussed in the 2005 LRDP EIR, no formal cemeteries are known to have occupied the UCR campus, so any human remains encountered would likely come from archaeological or historical archaeological contexts. As such, given the presence of archaeological resources on the campus, ground-disturbing activities associated with development could affect unknown human remains, particularly in those areas of the campus that are in a relatively undisturbed condition.

As discussed under Threshold 4b, construction of the proposed project may disturb native sediments during earth moving necessary to prepare the building pads and for installation of utility infrastructure. Therefore, there is a potential to encounter unknown human remains. The proposed project minimizes the area of campus subject to disturbance by implementing infill development on a previously disturbed site. Also, human burials, in addition to being potential archaeological resources, have specific provisions for treatment in Section 5097 of the *Public Resources Code* (PRC). In accordance with these requirements, the proposed project incorporates PP 4.5-5, which requires implementation of these provisions if human remains are discovered on campus. Accordingly, the proposed project would result in a less than significant impact related to the disturbance of human remains, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant potential to disturb any human remains, including those interred outside of formal cemeteries.

6. Geology and Soils

The analysis of geology and soils is tiered from the 2005 LRDP EIR and was addressed in Section 4.6, Geology and Soils, of that document. As described previously in Section II, Project Description, of this IS/MND, relevant elements of the proposed project related to geology and soils include earth-moving activities to accommodate the required removal and preparation of the underlying soils for building pads and associated building construction.

Information in this section is primarily based on *Geotechnical Investigation and Percolation Testing, UCR Barn Expansion Project, University of California, Riverside, Riverside, California* (geotechnical investigation) prepared for the proposed project by Geocon West, Inc. (Geocon)

and is provided in Appendix C (Geocon 2017). The results of this study are applicable to the proposed project and the Barn Theater Replacement Option.

The following applicable PPs are incorporated as part of the proposed project and are assumed in the analysis presented in this section.

PP 4.6-1(a) During project-specific building design, a site-specific geotechnical study shall be conducted under the direct supervision of a California Registered Engineering Geologist or licensed geotechnical engineer to assess seismic, geological, soil, and groundwater conditions at each construction site and develop recommendations to prevent or abate any identified hazards. The study shall follow applicable recommendations of CDMG Special Publication 117 and shall include, but not necessarily be limited to

- Determination of the locations of any suspected fault traces and anticipated ground acceleration at the building site
- Potential for displacement caused by seismically induced shaking, fault/ground surface rupture, liquefaction, differential soil settlement, expansive and compressible soils, landsliding, or other earth movements or soil constraints
- Evaluation of depth to groundwater

The structural engineer shall incorporate the recommendations made by the geotechnical report when designing building foundations.

PP 4.6-1(b) The campus shall continue to implement its current seismic upgrade program.

PP 4.6-1(c) The Campus will continue to fully comply with the University of California's Policy for Seismic Safety, as amended. The intent of this policy is to ensure that the design and construction of new buildings and other facilities shall, as a minimum, comply with seismic provisions of California Code of Regulations, Title 24, California Administrative Code, the California State Building Code, or local seismic requirements, whichever requirements are most stringent.

PP 4.6-2(a) The Campus shall continue to implement dust control measures consistent with SCAQMD Rule 403—Fugitive Dust during the construction phases of new project development. The following actions are currently recommended to implement Rule 403 and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the source of the dust generation. The Campus shall implement

these measures as necessary to reduce fugitive dust. Individual measures shall be specified in construction documents and require implementation by construction contractor:

(i) Apply water and/or approved nontoxic chemical soil stabilizers according to manufacturer's specification to all inactive construction areas (previously graded areas that have been inactive for 10 or more days)

(ii) Replace ground cover in disturbed areas as quickly as possible

(iii) Enclose, cover, water twice daily, or apply approved chemical soil binders to exposed piles with 5 percent or greater silt content

(iv) Water active grading sites at least twice daily

(v) Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour over a 30-minute period

(vi) All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least two feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer), in accordance with Section 23114 of the California Vehicle Code

(vii) Sweep streets at the end of the day if visible soil material is carried over to adjacent roads

(viii) Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip

(ix) Apply water three times daily or chemical soil stabilizers according to manufacturers' specifications to all unpaved parking or staging areas or unpaved road surfaces

(x) Post and enforce traffic speed limits of 15 miles per hour or less on all unpaved roads

(This is identical to Air Quality PP 4.3-2(b) and Hydrology PP 4.8-3[c].)

PP 4.6-2(b)

In compliance with National Pollution Discharge Elimination System (NPDES), the campus would continue to implement Best Management Practices, as identified in the *UCR Stormwater Management Plan* (UCR 2003):

(i) Public education and outreach on stormwater impacts

(ii) Public involvement/participation

(iii) Illicit discharge detection and elimination

(iv) Pollution prevention/good housekeeping for facilities

(v) Construction site stormwater runoff control

(vi) Post-construction stormwater management in new development and redevelopment

(This is identical to Biological Resources PP 4.4-2[b] and Hydrology PP 4.8-3[d].)

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:					
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☐	☒
iv) Landslides?	☐	☐	☐	☐	☒

Discussion

The analysis of Impact 4.6-1 in the 2005 LRDP EIR determined that, with implementation of PS Open Space 1 and 2, PS Conservation 2, and PPs 4.6-1(a) through 4.6-1(c), there would be less than significant impacts related to fault rupture, strong seismic ground shaking, or seismic-related hazards.

In accordance with PP 4.6-1(a), and as identified previously, a site-specific study has been prepared for the proposed project, and the associated geotechnical recommendations would be incorporated into the building design. The geotechnical investigation included excavation of 3 geotechnical borings to depths up to 26.5 feet bgs; excavation of 6 hand pits to depths of 2.0 feet bgs for percolation testing; laboratory testing; and engineering analyses.

The geotechnical investigation identifies that the project site is underlain by undocumented artificial fill materials up to two feet bgs. The fill materials were likely generated as part of grading for the existing buildings and parking lots on site and consist of brown to dark brown fine to coarse silty sand that is medium-dense to very dense and slightly moist to moist. In the parking and drive areas, the fill is capped with asphalt concrete. No aggregate base was encountered beneath the asphalt concrete. The fill materials are underlain by native sediments mapped as early Pleistocene-age old alluvial fan deposits. The alluvium at the site consists of grayish brown to reddish brown, loose to very dense, slightly moist to moist silty sands, and poorly graded sands.

Groundwater was not encountered within the maximum drilling depth of 26.5 feet bgs. In addition, based on data by the California Department of Water Resources, the regional groundwater level is anticipated at depths of 100 feet bgs or more (Geocon 2017).

As identified in the 2005 LRDP EIR, the UCR campus is not located within an Alquist-Priolo Earthquake Fault Zone as established by the California Department of Conservation, California Geologic Survey, and no known active or potentially active faults traverse the campus. Because ground rupture occurrences are generally limited to the location of faults, the proposed project would not be subject to a substantial risk of fault (ground surface) ruptures, and there would be no impact. This is consistent with the findings of the geotechnical investigation for the proposed project, which identifies that the project site is not located within a State of California Earthquake Fault Zone or a Riverside County Fault Hazard Zone (Geocon 2017).

The geotechnical investigation provides a list of nearby active faults and the maximum magnitude; slip character for the fault; slip rate for the fault; distance in miles between the nearest point on the fault and the project site; direction of the fault from the project site for each fault; and a list of historic earthquake events in the project area and the date, magnitude, distance, and direction to the epicenter for each earthquake. As identified, the active San Jacinto fault zone (San Bernardino Segment) is located approximately 5.7 miles northeast of the site. The San Andreas Fault, Cucamonga fault, Elsinore Fault Zone, and Whittier Fault are between 14 and 22 miles from the project site. These faults do not present a potential surface fault rupture hazard. As there are no mapped faults that traverse the project site, ground rupture due to faulting is not a design consideration for the proposed project.

Therefore, as concluded for the UCR campus in the 2005 LRDP EIR, the project area is located within a seismically active area and moderate to strong seismic shaking caused by an earthquake on any of the active or potentially active local and regional faults (refer to Figure 4.6-2, Regional Fault Map, of the 2005 LRDP EIR) can be expected during the lifetime of the proposed project. According to the 2016 CBC, the project area is classified as Site Class D, corresponding to a “Stiff Soil” profile. This classification is used as the basis for seismic design parameters to be implemented for the proposed project in accordance with 2016 CBC standards.

The geotechnical investigation concludes there are no geologic and seismic conditions on the project site that would preclude development of the proposed project, provided appropriate engineering design and construction practices are implemented (Geocon 2017). The proposed project incorporates PP 4.6-1(b) to comply with UCR’s ongoing program to seismically strengthen existing buildings. The proposed project also incorporates PP 4.6-1(c) and ensures that buildings and other facilities are designed and constructed in compliance with the University Policy on Seismic Safety, which requires compliance with the seismic provisions of the current CBC and other State codes as described in PP 4.6-1(c) or local seismic requirements, whichever is more stringent. Therefore, implementation of the proposed project would not expose people and/or structures to potentially substantial adverse effects resulting from strong seismic ground shaking, and this impact would be less than significant.

Other seismic-related hazards investigated in the geotechnical investigation include liquefaction, seismically induced settlement, and landslide potential. The project site is mapped by Riverside County as having low liquefaction potential. Based on the lack of shallow groundwater and the medium dense to very dense consistency of the old alluvium underlying the project site, the geotechnical investigation concludes that liquefaction and seismic settlement would not be a design consideration for the proposed project. The majority of the site is relatively level with no hillsides on or adjacent to the site; therefore, landslides are not a design consideration for the proposed project (Geocon 2017). Therefore, there would be no impacts related to seismic-related ground failure or landslides, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impacts related to surface fault rupture or seismic-related ground failure, including liquefaction, settlement, or landslides. There would be less than significant impacts related to strong seismic ground shaking.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.6-2 in the 2005 LRDP EIR concluded that there would be less than significant impacts related to soil erosion and loss of topsoil with implementation of PS Land Use 2 and 3, PS Open Space 1 through 5, PS Conservation 1 through 3, PP 4.6-2(a), and PP 4.6-2(b).

Soil erosion from water or wind can occur to exposed soils during site clearance, excavation/grading activities, and other earth-disturbing activities associated with construction, including vegetation and hardscape removal. Erosion hazards in most of the East Campus, including the project area, range from slight to moderate. Construction activities associated with the proposed project would comply with all provisions of the 2016 CBC related to excavation activities, grading activities, erosion control, and construction of foundations and retaining walls to minimize or eliminate soil erosion or loss of topsoil.

The proposed project would also minimize or eliminate soil erosion during construction activities through implementation of dust-control measures consistent with SCAQMD Rule 403 (PP 4.6-2[a]) and implement BMPs, in compliance with the National Pollution Discharge Elimination System (NPDES) permit (PP 4.6-2[b]) (refer to the discussion provided for Thresholds 9a and 9f in Section V.9, Hydrology and Water Quality, of this IS/MND). When these dust-control measures and construction BMPs are applied, they significantly reduce the erosion potential of project construction to negligible amounts. Therefore, the proposed project would result in less than significant impacts related to soil erosion or loss of topsoil, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to soil erosion and the loss of topsoil.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	☒	☐
d) Would the project 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?	☐	☐	☐	☒	☐

Discussion

The analysis of Impacts 4.6-3 and 4.6-4 in the 2005 LRDP EIR determined that, with implementation of PS Open Space 1 and 2, PS Conservation 2, and PP 4.6-1(a), there would be less than significant impacts related to unstable geologic materials, including expansive soils.

According to the project-specific geotechnical investigation and as previously discussed, based on the lack of shallow groundwater and the medium dense to very dense consistency of the old alluvium underlying the project site, the geotechnical investigation concludes that liquefaction and seismic settlement would not be a design consideration for the proposed project. Laboratory testing for expansive soils determined that soils on the project site have a very low expansion potential. The geotechnical investigation concludes that based on consolidation testing, the upper alluvial soils (upper six feet) have a moderate potential for hydrocollapse. However, deeper alluvial soils were determined to have only a slight potential for hydrocollapse. Remedial grading would address the collapse potential of the near-surface soils; however, precautionary measures would be needed to mitigate the potential for hydrocollapse of deeper soils. Proper site drainage should be maintained at all times. Landscape planters that saturate the subsurface or storm water infiltration should not be used within 20 feet of the proposed structure or other on-grade improvements (Geocon 2017).

Laboratory testing for corrosivity showed that the site would not be classified as corrosive to metal improvements and on-site soils indicated negligible sulfate exposure to concrete structures. As discussed under Threshold 6a, the project site is not subject to landslides (Geocon 2017).

It should also be noted that the geotechnical investigation concludes the previously placed fill and upper portion of the alluvium is considered unsuitable for the support of the proposed structures. Deeper areas of fill may exist on the site, particularly in building or previously landscaped areas. Remedial grading of the surficial soil would be required, as further described in the geotechnical investigation (Geocon 2017).

The preliminary geotechnical investigation concludes there are no geologic and seismic conditions on the project site that would preclude development of the proposed project, provided appropriate engineering design and construction practices are implemented (Geocon 2017). As required by PP 4.6-1(a), the geotechnical recommendations outlined in the geotechnical investigation for the proposed project (i.e., general recommendations and recommendations related to soil characteristics, grading/earthwork grading factors, utility trench backfill, foundations, exterior concrete flatwork, lateral loading, pavement, temporary excavations, site drainage and moisture, and plan review) would be incorporated into the building design.

Therefore, with the proposed project's incorporation of PP 4.6-1(a), there would be less than significant impacts related to unstable and expansive soils, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have less than significant impacts associated with unstable and expansive soils.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☐	☒

Discussion

Through the IS process for the 2005 LRDP EIR, implementation of the 2005 LRDP was determined to have no impact related to soils constraints for alternative wastewater disposal systems and was not carried forward for further discussion in the Draft EIR. There would be no impact related to the use of septic tanks or alternative waste water disposal systems resulting from implementation of the proposed project because existing wastewater infrastructure would be used. This is consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

7. Greenhouse Gas Emissions

The analysis of GHG emissions is tiered from the 2005 LRDP Amendment 2 EIR and was addressed in Section 4.16, Greenhouse Gas Emissions, of that document. As described previously in Section II, Project Description, of this IS/MND, relevant elements of the proposed project related to GHG emissions include (1) demolition of the Barn Stable and Barn Theater and removal of construction spoils from the project site; (2) construction equipment and workers' vehicles during the construction phase of the project; and (3) the increase in energy use for the expanded Barn Complex. The proposed project would increase Barn Dining hours Monday through Friday; dining capacity; and the number of events held at the Barn Complex from between 80 and 130 annual events to approximately 540 events/meetings and approximately 60

band/entertainment events. It is estimated that the proposed project could increase the UCR campus employee population by approximately nine persons. New buildings and renovated buildings associated with implementation of the proposed project and Barn Theater Replacement Option would be designed to achieve, at a minimum, LEED Silver rating. The operations of the proposed project and the Barn Theater Replacement Option would be the same.

Section 4.16 of the 2005 LRDP Amendment 2 EIR discusses the background of GHG emissions and climate change; the types of GHGs; the State, United States, and global GHG contributions; and the regulatory framework related to GHG emissions and their assessment under CEQA. This information remains current and applicable to the analysis of GHG emissions related to the proposed project in this IS/MND.

It is noted that analysis of GHG emissions and the establishment of GHG reduction goals has been historically based on comparisons with a "business as usual" (BAU) scenario. The BAU scenario, typically for year 2020, assumes the implementation of no GHG reduction measures. The measures not considered in the BAU analysis include many now adopted and/or required at the State or local level, such as the GHG emissions standards for vehicles, renewable energy requirements for electrical utilities, and the Title 24 Green Building Code. The UCR Climate Action Plan (CAP), adopted in December 2010, uses the BAU analysis (UCR 2010a).

The following applicable PSs and MM were adopted as part of the 2005 LRDP Amendment 2 EIR and are incorporated as part of the proposed project and assumed in the analysis presented in this section.

PS Campus and Community 4	Provide strong connections within the campus and its edges to promote walking, bicycling and transit use, rather than vehicular traffic.
PS Transportation 3	Provide a continuous network of bicycle lanes and paths throughout the campus, connecting to off campus bicycle routes.
PS Transportation 5	Provide bicycle parking at convenient locations.
MM 4.16-1	All projects developed under the amended 2005 LRDP shall be evaluated for consistency with the GHG reduction policies of the UCR CAP and the UC Policy on Sustainable Practices, as may be updated from time to time by the University. GHG reduction measures, including, but not limited to, those found within the UCR CAP and UC Policy identified in Tables 4.16-9 and 4.16-10 shall be incorporated in all campus projects so that at a minimum an 8 percent reduction in emissions from BAU is achieved. It is expected that the GHG reduction measures in the UCR CAP will be refined from time to time, especially in light of the evolving regulations and as more information becomes available regarding the effectiveness of specific GHG reduction measures. As part of the implementation of the UCR CAP, the Campus will also monitor its progress in reducing GHG emissions to ensure it will attain the established targets.

In addition, the following MMs are incorporated into the proposed project and would reduce GHG emissions: MM 4.3-2(b) included under the Air Quality analysis (Section V.3 of this IS/MND) which

requires UCR to continue to participate in GHG reduction programs; MM 4.14-1(b) included under the Transportation and Traffic analysis (Section V.16 of this IS/MND), which requires UCR to enhance its Transportation Demand Management (TDM); and MM 4.14-1(d) included under the Transportation and Traffic analysis (Section V.16 of this IS/MND), which requires UCR to review individual projects for consistency with UC sustainable transportation policy and UCR TDM strategies.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.16-1 in the 2005 LRDP Amendment 2 EIR concluded that, although development under the 2005 LRDP Amendment 2 would generate substantial direct and indirect GHG emissions, impacts would be less than significant with implementation of MM 4.16-1. UCR has committed to reduce GHG emissions by over 70 percent by 2020 from BAU projections.

Existing Campus Emissions

Total UCR campus operational GHG emissions for 2008 were estimated at 166,966 metric tons of CO_2 equivalent ($MTCO_2e$) per year, as provided in UCR's CAP (UCR 2010a). Campus GHG emissions in 2008 were approximately double the 1990 emissions (82,167 $MTCO_2e$), commensurate with the steady growth experienced in both campus population and building space. During the 1990 to 2000 period, the total campus population increased approximately 46 percent and building space increased approximately 40 percent. From 2000 to 2008, the population increased approximately 35 percent and space increased approximately 43 percent. However, despite an increase in the rate of growth in building space between 2000 and 2008, the rate of growth in GHG emissions decreased in this time period due to the implementation of a number of energy-efficient projects on the campus (UCR 2010a). The decrease in GHG emissions is further demonstrated by campus-wide emission of approximately 86,224 $MTCO_2e$ in 2015 (UCR 2016), as compared to 82,167 $MTCO_2e$ in 1990.

The existing Barn Group buildings located at the project site include the Barn Dining, Barn Theater, and Barn Stable. Direct GHG emissions sources include natural gas used for cooking; emissions from landscape maintenance equipment; and mobile source emissions from delivery trucks, service vehicles, and vehicles used by general dining users and event attendees. Indirect GHG emissions include purchased electricity; the electricity used to obtain and treat water and wastewater; and the emissions associated with the disposal of solid waste. It is noted that walking is the main form of transportation for staff, faculty, and students using the dining facilities and attending events in the Barn Complex. It is estimated that 80 percent of the event guests are affiliated with UCR (faculty, staff, and students), with the remaining 20 percent being composed of off-campus individuals.

GHG emissions were calculated for the existing operations and are shown in Table 8.

TABLE 8
ESTIMATED ANNUAL GREENHOUSE GAS EMISSIONS – EXISTING

Source	Emissions $MTCO_2e/yr$
Area	<0.5
Energy	111
Waste	34
Water	1
Total Operational Emissions – Existing	**146**

$MTCO_2e/yr$: metric tons of carbon dioxide equivalent per year
Totals may not add due to rounding.
Note: Detailed calculations can be found in Appendix A.

Proposed Project Emissions

GHG emissions from the proposed project were calculated using CalEEMod Version 2016.3.1. Construction GHG emissions are generated by vehicle engine exhaust from construction equipment, on-road hauling trucks, vendor trips, and worker commuting trips. Construction assumptions are described in Section V.3, Air Quality, and in Appendix A of this IS/MND. The results are output in $MTCO_2e$ for each year of construction. The estimated construction GHG emissions for the proposed Barn Theater Replacement Option, which would have greater construction emissions than the proposed project, are shown in Table 9.

TABLE 9
ESTIMATED CONSTRUCTION GREENHOUSE GAS EMISSIONS
BARN THEATER REPLACEMENT OPTION

Year	Emissions ($MTCO_2e$)
2017	27
2018	250
2019	27
Total*	**304**
Annual emissions for 30-year amortization	***10***

$MTCO_2e$: metric tons carbon dioxide equivalent.
* Totals may not add due to rounding.
Note: CalEEMod model data sheets are included in Appendix A.

Operational GHG emissions attributed to the proposed project include area sources (the use of landscape maintenance equipment and periodic painting); energy sources (purchased electricity and natural gas use for cooking); the electricity embodied in water consumption; the energy associated with solid waste disposal; and vehicle travel by the persons using the dining facilities and attending Barn Complex events and the supporting staff. Because the proposed project would not add to the campus student population and would add only approximately nine employees and most guests are already on campus and walk to the Barn Complex, it is assumed that mobile source emissions would not increase. Additionally, while there would be an overall increase in events at the Barn Complex, this increase would be spread over the entire year, and the increase

in daily off-campus guests would be nominal. Therefore, mobile source emissions are not expected to measurably increase and are not calculated.

Electricity use is based on CalEEMod default factors adjusted to provide energy use per square foot values consistent with the data in the UCR CAP. The carbon dioxide (CO_2) intensity factor was provided by Riverside Public Utilities (RPU) (Markis 2017). UC Policy and the UCR CAP require new construction projects to surpass California Energy Code Title 24 by 20 percent or better. Because some of the proposed project is renovation, to be conservative, it was assumed that the overall project would exceed the Code requirements by 10 percent.

UCR has committed to achieving, at a minimum, LEED Silver rating. The proposed project also incorporates PS Campus and Community 4, PS Transportation 3 and 5, MM 4.3-2b, MM 4.14-1b, MM 4.14-1d, and MM 4.16-1, which relate primarily to UCR implementation of GHG reduction policies and measures and travel demand management, and promoting alternative transportation.

Estimated operational and total GHG emissions for the proposed project are shown in Table 10. For estimating annual GHG emissions, the SCAQMD has recommended amortizing construction emissions over the life of a project, and a common value for project life is 30 years (SCAQMD 2008b). As shown in Table 8, the 30-year amortized construction emissions would be 7 $MTCO_2e$ per year ($MTCO_2e$/yr).

TABLE 10
ESTIMATED GROSS ANNUAL GREENHOUSE GAS EMISSIONS – PROPOSED PROJECT

Source	Emissions $MTCO_2e$/yr
Area	<0.5
Energy	295
Waste	48
Water	1
Total Operational Emissions – Proposed Project	**344**
Plus: Amortized construction emissions (Table 6)	10
Total Gross Emissions – Proposed Project	**354**

$MTCO_2e$/yr: metric tons of carbon dioxide equivalent per year.
Totals may not add due to rounding.
Note: Detailed calculations can be found in Appendix A.

The net increase in GHG emissions that would occur with the proposed project is estimated at 208 $MTCO_2e$/yr, as shown in Table 11.

TABLE 11
ESTIMATED NET ANNUAL GREENHOUSE GAS EMISSIONS – EXISTING

	Emissions $MTCO_2e$/yr
Gross GHG Emissions (Table 10)	354
Less: Existing GHG Emissions (Table 8)	146
Total Operational Emissions – Existing	**208**

$MTCO_2e$/yr: metric tons of carbon dioxide equivalent per year; GHG: greenhouse gas.

As discussed in Section 4.16 of the 2005 LRDP Amendment 2 EIR, some air quality management and air pollution control districts in California, including CARB and the SCAQMD, have either proposed or adopted guidance documents for evaluating the significance of GHG emissions. Beginning in April 2008, the SCAQMD convened a Working Group to provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents. In September 2010, the SCAQMD Working Group presented a revised tiered approach to determining GHG significance for residential and commercial projects (SCAQMD 2010). These proposals have not yet been considered by the SCAQMD Board. At Tier 1, GHG emissions impacts would be less than significant if the project qualifies under a categorical or statutory CEQA exemption. At Tier 2, for projects that do not meet the Tier 1 criteria, the GHG emissions impact would be less than significant if the project is consistent with a previously adopted GHG reduction plan that meets specific requirements.[11] At Tier 3, the Working Group proposes extending the 10,000 $MTCO_2e$/yr screening threshold currently applicable to industrial projects where the SCAQMD is the lead agency, described above, to other lead agency industrial projects. For residential and commercial projects, the Working Group proposes the following Tier 3 screening values: either (1) a single 3,000 $MTCO_2e$/yr threshold for all land use types or (2) separate thresholds of 3,500 $MTCO_2e$/yr for residential projects, 1,400 $MTCO_2e$/yr for commercial projects, and 3,000 $MTCO_2e$/yr for mixed-use projects. A project with emissions less than the applicable screening value would be considered to have less than significant GHG emissions.

As shown in Table 11, the estimated net annual operational GHG emissions for the proposed project with GHG reduction features, including amortized construction emissions, is 208 $MTCO_2e$/yr. This value may be compared with the proposed SCAQMD Tier 3 screening threshold of 3,000 $MTCO_2e$/yr for all land use types. Therefore, the proposed project would generate a less than significant emission rate of GHG emissions based on the SCAQMD threshold. It is therefore concluded that the direct and indirect GHG emissions of the proposed project would not be cumulatively considerable and would result in a less than significant impact.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to GHG emissions.

11 The plan must (a) quantify greenhouse gas emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area; (b) establish a level, based on substantial evidence, below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable; (c) identify and analyze the greenhouse gas emissions resulting from specific actions or categories of actions anticipated within the geographic area; (d) specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level; (e) establish a mechanism to monitor the plan's progress toward achieving the level and to require an amendment if the plan is not achieving specified levels; and (f) be adopted in a public process following environmental review (State CEQA Guidelines, §15183.5).

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☐	☒

Discussion

The analysis of Impact 4.16-2 in the 2005 LRDP Amendment 2 EIR concluded that development under the 2005 LRDP, as amended, would result in a less than significant impact related to conflict with applicable plans, policies, or regulations concerning reductions in GHG emissions. The applicable plans, policies, or regulations pertinent to the proposed project include (1) the UC Policy on Sustainable Practices (last issued in September 2016) and (2) the UCR CAP (UCOP 2016 and UCR 2010a).

The Green Building Design section of the UC Policy on Sustainable Practices includes the following goals for new buildings that are applicable to the proposed project:

- All new building projects, other than acute care facilities, shall be designed, constructed, and commissioned to outperform the CBC energy-efficiency standards by at least 20 percent. The University will strive to design, construct, and commission buildings that outperform CBC energy efficiency standards by 30 percent or more, whenever possible within the constraints of program needs and standard budget parameters.[12]
- All new buildings will achieve a USGBC LEED "Silver" certification at a minimum. All new buildings will strive to achieve certification at a USGBC LEED "Gold" rating or higher, whenever possible within the constraints of program needs and standard budget parameters.
- All new building projects will achieve at least two points within the available credits in LEED-BD+C's Water Efficiency category.
- Major Renovations shall outperform CBC energy-efficiency standards by 20 percent.

UCR's CAP, prepared in 2010, describes and addresses policy and regulatory requirements of the UC Policy on Sustainable Practices*;* Assembly Bill (AB) 32; American College and University Presidents Climate Commitment (ACUPCC), to which UCR is a signatory; CEQA; and USEPA reporting requirements. Consistent with the UC Policy on Sustainable Practices*,* the UCR CAP establishes the goal and emission reductions methods for the campus to reduce GHG emissions to 1990 levels by 2020.

The proposed project incorporates MM 4.3-2b, which requires UCR to implement the GHG reduction measures described in the 2005 LRDP Amendment 2 EIR (Tables 4.16-9 and 4.16-10 in Section 4.16); MM 4.14-1b, which requires UCR's continued implementation and enhancement of its TDM program; MM 4.14-1d, which requires UCR's review of individual projects for consistency with UC transportation policy and TDM strategies; and MM 4.16-1, which requires

12 The UC Policy also offers an alternative "energy performance target" method.

UCR's review of individual projects for consistency with the GHG reduction policies of the UC Policy on Sustainable Practices and the CAP.

Specifically, the design, construction, and operation of the proposed project would include a series of green building strategies under development, along with mandatory strategies required by the CalGreen Code and the UC Policy on Sustainable Practices to exceed CBC energy efficiency requirements by 20 percent or greater (for new buildings). Additionally, the proposed project would comply with applicable UC Policy on Sustainable Practices goals for climate protection, recycling and waste management, and sustainable food services (e.g., food procurement, education, engagement with external stakeholders, and sustainable operations).

Additionally, the proposed project would provide bicycle storage (to accommodate approximately 20 bicycles) following strategies PS Transportation 3 and PS Transportation 6 and supporting vehicle trip reduction goals.

Based on the above analysis, the proposed project would not conflict with the UCR CAP or the UC Policy on Sustainable Practices. No impact would result and no mitigation is required.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

8. Hazards and Hazardous Materials

The analysis of hazards and hazardous materials is tiered from the 2005 LRDP EIR and was addressed in Section 4.7, Hazards and Hazardous Materials, of that document. As described previously in Section II, Project Description, of this IS/MND, relevant elements of the proposed project related to hazards and hazardous materials include the construction, expansion, and renovation of buildings in the Barn Complex. Construction activities would involve demolition of the existing Barn Stable, potentially the Barn Theater (if the Barn Theater Replacement Option is implemented), and existing hardscape. The existing buildings to be demolished and/or renovated have the potential to contain asbestos-containing materials (ACMs) and lead-based paint (LBP) due to their age. Landscape maintenance chemicals and cleaning products would continue to be used, consistent with existing campus operations. The design of the proposed project ensures that emergency access to and around the project area is maintained. Unless otherwise noted, the analysis of the potential impacts related to hazards and hazardous materials is applicable to the proposed project and the Barn Theater Replacement Option.

Section 4.7 of the 2005 LRDP EIR provides a detailed description of the hazardous materials and wastes handled and/or generated at UCR and the policies, programs, and practices implemented to manage these materials in compliance with local, State, and federal regulations, as applicable. These include, but are not limited to, the following programs offered by UCR's Environmental Health and Safety (EH&S) Department: Biosafety; Emergency Management; Campus Emergency Response Plan; Environmental Health; Environmental Programs; Hazardous Materials Program; Spill Prevention, Control and Countermeasures Plan; Industrial Hygiene and Safety; Laboratory/Research Safety; and Radiation Safety.

The following applicable PPs were adopted as part of the UCR 2005 LRDP EIR as supplemented and updated by the 2005 LRDP Amendment 2 EIR; they are incorporated as part of the proposed project and assumed in the analysis presented in this section.

PP 4.3-2(c) The campus shall continue to implement SCAQMD Rule 1403-Asbestos when demolishing existing buildings on campus.

PP 4.7-1 The Campus shall continue to implement the current (or equivalent) health and safety plans, programs, and practices related to the use, storage, disposal, or transportation of hazardous materials, including, but not necessarily limited to, the Business Plan, the Broadscope Radioactive Materials License, and the following programs: Biosafety, Emergency Management, Environmental Health, Hazardous Materials, Industrial Hygiene and Safety, Laboratory/Research Safety, Radiation Safety, and Integrated Waste Management. These programs may be subject to modification as more stringent standards are developed or if the programs are replaced by other programs that incorporate similar health and safety protection measures.

PP 4.7-2 The campus shall perform hazardous materials surveys on buildings and soils, if applicable, prior to demolition and construction. When remediation is deemed necessary, surveys shall identify all potential hazardous materials within the structure to be demolished, and identify hazardous materials within the structure to be demolished, and identify handling and disposal practices. The campus shall follow the practices during building demolition to ensure construction worker and public safety.

PP 4.7-7(a) To the extent feasible, the Campus shall maintain at least one unobstructed lane in both directions on campus roadways. At any time only a single lane is available, the Campus shall provide a temporary traffic signal, signal carriers (i.e., flag persons), or other appropriate traffic controls to allow travel in both directions. If construction activities require the complete closure of a roadway segment, the Campus shall provide appropriate signage indicating alternative routes. *(This is identical to Transportation and Traffic PP 4.14-5.)*

PP 4.7-7(b) To maintain adequate access for emergency vehicles when construction projects would result in roadway closures, Architects & Engineers (formerly the Office of Design and Construction) shall consult with the UCPD, EH&S, and the RFD to disclose roadway closures and identify alternative travel routes. *(This is identical to Transportation and Traffic PP 4.14-8.)*

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☒	☐
b) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☒	☐

Discussion

The analysis of Impacts 4.7-1 through 4.7-4 in the 2005 LRDP EIR concluded that, with implementation of PP 4.7-1 through PP 4.7-4 and MM 4.7-4, development under the 2005 LRDP would have a less than significant impact during construction (including demolition and utility line relocation activities) and long-term operations related to public exposure to hazards from (1) the routine transport, use, or disposal of hazardous materials and (2) a reasonably foreseeable upset and accident condition involving the release of hazardous materials.

As defined in the 2005 LRDP EIR, for purposes of this analysis, hazardous materials include inorganic and organic chemicals and products (chemical reagents and reactions) containing such substances as defined by California laws and regulations, radioactive materials, and biohazardous materials.

Construction-Related Hazards

As discussed in Section 4.7 of the 2005 LRDP EIR, maintenance, renovation, or demolition of existing buildings and extension and/or relocation of utility systems as part of 2005 LRDP implementation could expose construction workers and campus occupants to hazardous materials or wastes that may be present in buildings or in underground utilities (Impact 4.7-2).

In accordance with PP 4.7-2, an assessment of the existing buildings was conducted to determine if they contain asbestos or lead. As identified in the 2005 LRDP EIR, asbestos, a naturally occurring fibrous material, was used for years in many building materials for its fireproofing and insulating properties. Loose insulation, ceiling panels, and brittle plaster are potential sources of friable (easily crumbled) asbestos. In addition, underground utility tunnels may also contain asbestos. Nonfriable asbestos is generally bound to other materials such that it does not become airborne under normal conditions. Any activity that involves cutting, grinding, or drilling during building renovation or demolition or relocation of underground utilities could release friable asbestos fibers unless proper precautions are taken. Inhalation of airborne fibers is the primary mode of asbestos entry into the body, making friable materials the greatest potential health risk. Asbestos-related health problems include lung cancer and asbestosis. As identified in the *Asbestos/Lead Building Material Survey* conducted for the Barn Group by Ambient Environmental, Inc. in March 2017, asbestos was detected in the vinyl sheet flooring and wall mastic at the Barn Stable, which would be demolished as part of the proposed project (Ambient 2017). It is also possible that transite pipe is located onsite; transite pipe is an asbestos-cement product used in some utility lines. The use of asbestos to manufacture transite pipe was phased

out in the 1980s. As required by PPP 4.3-2(c) and PPP 4.7-2, the campus shall follow applicable federal, State and local rules and regulations (including SCAQMD Rule 1403) during building and utility demolition to ensure construction worker and public safety when handling asbestos-containing materials.

Lead is a naturally occurring metallic element. Among its numerous uses and sources, lead can be found in paint, water pipes, solder in plumbing systems, and soils around buildings and structures painted with LBP. In 1978, the federal government began to regulate the use of lead in house paint. Because many structures on the UCR campus were constructed prior to 1978, wall surfaces and other building materials may contain LBPs, which can pose a risk of exposure due to chipped or peeling paint or from renovation or demolition of buildings or building materials that contain lead. Excessive exposure to lead (even low levels) can result in the accumulation of lead in the blood, soft tissues, and bones. As identified in the *Asbestos/Lead Building Material Survey*, lead was detected in the exterior paint of all the Barn Group buildings. As required by PPP 4.7-2, the campus shall follow applicable rules and regulations during building renovation and demolition to ensure construction worker and public safety when handling lead-based paint.

There have been localized areas of soil contamination on campus in connection with leaking underground storage tanks (USTs) in the past, all of the sites on campus have been remediated and properly closed. Additionally, although there is no known contamination associated with the historic use of agricultural teaching and research fields in the West Campus, due to the long-term use of common agricultural practices, including the application of pesticides, fertilizers, and other agricultural chemicals, the potential exists for residues of agricultural chemicals to be present in the soil in this area. Development of new facilities in the West Campus north of Martin Luther King Jr. Boulevard could result in exposure of these residues, if any, to construction workers during construction and campus occupants during operation of the buildings and other facilities. The proposed project is located in the East Campus and would not expose construction workers or building occupants to these potential hazards.

Additionally, construction activities, including extension or relocation of utilities, could encounter abandoned pipes, discarded building materials, unknown USTs, or previously unidentified contaminated soil, which could result in the exposure of construction workers or campus occupants to hazardous materials.

The proposed project incorporates PP 4.7-1, described above, which requires compliance with federal, State, and local regulations as well as current (or equivalent) campus plans, programs, and practices related to the use, storage, disposal, and transport of hazardous materials and wastes. Therefore, the proposed project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials during construction; there would be a less than significant impact, consistent with the findings of the 2005 LRDP EIR.

Operational Hazards

Hazardous Materials Use and Transport

As discussed in Section 4.7 of the 2005 LRDP EIR, implementation of the 2005 LRDP would include development of facilities that use hazardous materials in teaching and research activities; development of such facilities are not included under the proposed project. However, with an increase in on-campus facilities, expansion of maintenance and cleaning services would be required, which would increase the use, handling, storage, and disposal of products routinely used in building maintenance, some of which may contain hazardous materials (Impact 4.7-1).

This, in turn, would result in an increase in the amount of hazardous materials that are used, stored, transported, and disposed of and could increase the potential for an accident or accidental release of hazardous materials or wastes (Impact 4.7-3).

As discussed in the 2005 LRDP EIR, transportation of hazardous materials and wastes along any City or State roadway or rail lines within or near the campus is subject to all relevant Department of Transportation (DOT), California Highway Patrol (CHP), and California Department of Health Services (DHS) hazardous materials and wastes transportation regulations, as applicable. Regular inspections of licensed waste transporters are conducted by a number of agencies to ensure compliance with requirements that range from the design of vehicles used to transport wastes to the procedures to be followed in case of spills or leaks during transit.

To minimize risks associated with routine hazardous material use on campus, the proposed project incorporates PP 4.7-1, which requires compliance with federal, State, and local regulations as well as current (or equivalent) campus plans, programs, and practices related to the use, storage, disposal, and transport of hazardous materials and wastes. Modifications of these existing programs and services are made over time to make sure that they continue to keep the campus in compliance with the numerous hazardous materials laws and regulations at all levels of government.

Other hazardous materials that may be used as part of the proposed project include commercial cleaning products and landscape maintenance chemicals. Cleaning products would be disposed of either through the wastewater system (i.e., sinks, laundry) or evaporation. Neither chlorine nor standard cleaning products (i.e., degreasers, window cleaning products) are used in quantities that would result in adverse health effects either through direct exposure to the skin or inhalation. Pesticides and herbicides are directly applied to affected areas using methods that follow State and County laws and/or guidelines.

The potential for accidents involving hazardous materials during operation would not increase with the proposed project since the types of uses would be consistent with existing conditions at the project site and other locations on campus. Additionally, operation of the proposed project would comply with applicable federal, State, and local laws and regulations and with the existing UCR programs, practices, and procedures required by PP 4.7-1, identified above. Therefore, the proposed project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials during operation; there would be a less than significant impact, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to the potential to create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☐	☒

Discussion

The analysis of Impact 4.7-5 in the 2005 LRDP EIR concluded that, with implementation of PP 4.7-1, development under the 2005 LRDP would have a less than significant impact related to hazardous emissions or handling hazardous materials within a ¼ mile of a school. There are 6 existing schools within a ¼ mile of the UCR campus perimeter:

- Emerson Elementary School, 4660 Ottawa Avenue (Riverside Unified School District [RUSD]);
- Islamic Academy of Riverside Elementary School, 1038 West Linden Street (private);
- Riverside Garden Elementary School, 1085 West Linden Street (private);
- Highland Elementary School, 700 Highlander Drive (RUSD);
- University Heights Middle School, 1155 Massachusetts Avenue (RUSD); and
- Hyatt Elementary School, 4466 Mount Vernon Avenue (RUSD).

There are no schools located within a ¼ mile of the project site. The nearest school is the Islamic Academy of Riverside Elementary School, which is approximately 0.4 mile north-northwest of the project area at its nearest point. Further, the proposed project does not involve the operation of any uses that would involve the use, storage, transport, and disposal of hazardous materials beyond that which currently occurs on campus, including hazardous materials associated with food service. Compliance with federal, State, and local regulations as well as current (or equivalent) campus plans, programs, and practices related to the use, storage, disposal, and transport of hazardous materials and wastes, as required by PP 4.7-1, 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.

The proposed project incorporates PP 4.7-1, which would ensure the appropriate use and transport of common hazardous materials, including cleaning and landscape maintenance products, as discussed under Thresholds a and b, above. Therefore, there would be no impact related to handling hazardous materials within a ¼ mile of a school, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to handling hazardous materials within a ¼ mile of a school.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☐	☒

Discussion

The analysis of Impact 4.7-6 in the 2005 LRDP EIR concluded that development under the 2005 LRDP would have a less than significant impact related to construction on a site included on the Cortese List, which is compiled pursuant to Section 65962.5 of the *California Government Code.*

The project site is not included in any database of sites compiled pursuant to Section 65962.5 of the *California Government Code*, referred to as the Cortese List, and collected by the California Environmental Protection Agency (CalEPA 2016a). Specifically, the project site is not identified on (1) the California Department of Toxic Substances Control's (DTSC's) Hazardous Waste and Substances Site List, also called Envirostor; (2) the DTSC's list of hazardous waste facilities where the DTSC has taken or contracted for corrective action because a facility owner/operator has failed to comply with a date for taking corrective action or because DTSC determined that immediate corrective action was necessary to abate an imminent or substantial endangerment; (3) the State Water Resources Control Board's (SWRCB's) Leaking Underground Storage Tank (LUST) sites, also called GeoTracker; (4) the SWRCB's list of Cease and Desist Orders (CDO) and Cleanup and Abatement Orders (CAO); and (5) the SWRCB's list of solid waste disposal sites with waste constituents above hazardous waste levels outside the waste management unit (CalEPA 2016a, 2016b, 2016c, 2016d, 2016e; DTSC 2016).

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not be located on a site that is included on a list of hazardous materials sites compiled pursuant to *California Government Code* Section 65962.5 and would have no impact.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☐	☒

Discussion

Based on the IS prepared for the 2005 LRDP EIR, development under the 2005 LRDP was determined to have no impact related to public use airports or private airstrips and was not carried forward for further discussion in the Draft EIR. Specifically, the UCR campus is not located within two miles of a public airport or public use airport; it has not been included in an airport land use plan; and it is not located within the vicinity of a private airstrip.

Therefore, the proposed project would not result in any impacts from safety hazards associated with airports or airstrips.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impacts related to public use airports or private airstrips.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
g) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.7-7 in the 2005 LRDP EIR concluded that, with implementation of PS Land Use 3, PS Open Space 1, PS Open Space 4 through 7, PS Transportation 4, PP 4.7-7(a), PP 4.7-7(b), MM 4.7-7(a), and MM 4.7-7(b), development under the 2005 LRDP would have a less than significant impact related to impairing the implementation of or physically interfering with an adopted emergency response plan or emergency evacuation plan.

EH&S is responsible for the campus' Emergency Operations Plan (EOP), which is intended to safeguard people, property, research, and other resources from the consequences of natural and

man-made hazards through mitigation, preparedness, response, and recovery. The EOP was last updated in December 2011. Although the City of Riverside does not have a Master Emergency Response Plan prepared specifically for the campus, the campus coordinates with the City during development and update of its EOP to ensure awareness and proper coordination when emergency situations occur on the campus.

Multiple emergency access or evacuation routes are provided on campus to ensure that, in the event one roadway or travel lane is temporarily blocked, another may be utilized. Construction of the proposed project could result in temporary lane or roadway closures to an on-campus road, West Campus Drive. However, construction and operation of the proposed project would be designed to ensure that the EOP is maintained and that emergency access on campus is not impeded, including existing fire lanes near the project area. Notably, as shown on the conceptual site plans provided in Figures 5 and 6, the existing fire access from the drive aisle between the project site and Sproul Hall would be maintained. Additionally, access to the project site would be provided from the relocated driveway along West Campus Drive for the service area and loading dock.

Also, the proposed project incorporates PP 4.7-7(a), which requires the maintenance of at least one unobstructed lane in both directions on campus roadways, to the extent feasible, and PP 4.7-7(b), which requires consultation between UCR and the UC Police Department (UCPD), Riverside Fire Department, and UCR EH&S to identify alternative travel routes for emergency vehicle access when construction projects result in roadway closures.

The campus emergency assembly area (EAA) nearest to the project site is located in the undeveloped turf area south of Sproul Hall. The temporary dining facilities would be located in this area but would not obstruct the use of the area as an EAA. Therefore, the proposed project would result in a less than significant impact related to emergency response and evacuation on campus with incorporation of PPs 4.7-7(a) and 4.7-7(b) and MM 4.7-7(b), consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to implementation of or physical interference with an adopted emergency response plan or emergency evacuation plan.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
h) Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☐	☒

Discussion

The analysis of Impact 4.7-8 in the 2005 LRDP EIR concluded that, with implementation of PS Open Space 1, MM 4.7-8(a), and MM 4.7-8(b), development under the 2005 LRDP would have a less than significant impact related to wildfires. The 2005 LRDP EIR identified the campus areas that may be subject to wildland fires, which include the following areas located adjacent to the southeast hills and the Botanic Gardens: the area south of South Campus Drive and areas currently occupied by Parking Lots 13 and V10, east of East Campus Drive.

The project area is not located within or near the areas in the southeast portions of campus that are susceptible to wildfires. Also, the project area is surrounded on all sides by development. There would be no impact related to wildland fires.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to wildland fires.

9. Hydrology and Water Quality

The analysis of hydrology and water quality is primarily tiered from the 2005 LRDP EIR; however, current regulatory information and selected portions of the impact analysis, as indicated, are tiered from the 2005 Amendment 2 EIR. Hydrology and water quality issues are addressed in Section 4.8 of both documents. As described previously in Section II, Project Description, of this IS/MND, relevant elements of the proposed project related to hydrology and water quality include the use of treatment-based low impact development (LID) BMPs. The analysis of hydrology and water quality is applicable to the proposed project and the Barn Theater Replacement Option, which would involve the same types of uses, and a similar amount of pervious and impervious surface.

The following applicable PS and PPs were adopted as part of the 2005 LRDP Amendment and/or 2005 LRDP Amendment 2 EIR; they are incorporated as part of the proposed project and have been assumed in the analysis presented in this section.

PS Conservation 2 Site buildings and plan site development to minimize site disturbance, reduce erosion and sedimentation, reduce stormwater runoff, and maintain existing landscapes, including healthy mature trees whenever possible.

PP 4.8-1 The Campus will continue to comply with all applicable water quality requirements established by the SARWQCB. *(This is identical to Utilities PP 4.15-5.)*

PP 4.8-2(a) To further reduce the campus' impact on domestic water resources, to the extent feasible, UCR will

(i) Install hot water recirculation devices (to reduce water waste)

(ii) Continue to require all new construction to comply with applicable State laws requiring water-efficient plumbing fixtures, including but not limited to the Health and Safety Code and Title 24, California Code of Regulations, Part 5 (California Plumbing Code)

(iii) Retrofit existing plumbing fixtures that do not meet current standards on a phased basis over time

(iv) Install recovery systems for losses attributable to existing and proposed steam and chilled-water systems

(v) Prohibit using water as a means of cleaning impervious surfaces

(vi) Install water-efficient irrigation equipment to maximize water savings for landscaping and retrofit existing systems over time

(This is identical to Utilities PP 4.15-1[b].)

PP 4.8-2(b) The Campus shall promptly detect and repair leaks in water and irrigation pipes. *(This is identical to Utilities PP 4.15-1[c].)*

PP 4.8-2(c) The campus shall avoid serving water at food service facilities except upon request. *(This is identical to Utilities PP 4.15-1[d].)*

PP 4.8-3(c) The Campus shall continue to implement dust control measures consistent with SCAQMD Rule 403—Fugitive Dust during the construction phases of new project development. The following actions are currently recommended to implement Rule 403 and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the source of the dust generation. The Campus shall implement these measures as necessary to reduce fugitive dust. Individual measures shall be specified in construction documents and require implementation by construction contractor:

(i) Apply water and/or approved nontoxic chemical soil stabilizers according to manufacturer's specification to

all inactive construction areas (previously graded areas that have been inactive for 10 or more days)

(ii) Replace ground cover in disturbed areas as quickly as possible

(iii) Enclose, cover, water twice daily, or apply approved chemical soil binders to exposed piles with 5 percent or greater silt content

(iv) Water active grading sites at least twice daily

(v) Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour over a 30-minute period

(vi) All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least two feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer), in accordance with Section 23114 of the California Vehicle Code

(vii) Sweep streets at the end of the day if visible soil material is carried over to adjacent roads

(viii) Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip

(ix) Apply water three times daily or chemical soil stabilizers according to manufacturers' specifications to all unpaved parking or staging areas or unpaved road surfaces

(x) Post and enforce traffic speed limits of 15 miles per hour or less on all unpaved roads

(This is identical to Air Quality PP 4.3-2[b] and Geology PP 4.6-2[a].)

PP 4.8-3(d)

In compliance with NPDES, the campus would continue to implement Best Management Practices, as identified in the *UCR Stormwater Management Plan* (UCR 2003):

(i) Public education and outreach on stormwater impacts

(ii) Public involvement/participation

(iii) Illicit discharge detection and elimination

(iv) Pollution prevention/good housekeeping for facilities

(v) Construction site stormwater runoff control

(vi) Post-construction stormwater management in new development and redevelopment

(This is identical to Biological Resources PP 4.4-2[b] and Geology and Soils PP 4.6-2[b].)

PP 4.8-3(e) Prior to the time of design approval, the Campus will evaluate each specific project to determine if the project runoff would exceed the capacity of the existing storm drain system. If it is found that the capacity would be exceeded, one or more of the following components of the storm drain system would be implemented to minimize the occurrence of local flooding:

(i) Multi-project stormwater detention basins

(ii) Single-project detention basins

(iii) Surface detention design

(iv) Expansion or modification of the existing storm drain system

(v) Installation of necessary outlet control facilities

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project violate any water quality standards or waste discharge requirements?	☐	☐	☐	☒	☐
f) Would the project otherwise substantially degrade water quality?	☐	☐	☐	☒	☐

Discussion

The analysis of Impacts 4.8-1 and 4.8-7 in the 2005 LRDP EIR concluded that, with implementation of PS Conservation 2 and PP 4.8-1, there would be a less than significant impact related to violation of existing water quality standards or waste discharge requirements (WDRs) and degradation of water quality. A detailed discussion of the regulatory setting for water quality is provided in Section 4.8, Hydrology and Water Quality, of the 2005 LRDP Amendment 2 EIR. The Clean Water Act (CWA) establishes a framework for regulating potential water quality impacts through the NPDES program. Phase I of the NPDES Program requires NPDES permits for storm water discharge from a large number of priority sources, including Municipal Separate Storm Sewer System Permits (MS4s) serving populations of over 100,000; several categories of industrial activity; and construction activity that disturbs 1 acre or more, as discussed further below.

Phase II of the NPDES Program regulates storm water discharges from small MS4s (such as schools and universities). As part of Phase II, the SWRCB adopted a General Permit for the Discharge of Storm Water from Small MS4s (WQ Order No. 2003-0005-DWQ) to provide permit coverage for smaller municipalities, including non-traditional Small MS4s, which include public campuses. The Phase II Small MS4 General Permit covers Phase II Permittees Statewide. On February 5, 2013, the Phase II Small MS4 General Permit was adopted and became effective on July 1, 2013 (WQ Order No. 2013-0001-DWQ). UCR was approved for coverage under the Phase

II MS4 permit program and is required to comply with the requirements of the MS4 permit, including the following:

1. Education and outreach program;
2. Public involvement and participation program;
3. Illicit discharge detection and elimination;
4. Construction site storm water runoff control program;
5. Pollution prevention/good housekeeping for facilities;
6. Post-construction stormwater management program; and
7. Program effectiveness assessment and improvement.

Construction

Implementation of the proposed project could result in runoff exiting the project site during project construction. Storm water runoff during construction could contain pollutants such as soils and sediments released during grading and excavation activities as well as petroleum-related pollutants due to spills or leaks from heavy equipment and machinery. Other common pollutants that may result from construction activities include solid or liquid chemical spills; concrete and related cutting or curing residues; wastes from paints, stains, sealants, solvents, detergents, glues, acids, lime, plaster, and cleaning agents; and heavy metals from equipment.

The proposed project would involve construction activities on more than one acre; therefore, the proposed project incorporates PP 4.8-1, which requires compliance with requirements and water quality standards set forth within the current NPDES permit regulations. The SWRCB is authorized by the USEPA to oversee the NPDES program through the Regional Water Quality Control Boards (RWQCBs). The proposed project would be subject to the requirements of the Statewide General NPDES Permits, including the requirement to obtain coverage under the Statewide General NPDES Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (NPDES No. CAS000002, California Water Resources Control Board Resolution No. 2001-046; Modification of Water Quality Order 99-08-DWQ, SWRCB, NPDES, General Permit for Storm Water Discharges Associated with Construction Activity). This permit was revised on September 2, 2009 (Construction General Permit Order 2009-0009-DWQ) and was subsequently amended by Order No. 2010-0014-DWQ and Order No. 2012-0006-DWQ. Order No. 2012-0006-DWQ became effective on July 17, 2012. Specifically, the proposed project would require completion and filing of a Permit Registration Document with the SWRCB, which consists of a Notice of Intent (NOI), Risk Assessment, Site Map, Storm Water Pollution Prevention Plan (SWPPP), annual fee, and a signed certification statement. The primary objective of the SWPPP is to identify, construct, implement, and maintain BMPs to reduce or eliminate pollutants in storm water discharges and authorized non-storm water discharges from the construction site during construction.

An SWPPP typically includes both source-control and treatment-control BMPs to reduce water quality impacts. The BMPs that are most often used during construction include watering exposed soils; covering stockpiles of soil; installing sandbags to minimize off-site runoff; creating temporary desilting basins; and timing grading to avoid the rainy season (November through April). In addition, coverage under the Construction Permit would also include implementation of post-construction standards to achieve the pre-project volume and rate of storm water runoff from the project area. The proposed project would meet these standards through installation of active and passive treatment units, as described below under “Operation”. The proposed project also incorporates PP 4.8-3(c), which requires implementation of SCAQMD Rule 403 for management

of fugitive dust during construction. Finally, the proposed project would be required to comply with applicable provisions of the 2016 California Building Code and 2016 CalGreen Code, which became effective January 1, 2017, and require the reduction of erosion and sedimentation and therefore further reduce construction-related water quality impacts.

Because the PPs discussed above are included in the proposed project, short-term construction-related water quality impacts would be less than significant, which is consistent with the findings of the 2005 LRDP EIR.

Operations

As discussed under the analysis of Impact 4.8-1 in the 2005 LRDP EIR, the UCR campus is not considered a point source for regulatory purposes and is not subject to WDRs. In addition, no hazardous wastes generated on campus are discharged into the sewer or storm drainage systems. Therefore, the proposed project would not violate WDRs.

According to the *Phase II Small MS4 Post-Construction Stormwater Management Checklist* prepared for the proposed project by Fuscoe Engineering, Inc., and included in Appendix D of this IS/MND, implementation of the proposed project would introduce approximately 13,900 sf of new impervious surfaces and would replace approximately 32,600 sf of impervious surface (Fuscoe 2016a). The proposed project would result in increased storm water runoff that would contain contaminants that are typical of urbanized areas. Specifically, pollutant-generating activities associated with operation of the proposed project include drain or wash water from drain lines, rooftop equipment, drainage sumps, and other sources; fire sprinkler test water; interior floor drains; loading dock; outdoor storage of equipment or materials; and food service operations. Source-control BMPs would be implemented to address the following activities:

- Drain or wash water from the service yard would be directed into the sewer system via an automatic switch/diversion control valve downstream of the trench drain. Storm water would enter the storm drain system, while non-storm water would enter the sanitary sewer system.
- Interior floor drains would be directed to the sanitary sewer system.
- Loading dock drainage would be isolated to the maximum extent practical. Dry weather flows would be directed to the sanitary sewer system.
- Outdoor storage of equipment or materials would be covered to the maximum extent practical to reduce the potential of storm water contact.

The following site-design BMPs would be implemented to reduce project site runoff from the 85th percentile storm event:

- Soil quality improvement and maintenance through soil amendments and creation of a microbial community.
- Tree planting and preservation.
- Rerouting of rooftop drainage pipes to drain rainwater into rain barrels, cisterns, or permeable areas instead of the storm sewer.

Storm water treatment would consist of the construction of a vegetated swale along the western portion of the site. The vegetated swale would be designed to treat and attenuate storm water runoff.

Despite the increase in impervious areas on the project site, the constituent pollutants entering the campus and City storm drain systems with proposed project implementation would not substantively change in character compared to existing conditions on campus, as the proposed facilities are essentially the same as existing facilities on site and elsewhere on campus. In addition, as required by PP 4.8-1, the proposed project would comply with all applicable water quality requirements, including NPDES Phase I requirements (General Construction Permit), as described above, and Phase II Small MS4 General Permit requirements. Therefore, operation of the proposed project would not violate any water quality standards or otherwise substantially degrade water quality. There would be a less than significant impact related to surface water quality, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to (1) violating water quality standards or WDRs and (2) otherwise substantially degrading water quality.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.8-2 in the 2005 LRDP EIR concluded that, with implementation of PS Conservation 5 and PP 4.8-2(a) through PP 4.8-2(c), there would be a less than significant impact related to substantial depletion of groundwater supplies or interference with groundwater recharge. The Riverside area is located within the Upper Santa Ana Valley Groundwater Basin, and the UCR campus is located near the southeastern edge of the Riverside-Arlington Subbasin (Subbasin). Groundwater in the Subbasin is replenished by infiltration from Santa Ana River flow; underflow past the Rialto-Colton Fault; intermittent underflow from the Chino Groundwater Subbasin; return irrigation flow; and deep percolation of precipitation.

As discussed in Section V.17, Utilities and Service Systems, of this IS/MND, the proposed project would generate a demand for an additional 0.004 million gallons per day (mgd) of potable water. The increased demand for potable water resulting from the proposed project could indirectly increase demand for groundwater, as the RPU supplies domestic water to the campus. The RPU utilizes groundwater wells for potable water. It should be noted that the proposed project incorporates PP 4.8-2(a), which requires implementation of water conservation measures to reduce potable water consumption; PP 4.8-2(b), which requires the campus to promptly detect and repair leaks in water and irrigation pipes; and PP 4.8-2(c), which requires the campus to avoid serving water at food service facilities except upon request.

As stated in the 2005 LRDP Amendment 2 EIR, the RPU has indicated that it does not anticipate any problems in providing adequate water supply to remaining and new development on the UCR campus. Therefore, the provision of additional water to the UCR campus, which could include groundwater, would not require water supplies in excess of existing entitlements and resources or result in the need for new or expanded entitlements. As such, implementation of the proposed project would not substantially deplete groundwater supplies, which is consistent with the findings of the 2005 LRDP EIR.

As identified in the 2005 LRDP EIR, the UCR campus is not a designated groundwater recharge area for the Subbasin, nor does the campus serve as a primary source of groundwater recharge within the Subbasin. The soils underlying the East Campus are designated as Class D, which is the least-permeable soil type. Therefore, the increase in the impervious surface area on the approximately 1.7-acre project site would not substantially interfere with groundwater recharge. Therefore, there would be a less than significant impact related to groundwater recharge, which is consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to substantial depletion of groundwater supplies; it would have a less than significant impact related to interference with groundwater recharge such that there would be a net deficit in aquifer volume or lowering of the local groundwater table.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☐	☒	☐
d) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	☒	☐
e) Would the project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒	☐

Discussion

The analysis of Impacts 4.8-3 through 4.8-5 in the 2005 LRDP EIR concluded that, with implementation of PS Land Use 2 and 3, PS Open Space 1 through 5, PS Conservation 1 through 3, and PP 4.8-3(a) through 4.8-3(e), there would be a less than significant impact related to alteration of existing drainage patterns and storm drain system capacity.

As described in the 2005 LRDP EIR, the UCR campus is located within two sub-watersheds of the Upper Santa Ana River Watershed, generally divided by the I-215/SR-60 freeway. Most of the East Campus drains to the University Arroyo Watershed, while portions of the West Campus drain to the Box Springs Arroyo Watershed. Major storm drainages on campus, including natural drainages, are shown in Figure 4.8-3 of the 2005 LRDP EIR. As shown, there are no natural channels within the project site. The nearest major storm drain that would serve the project site extends along West Campus Drive. Currently, storm water runoff from the eastern portion of the site (Basin A) drains south to an existing curb inlet along the north side of West Campus Drive, and storm water from the western portion of the site (Basin B) drains west via sheet flow to the curb and gutter in West Campus Drive.

Consistent with existing conditions, storm water runoff from the project site would discharge into the East Campus' existing storm drain system, which consists of culverts, pipelines, engineered channels of the University Arroyo, and the Gage and Glade Detention Basins, and then into the City of Riverside's storm drain system. Storm water flows from the project site would continue to discharge to the storm drain in West Campus Drive and would not directly enter a natural channel or drainage. The proposed project would not alter the course of a stream or river.

In compliance with PP 4.8-3(d), UCR has evaluated the existing hydrologic conditions of the project site and future conditions with implementation of the proposed project to determine if the proposed project runoff would exceed the capacity of the existing storm drain system. A *Preliminary Drainage Study, UCR Barn,* was prepared by Fuscoe Engineering, Inc. and is included in Appendix D of this IS/MND (Fuscoe 2016b). With implementation of the proposed project, the amount of impervious surface at the project site would increase from approximately 54 percent to 74 percent. Storm water runoff from the project site would continue to discharge at

two locations along West Campus Drive; however, the basin areas would be altered slightly to include the loading dock in Basin A. Runoff from the eastern and southern portion of the project site (Basin A) would be conveyed via a combination of storm drain piping and vegetated swale to the existing curb inlet on the north side of West Campus Drive. The western portion of the site (Basin B) would drain west via storm drain piping and vegetated swales and discharge through a curb outlet on West Campus Drive. The existing and proposed hydrology conditions are depicted on Figure 16.

Table 12 presents the comparison between existing and proposed peak discharge and basin areas. The calculations were based on the 10-year, 1-hour storm and the 100-year, 1-hour storm events.

TABLE 12
EXISTING AND PROPOSED HYDROLOGY

Basin	Existing Conditions			Proposed Conditions		
	Area (ac)	Q10 (cfs)	Q100 (cfs)	Area (ac)	Q10 (cfs)	Q100 (cfs)
A	0.53	0.9	1.4	0.69	1.4	2.0
B	1.14	2.1	3.1	0.98	1.9	2.9
Total	**1.67**	**3.0**	**4.5**	**1.67**	**3.3**	**4.9**

ac: acre; Q10: peak 10-year flow; cfs: cubic feet per second; Q100: peak 100 year flow.
Source: Fuscoe 2016b.

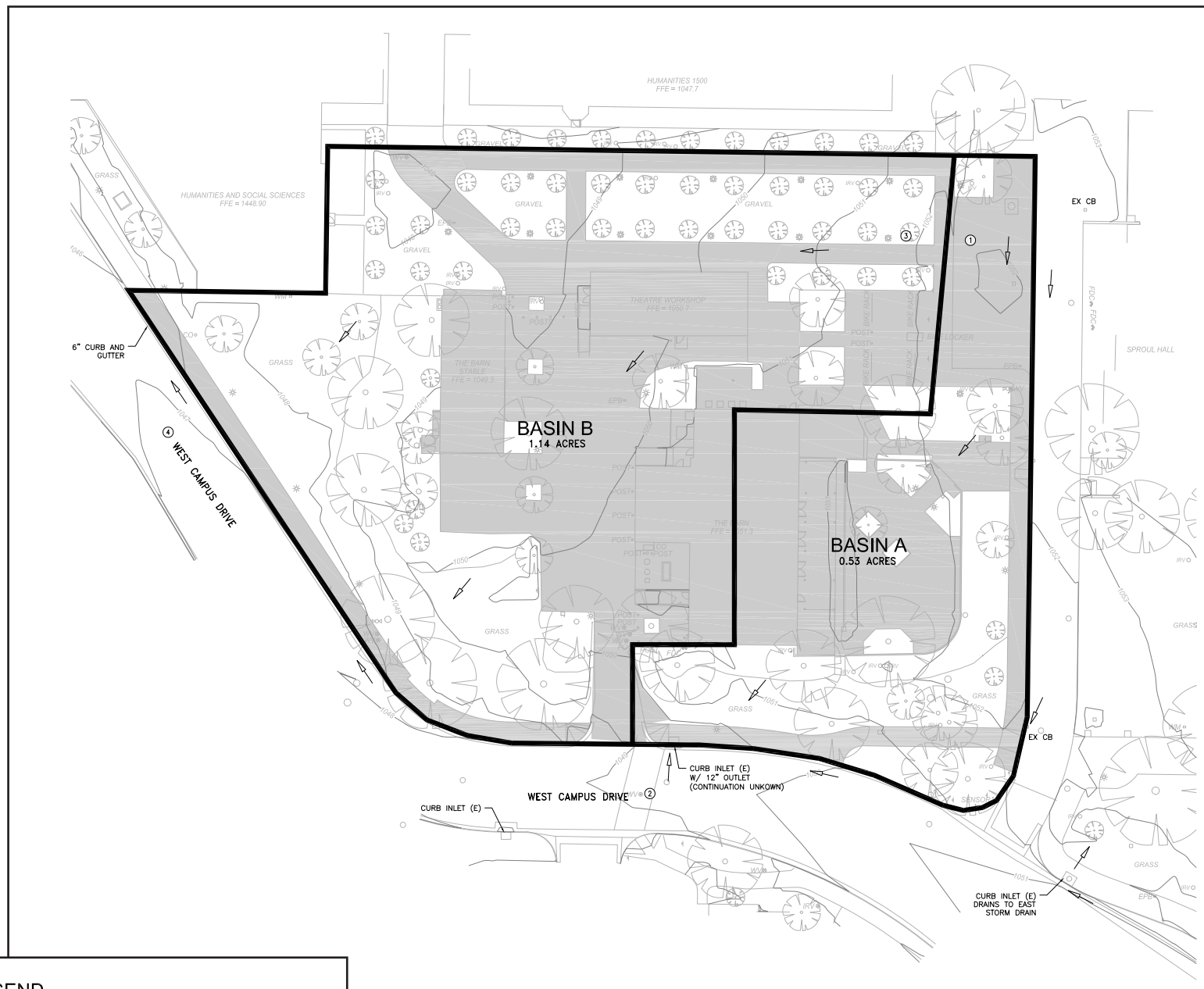
As shown, the proposed project would result in a net increase in the 100-year storm discharge of 0.4 cubic foot per second (cfs) and 10-year storm discharge of 0.3 cfs due to the increase in impervious surface. The increase in discharge represents a 9 percent increase in runoff from the site in proposed conditions for the 100-year storm event.

The proposed project would include installation of a local drainage system consisting of area drains, catch basins, an underground storm drain, and vegetated swales to convey the proposed flows toward the discharge points along West Campus Drive. The proposed drainage system would be located within the project site. Grading of the site would be designed to allow for overland flow of storm events greater than a 10-year storm without flooding of existing and new structures. The proposed storm drain facilities have adequate capacity to serve the project site. The installation of new or expanded storm drains off site would not be required.

Additionally, as discussed above, the proposed project incorporates PP 4.8-1, which requires compliance with applicable water quality regulations to manage storm water runoff during construction and operation with appropriate BMPs and to ensure that drainage from the project site does not result in erosion or contribute pollutants to runoff. Therefore, the proposed project would result in less than significant impacts related to (1) substantial alteration of existing drainage patterns and the potential to cause substantial erosion or flooding on or off site; (2) increased volumes of runoff that could exceed the capacity of the existing UCR or City of Riverside storm drain systems; or (3) substantial additional sources of polluted runoff. This determination is consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.



EXISTING HYDROLOGY

LEGEND

- BASIN BOUNDARY
- IMPERVIOUS SURFACE
- FLOW DIRECTION ARROW
- STORM DRAIN
- SWALE
- HYDROLOGY NODE (#)

PROPOSED HYDROLOGY

Source: Fuscoe Engineering, 2016

Existing and Proposed Hydrology Conditions

Figure 16

UCR Barn Expansion

N W E S

PSOMAS

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Level of Significance

The proposed project would have a less than significant impact related to (1) altering the existing drainage pattern in a manner that would result in substantial erosion or siltation on or off site; (2) altering the existing drainage pattern or substantially increasing the rate or amount of surface runoff in a manner that would result in flooding on or off site; and (3) creating or contributing to runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
g) Would the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☐	☒
h) Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☐	☒
i) Would the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☐	☒
j) Would the project expose people or structures to inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☐	☒

Discussion

The analysis of Impacts 4.8-8 through 4.8-11 in the 2005 LRDP EIR concluded that, with implementation of PS Open Space 1 and 2, PP 4.8-3(e), PP 4.8-10, and MMs 4.8-9(a) and 4.8-9(b), there would be no impact related to placing housing within a 100-year flood hazard area and less than significant impacts related to placing structures within a 100-year flood hazard area; flooding as a result of failure of a levee or dam; or inundation by seiche, tsunami, or mudflow.

Based on review of Figure 4.8-2, FEMA Map, of the 2005 LRDP EIR, the project site is not within the Federal Emergency Management Agency's (FEMA's) 100-year flood hazard area and would not, therefore, result in the placement of housing or other structures in a flood hazard area. Therefore, the proposed project would not result in any impacts related to the 100-year flood hazard area.

The nearest upstream dam to the campus is the Seven Oaks Dam, located on the Santa Ana River in the upper Santa Ana Canyon about 8 miles northeast of the City of Redlands and approximately 24 miles upstream of the City of Riverside. As discussed in the 2005 LRDP EIR, given the distance between the campus and the Santa Ana River (more than three miles), the potential for flooding to occur on the project area as the result of a catastrophic failure of the Seven Oaks Dam is remote. In addition, the potential for catastrophic failure of the Santa Ana Pipeline (which is operated by the California State Department of Water Resources and is located north and east of the campus along Watkins Drive at the base of the Box Springs Mountains) to affect campus lands is also considered remote. Therefore, implementation of the proposed project would not expose people or structures to a significant risk of loss, injury, or death involving

flooding, including flooding as a result of the failure of a levee or dam, and there would be no impact.

As discussed in the 2005 LRDP EIR, the potential for the campus to be affected by a seiche or tsunami is considered extremely remote given the inland location of the campus and the distance to any large water bodies. In addition, the potential for mudflows to affect campus development is limited to areas immediately adjacent to the southeast hills or within the existing on-campus arroyos. As the project area is not located in or near these areas, the proposed project would not be susceptible to mudflows. Therefore, implementation of the proposed project would not result in potential inundation by a seiche, tsunami, or mudflow, and there would be no impact.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impacts related to (1) placement of housing or structures within a 100-year flood hazard area; (2) exposure of people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; and (3) inundation by seiche, tsunami, or mudflow. There would also be no impacts related to placement of structures within a 100-year flood hazard area that would impede or redirect flood flows due to installation of a utility connection across an identified flood hazard area.

10. Land Use and Planning

The analysis of land use and planning is tiered from the 2005 LRDP EIR and, as applicable, the 2005 Amendment 2 EIR and was addressed in Section 4.9, Land Use and Planning, of both documents. As described previously in Section II, Project Description, of this IS/MND, relevant elements of the proposed project related to land use and planning include (1) demolition, renovation, and expansion of existing structures and construction of new structures resulting in a total of approximately 18,795 gsf in the Barn Complex (a net increase of approximately 10,700 gsf); (2) the introduction of new landscaping and hardscape; and (3) consistency with the 2005 LRDP, as amended. The proposed project would increase the UCR campus population with the addition of approximately nine career staff positions. With implementation of the Barn Theater Replacement Option, there would be a total of approximately 18,860 gsf in the Barn Complex (a net increase of approximately 10,765 gsf).

The following applicable PSs and PPs were adopted as part of the 2005 LRDP Amendment and/or 2005 LRDP Amendment 2 EIR and are incorporated as part of the proposed project and assumed in the analysis presented in this section.

PS Land Use 1	Achieve academic core densities of 1.0 FAR or higher on both the East and West Campuses in order to achieve a balance of academic land area versus other required uses.
PS Land Use 2	In order to achieve a compact and contiguous academic core and desired development densities, strategies will include infill sites in the developed East Campus academic core as well as expansion to the West Campus academic zone immediately adjacent to the I-215/SR-60 freeway.

PS Conservation 2 Site buildings and plan site development to minimize site disturbance, reduce erosion and sedimentation, reduce stormwater runoff, and maintain existing landscapes, including healthy mature trees whenever possible.

PS Development Strategy 1 Establish a design review process to provide regular review of building and landscape development on campus.

PP 4.9-1(a) The campus shall provide design architects with the 2007 Campus Design Guidelines and instructions to implement the Guidelines, including those sections related to use of consistent scale and massing, compatible architectural style, complementary color palette, preservation of existing site features, and appropriate site and exterior lighting design. *(This is identical to Aesthetics PP 4.1-1.)*

PP 4.9-1(b) The campus shall continue to provide design architects with the 2007 Campus Design Guidelines and instructions to develop project-specific landscape plans that are consistent with the Guidelines with respect to the selection of plants, retention of existing trees, and use of water conserving plants, where feasible. *(This is identical to Aesthetics PP 4.1-2[a].)*

PP 4.9-1(c) The campus shall continue to relocate, where feasible, mature "specimen" trees that would be removed as a result of construction activities on the campus. *(This is identical to Aesthetics PP 4.1-2[b].)*

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project physically divide an established community?	☐	☐	☐	☐	☒

Discussion

Based on the IS prepared for the 2005 LRDP Amendment 2 EIR, it was concluded that development of the campus under the 2005 LRDP, as amended, would have no impact related to division of an established community. This issue was not carried forward for further analysis in the EIR. The 2005 LRDP, as amended, guides development within the campus boundaries, such as the proposed project, and does not therefore affect the established community outside the UCR campus. Consistent with the findings of the 2005 LRDP Amendment 2 EIR, no impact would occur.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to physically dividing an established community.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the LRDP, general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☐	☒

Discussion

The analysis of Impact 4.9-2 in the 2005 LRDP Amendment 2 EIR concluded that development of the UCR campus under the 2005 LRDP, as amended, which incorporates relevant PSs, PPs, and MMs would not conflict with applicable local or regional land use plans, policies, or regulations.

Following is an evaluation of the proposed project's consistency with the UCR 2005 LRDP, as amended, and applicable local and regional plans, policies, or regulations.

University of California, Riverside 2005 Long Range Development Plan, as Amended

The "Vision for UC Riverside" section of the 2005 LRDP, as amended, identifies various goals for the UCR campus, including to "enhance UCR image and identity" and "emphasize strong connections and ease of access within campus and with the surrounding community". The proposed Barn Expansion supports these goals through design by (1) enhancing the awareness of the campus' agrarian heritage, including retention of portions of the citrus grove along the northern portion of the project site; (2) developing the overall cultural of the Barn Complex to revive and repurpose the Barn Dining and Barn Theater, with these buildings as the central elements; and (3) designing the proposed project to ensure convenient access through the project site and to surrounding land uses.

Following is a discussion of the proposed project's consistency with the land use designation, square footage and population assumptions, and Planning Strategies of the 2005 LRDP, as amended.

LRDP Land Use Designation. The Land Use Plan included in the 2005 LRDP, as amended, (shown in Figure 3.0-6 of the 2005 LRDP Amendment 2 EIR and Figure 13 of the 2005 LRDP Amendment 2) identifies 12 general categories of land use for development within the UCR campus boundaries. The project site is designated as "Academic". The Academic land use category allows for various Academic and support uses. Specifically, the Land Use Section of the 2005 LRDP Amendment 2 identifies that Academic support uses, such as the dining facilities provided at the Barn, "should be located near the center of the academic core on both the East and West Campuses," and "be located on and near primary pedestrian circulation routes and in central, accessibile locations, where informal gathering and interaction can occur easily." As

addressed below under the discussion of "Circulation and Parking and Campus Planning Strategies", the project site is located adjacent to the future Barn Walk, and is accessible from various pedestrian paths to the north, east and south, including the Eucalyptus Walk and the sidewalk along West Campus Drive. Additionally, enhanced pedestrian. The proposed project, which would involve an expansion of the existing Barn Group, does not conflict with the Academic land use designation, and is consistent with the guidance provided in the LRDP for the location of support uses.

LRDP Square Footage. The 2005 LRDP, as amended, projected total building space on campus to be approximately 14.9 million gsf by 2020/2021, including approximately 3.1 million gsf allocated to the SOM. As identified in Table 3.0-5 of the 2005 LRDP Amendment 2 EIR, of this amount, there is a total of 5.5 million gsf allocated to Academic Programs. The existing on-campus development is approximately 7.00 million gsf; therefore, there is approximately 7.71 million gsf of development allocation remaining on campus, when also taking into consideration the approved Multidisciplinary Research Building 1, which has not been constructed. The proposed project involves a net increase of up to 10,765 gsf of development, which is well within the remaining building allocation.

LRDP Population. The 2005 LRDP, as amended, projected a total enrollment of 25,000 students and 16,393 associated faculty, staff, and visitors for a total campus population of 41,393 by the academic year 2020/2021. Of this amount, 5,853 individuals (non-students) would be associated with the SOM; the projected population for the rest of the campus is 35,540 individuals. Excluding the category of "other individuals",[13] there are projected to be 32,916 students, faculty, and academic staff and non-academic staff. For comparison, the current student population on campus based on the fall 2016 enrollment is 22,921 students (including 19,799 undergraduate students and 3,122 graduate students) (UCR 2017). Additionally, there are approximately 8,306 faculty, staff, and staff personnel, for a total population of 31,227 individuals (not including other individuals). Therefore, the remaining projected growth on campus (not including SOM and other individuals) is 1,689 individuals.

The proposed project would provide expanded dining and event space on campus and would increase career staff and student employment opportunities at the Barn Complex. As previously discussed, there would be a potential increase of 91 student employees at the Barn Complex (41 student employees not including events); however, these positions would be filled by students already on campus. There would also be a potential increase of nine career staff, which could be new employees on campus. This potential increase in population is within the remaining projected growth on campus, as identified in the 2005 LRDP, as amended.

With respect to "other individuals", the campus population projections presented in Table 3.0-4 of the 2005 LRDP Amendment 2 EIR consider the average weekday number of other individuals, not evening or weekend visitors. Because the most notable increase in guests at the Barn Complex that would involve individuals not affiliated with UCR would be events occurring in the evenings and on weekends, the proposed project would not conflict with the projections for other individuals on campus.

LRDP Planning Strategies. The 2005 LRDP, as amended, includes Planning Strategies for the following issues to guide expansion and development of the UCR campus: land use, circulation and parking, open space and landscape, and campus and community. These planning strategies are required to be implemented with each development project on campus and have been specifically identified in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR, along with

13 Includes campus visitors, patients, childcare students, student family members (living on campus), daytime extension students, ASUCR, KUCR, and Highlander non-student staff, vendors, and construction workers.

general development strategies. Key Planning Strategies that have been incorporated into the project are identified for each topical issue in this IS/MND. Notably, as identified in the "Land Use" section of the 2005 LRDP, as amended, in order to achieve campus goals and to accommodate the program anticipated to be associated with an enrollment of 25,000, expansion of the campus and its facilities will be guided by a number of Land Use Planning Strategies. Most relevant to the proposed project are the following two strategies that are incorporated into the proposed project:

- Achieve academic core densities of 1.0 Floor Area Ratio (FAR) or higher on the East Campus and 1.6 to 1.9 FAR on the West Campus in order to achieve a balance of academic land area versus other required uses within the existing land base; and
- In order to achieve a compact and contiguous academic core and desired development densities, strategies will include infill sites in the developed East Campus academic core as well as expansion to the West Campus academic zone immediately adjacent to the I-215/SR-60 freeway.

  These strategies (PS Land Use 1 and PL Land Use 2) are incorporated into the proposed project. The proposed project involves an expansion of the Barn Group from its current approximately 8,095 gsf to up to 10,765 gsf and would be an infill development in the area designated for academic and support uses in the East Campus. The proposed project would contribute to a 1.0 FAR or higher density on the East Campus.

Circulation and Parking and Campus Planning Strategies relevant to the proposed project include the following:

- Provide a continuous network of bicycle lanes and paths.
- Provide bicycle parking at convenient locations.
- Provide strong connections within the campus and its edges to promote walking, bicycling, and transit use, rather than vehicular traffic.

  These strategies (PS Transportation 3 and PS Transportation 5) are incorporated into the proposed project and are further discussed in Section V.16, Transportation and Traffic, of this IS/MND. As shown on the conceptual site plans for the proposed project and Barn Theater Replacement Option (refer to Figures 5 and 6, respectively), in Section II, Project Description, of this IS/MND, the proposed project has been organized to maintain existing and provide enhanced campus pedestrian and bicycle circulation. Pedestrians and bicyclists arriving to the site would have access from all directions. The entry/gateway to the east is located at the future Barn Walk and is accessible from various pedestrian paths to the north, east, and south, including the Eucalyptus Walk, Library Mall, and the sidewalk along West Campus Drive. The proposed project would not preclude construction of the future Barn Walk adjacent to and east of the project site, as anticipated in the 2005 LRDP, as amended. Additionally, there are existing on-street striped bike lanes along West Campus Drive adjacent to the project site, which would be maintained with the proposed project.

  A new walkway would be constructed west of the project site, with access from West Campus Drive and the pedestrian path west of the H&SS building. A proposed new walkway within the Barn Complex, between the Barn Dining and Kitchen Addition to the south and the Barn Theater and Campus Meeting Room to the north, would be the main pedestrian pathway within the project site and would provide access to all existing and proposed facilities in the Barn Complex. All pedestrian paths would be ADA accessible.

Additionally, bike storage would be provided at the eastern entry of the project site and would be accessed from the future Barn Walk.

The Open Space and Landscape Planning Strategy relevant to the proposed project is as follows:

- Provide landscaped Open Space buffers and setbacks along campus edges, such as Valencia Hills Drive and its extension south of Big Springs Road, Martin Luther King Jr. Boulevard, and the I-215/SR-60 freeway.

  This strategy (PS Open Space 4) is incorporated into the proposed project, as further discussed in Section V.1, Aesthetics, of this IS/MND. The project site is along West Campus Drive near the eastern edge of the east campus and in the vicinity of I-215/SR-60. As shown in the Tree Impact Map (refer to Figure 15), mature western sycamore trees at the southeast corner of the project site near the intersection with West Campus Drive and the service driveway to Sproul Hall would be maintained. Additionally, as shown in Figure 10, Conceptual Landscape Plan, new landscaping, including trees, would be planted along the perimeter of the project site. Further, the proposed project does not involve any components that would alter the existing conditions of the campus perimeter along I-215/SR-160.

University of California, Riverside Campus Design Guidelines

The UCR Campus Design Guidelines include Site and Architectural Guidelines to establish the basic premises and clear intent for creative design decisions that are made for projects on campus; the Campus Design Guidelines are not intended to be prescriptive. The Site Guidelines address planting, paving, site lighting, furnishings, grading and rainwater management, circulation systems, and campus-wide signage. The Architectural Guidelines address outdoor circulation; building orientation and entrances; relationship of interior to exterior at ground floor; building massing and articulation; building materials and color palette; and building response to climate. A description of the proposed project, which addresses each of these issues, is provided in Section II, Project Description, of this IS/MND.

The proposed project incorporates PP 4.9-1(a), which ensures that the Campus Design Guidelines and instructions to implement the Guidelines are taken into consideration, including those sections related to use of consistent scale and massing, compatible architectural style, complementary color palette, preservation of existing site features, and appropriate site and exterior lighting design. As described in Section II, Project Description, and further analyzed in Section V.1, Aesthetics, of this IS/MND, the overall character of the proposed project has been developed to revive and repurpose the Barn Dining and Barn Theater, with these buildings as the central elements. As shown in the conceptual building elevations (Figures 9a through 9c), with the exception of the Ticketing Tower, each of the buildings would be a single level, consistent with existing conditions. The proposed Ticketing Tower is designed to be a prominent visual feature, serving as a gateway to the Barn Complex, and would have a maximum height of 30 feet, 9 inches. All of the buildings would be shorter than the multilevel structures to the north and east of the project site, including the H&SS Building and Sproul Hall.

The proposed project has been designed to enhance the awareness of the campus' agrarian heritage. In order to accomplish this and for the Barn facilities to be perceived as a complex of related structures and activities, the material choices, massing strategies, and connecting structures have been considered as a whole. The existing buildings to be retained and new buildings to be constructed would be interconnected through at-grade connections to the existing and proposed pedestrian paths and outdoor spaces, including the East and West Courtyards. The building materials and color palette to be used would adhere to the Campus

Design Guidelines to be visually harmonious with the UCR campus as well as the immediately surrounding buildings (as required by PP 4.1-1) and would be reviewed as part of the project-specific design review process and through approval of construction documents (refer to MM 4.1-3[a]).

The existing buildings in the Barn Group consist of wood-framed buildings in need of repair. The proposed Kitchen Addition would also be a wood-framed structure on a concrete slab; however, to contrast with the Barn Dining building, metal or a different pattern and scale of wood siding would be used. The proposed Faculty/Staff Dining building would have a modern agrarian aesthetic, a contemporary take on the gable vernacular. The proposed Campus Meeting Room would be a hybrid between the vernacular wood framing of Barn Dining and the more modern agrarian/market hall framing of Faculty/Staff Dining. The exterior materials would be wood siding and aluminum windows and doors. The Restroom building would also be a wood-framed building with a flat roof. Should the Barn Theater be replaced, it would also be a wood-framed building.

Additionally, the proposed project incorporates PP 4.9-1(b) , which ensures that the design team has developed a project-specific landscape plan consistent with the Campus Design Guidelines with respect to the selection of plants, retention of existing trees, and use of water conserving plants, where feasible. The conceptual open space and landscape plan is depicted on Figure 10. The proposed landscape has been designed to support the programmed exterior uses at the Barn Complex and to address connections with the UCR campus as a whole. Along the south and west sides of the project site, plant materials would be used to both screen patio spaces and provide a pleasant, unified landscape edge along West Campus Drive. Along the eastern edge of the project site, a row of new trees and groundcovers would be planted along the future Barn Walk.

Incorporation of PPs 4.9-1(a) and 4.9-1(b) into the proposed project ensures that the intent of the Campus Design Guidelines related to site and architectural guidelines have been met.

Regional and Local Plans

The proposed project would involve a net increase of development on campus of up to approximately 10,765 gsf. The proposed project would not be considered regionally significant by SCAG based on the established criteria in Section 15206 of the State CEQA Guidelines, which is applied by SCAG to determine regional significance (SCAG 2016a). Therefore, an assessment of the proposed project's consistency with SCAG's regional plans is not required.

As addressed in Section V.9, Hydrology and Water Quality, of this IS/MND, the proposed project is required to comply with all applicable water quality requirements established by the Santa Ana RWQCB and SWRCB. Therefore, consistent with the findings of the 2005 LRDP Amendment 2 EIR, the proposed project would be consistent with the Basin Plan. As discussed in Section V.3, Air Quality, of this IS/MND, the proposed project would also be consistent with the AQMP. Refer to the analysis for Threshold 10d below regarding the MSHCP.

UCR is part of the UC, a constitutionally created entity of the State of California. As a constitutional entity, the UC is not subject to municipal regulations, such as the County and City General Plans. Nevertheless, UCR has considered local plans and policies for the communities surrounding the campus. UCR participated in the development of the current City of Riverside General Plan and the University Neighborhood Plan in an effort to coordinate planning efforts between the City of Riverside and the campus. The City of Riverside General Plan, which includes the campus, has identified UCR as a public facility/institutional land use. The proposed project is consistent with this land use designation, consistent with the findings of the 2005 LRDP Amendment 2 EIR.

In summary, consistent with the finding under Impact 4.9-2 of the 2005 LRDP Amendment 2 EIR, there would be a less than significant impact related to conflicts with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the proposed project adopted for the purpose of avoiding or mitigating an environmental effect.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the proposed project; therefore, no impact would result.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☐	☒

Discussion

As addressed in Section V.4, Biological Resources, of this IS/MND, although sections of Cells 634 and 719 of the MSHCP include portions of the campus, the plan does not identify any portion of UCR for conservation. Therefore, the development under the 2005 LRDP, including the proposed project, would not conflict with the MSHCP.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact to any applicable HCP or NCCP.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project create other land use impacts?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.9-1 in the 2005 LRDP EIR concluded that, with implementation of PS Land Use 1 through 7, PS Open Space 1 through 7, PS Campus and Community 1 through 3, PS Transportation 1 through 6, PS Conservation 1 through 4, PS Development Strategy 1 through 3, and PPs 4.9-1(a) through (c), there would be a less than significant impact related to land use incompatibilities.

The Barn has been and continues to be one of the most popular campus dining venues and is a social gathering place for UCR's campus community. However, the current Barn dining program is at capacity and constrained due to the size and configuration of the kitchen and limited seating. This has resulted in dining deficiencies in the southwest part of the East Campus. Additionally, there is currently no faculty club on campus that offers faculty and staff a place to meet and interact in a relaxed environment. Further, the Barn Theater requires attention to extend the useful life of the building and to support the academic and student organizations that utilize the space. Improvements to the Barn Theater are necessary to address building deficiencies.

The proposed project would substantially enhance the dining, gathering, and entertainment capacities of the Barn facilities for faculty, staff, students, and guests, while maintaining the importance of the Barn to the campus community. To accomplish the established goals, the proposed project would involve demolition, renovation, and expansion of existing structures and construction of new structures. With implementation of the proposed project, there would be approximately 18,795 gsf of building space in the Barn Complex; this represents a net increase of only approximately 10,700 gsf compared to existing conditions. With implementation of the Barn Theater Replacement Option, there would be a total of approximately 18,860 gsf in the Barn Complex, a net increase of approximately 10,765 gsf. This is a relatively minimal increase in building area on campus, especially given the importance of expanding the dining and entertainment facilities in this part of the campus.

By improving the existing Barn facilities, the proposed project minimizes site disturbance. Additionally, mature trees would be retained, to the extent feasible. The final design of the proposed buildings is required to be consistent with the Campus Design Guidelines (PPs 4.9-1[a] through [c]). As discussed above and further under the analysis of Aesthetics in Section V.1 of this IS/MND, the overall character of the proposed project has been developed to revive and repurpose the Barn Dining and Barn Theater, with these buildings as the central elements. The buildings are consistent with regard to scale, massing, and other aspects of building design. Additionally, the proposed project maintains or enhances pedestrian and bicycle circulation within and through the project site. The proposed project would be compatible with existing on-campus development, including the H&SS building to the north and Sproul Hall to the east.

Therefore, there would be a less than significant impact related to development of land uses that are incompatible with existing adjacent land uses or with planned uses with incorporation of the identified PSs and PPs into the proposed project, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to other land use impacts.

11. Mineral Resources

Mineral resource issues were addressed in the Initial Study prepared for the 2005 LRDP EIR. There are no relevant elements of the proposed project related to Mineral Resources. Additionally, there are no relevant PSs, PPs, or MMs adopted as part of the 2005 LRDP EIR.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☐	☒
b) Would the project 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?	☐	☐	☐	☐	☒

Discussion

As identified in the Initial Study for the 2005 LRDP EIR, there are no mineral resources of regional or Statewide importance known to exist on the UC Riverside campus. Also, no mineral resource recovery activities occur on the UCR campus, and no mineral resource recovery sites are delineated in the General Plans for the County and City of Riverside or the University Community Plan, which covers the area around the campus. Therefore, consistent with the findings of the 2005 LRDP EIR, implementation of the proposed project would not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State, and no impact would occur.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to (1) the availability of a known mineral resource that would be of value to the region and the residents of the State or (2) the availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

12. Noise

The analysis of noise is tiered from the UCR 2005 LRDP EIR (as it relates to development in the East Campus) as supplemented and updated by the UCR 2005 LRDP Amendment 2 EIR (as it relates to increased noise from traffic generated by the 2005 LRDP Amendment 2); it was addressed in Section 4.10, Noise, of those documents. As described previously in Section II, Project Description, of this IS/MND, relevant elements of the proposed project related to noise and vibration include the use of diesel-powered and other heavy equipment during construction. The proposed project would include construction activities at the project site, which would involve demolition, grading, and other construction-related activities.

With respect to operations, the proposed project would increase Barn Dining hours Monday through Friday; dining capacity; and the number of events held at the Barn Complex from between 80 and 130 annual events to approximately 540 events/meetings and approximately 60 band/entertainment events. It is estimated that the proposed project could increase the UCR campus employee population by approximately nine persons. Additionally, the proposed project includes use of mechanical equipment (such as air conditioning units) and a permanent amplification system for events at the West Courtyard (temporary sound amplification is brought in for outdoor events under existing conditions).

The following applicable PPs and MM were adopted as part of the 2005 LRDP Amendment and/or 2005 LRDP Amendment 2 EIR and are incorporated as part of the proposed project and assumed in the analysis presented in this section.

PP 4.10-1(a) UCR will incorporate the following siting design measures to reduce long-term noise impacts:

(i) Truck access, parking area design, and air conditioning/refrigeration units will be designed and evaluated when planning specific individual new facilities to minimize the potential for noise impacts to adjacent developments.

(ii) Building setbacks, building design and orientation will be used to reduce intrusive noise at sensitive student residential and educational building locations near main campus access routes, such as Blaine Street, Canyon Crest Drive, University Avenue, and Martin Luther King Jr. Boulevard. Noise walls may be advisable to screen existing and proposed facilities located near the I-215/SR-60 freeway.

(iii) Adequate acoustic insulation would be added to residence halls to ensure that the interior L_{dn} would not exceed 45 dBA during the daytime and 40 dBA during the nighttime (10 PM to 7 AM) in rooms facing major streets.

(iv) Potential noise impacts would be evaluated as part of the design review for all projects. If determined to be significant, mitigation measures would be identified and alternatives suggested. At a minimum, campus residence halls and student housing design would comply with Title 24, Part 2 of the California Administrative Code.

PP 4.10-2 The UCR campus shall limit the hours of exterior construction activities from 7:00 AM to 9:00 PM Monday through Friday and 8:00 AM to 6:00 PM on Saturday when necessary. Construction traffic shall follow transportation routes prescribed for all construction traffic to minimize the impact of this traffic (including noise impacts) on the surrounding community.

PP 4.10-6	The Campus shall continue to shield all new stationary sources of noise that would be located in close proximity to noise-sensitive buildings and uses.
PP 4.10-7(a)	To the extent feasible, construction activities shall be limited to 7:00 AM to 9:00 PM Monday through Friday, 8:00 AM to 6:00 PM on Saturday, and no construction on Sunday and national holidays, as appropriate, in order to minimize disruption to area residences surrounding the campus and to on campus uses that are sensitive to noise.
PP 4.10-7(b)	The Campus shall continue to require by contract specifications that construction equipment be required to be muffled or otherwise shielded. Contracts shall specify that engine-driven equipment be fitted with appropriate noise mufflers.
PP 4.10-7(c)	The Campus shall continue to require that stationary construction equipment material and vehicle staging be placed to direct noise away from sensitive receptors.
PP 4.10-7(d)	The Campus shall continue to conduct regular meetings, as needed, with on campus constituents to provide advance notice of construction activities in order to coordinate these activities with the academic calendar, scheduled events, and other situations, as needed.
~~**PP 4.10-8**~~	~~The Campus shall continue to conduct meetings, as needed, with off-campus 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.~~
MM 4.10-2	The campus shall notify all academic and residential facilities within 300 feet of approved construction sites of the planned schedule of vibration causing activities so that the occupants and/or researchers can take necessary precautionary measures to avoid negative effects to their activities and/or research.

As identified in Section V.3, Air Quality, of this IS/MND, the proposed project also incorporates PS Campus and Community 4 (promote campus-wide non-vehicular transportation), PS Transportation 3 (campus-wide bicycle network to connect to off-campus bicycle routes), PS Transportation 4 (provide bicycle parking), and PP 4.3-1 (campus-wide implementation of a transportation demand management program), which all serve to reduce vehicular trips.

Noise-Sensitive Receptors

Noise-sensitive land uses include those uses where noise exposure could result in health-related risks to individuals and places where quiet is an essential element of the intended purpose. Residential dwellings are of primary concern; land uses such as parks, historic sites, cemeteries, and some recreation areas are considered sensitive to increases in exterior noise levels. Noise-

sensitive land uses identified in the UCR 2005 LRDP Amendment 2 EIR are residential areas and a motel. However, recreational uses are also identified for construction noise impact analysis. The nearest residences to the project area are on-campus residences approximately 2,300 feet to the northeast and northwest of the project site and off-campus residences on North University Drive, approximately 2,200 feet south of the Barn Complex and west of I-215/SR-60. The closest buildings to the Barn Complex are academic and administrative facilities, which are not noise-sensitive receptors.

Existing Noise Levels

The dominant source of noise in the project area is vehicle traffic on West Campus Drive, which is adjacent to the Barn Complex; Canyon Crest Drive, which is approximately 300 feet southeast of the Barn Complex and connects to West Campus Drive; and on the I-215/SR-60 freeway, which is approximately 150 feet southwest of the Barn Complex. There is an approximately 10- to 12-foot-high wall adjacent to the freeway that reduces vehicle noise to the project site. When noise measurements were taken for the 2005 LRDP EIR, noise levels along West Campus Drive near Parking Lot 4 adjacent to the project site ranged from 62.3 to 82.8 A-weighted decibels (dBA) on the Sound Energy Equivalent Noise Level (L_{eq}), with an average 68.5 L_{eq}. The predominant source of noise was I-215/SR-60.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project result in exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☐	☒

Discussion

The University of California is not subject to municipal regulations, such as the County and City General Plans or noise ordinances. As identified in the UCR 2005 LRDP EIR, federal agencies that have developed noise standards include the Federal Highway Administration (FHWA), the Department of Housing and Urban Development (HUD), the Federal Interagency Committee on Urban Noise (FICUN), and the Federal Aviation Administration (FAA). None of these federal noise standards are applicable to the UCR campus. Title 24 of the *California Code of Regulations* codifies Sound Transmission Control requirements, which establishes uniform minimum noise insulation performance standards for new residences, hotels, motels, dormitories, and apartment houses. The Barn Complex consists of non-residential entertainment and dining facilities and the State Title 24 regulations are not applicable to the proposed project. In addition, there are no University noise standards applicable to the proposed project. Therefore, there would be no impact because there are no federal, State, or University noise regulations applicable to the proposed project.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐	☐

Discussion

The 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR adopt the following thresholds for "excessive" vibrations: 65 vibration decibels (VdB) at buildings where vibration would interfere with interior operations (e.g., sensitive on-campus research buildings), 80 VdB at residences and buildings where people normally sleep (e.g., student housing buildings and nearby residences), and 83 VdB at other institutional buildings.

Short-Term (Construction) Vibration

The analysis of Impact 4.10-3 in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR concluded that development on campus would result in less than significant short-term impacts to off-campus persons from vibration during construction, including vibration from heavy trucks.

The analysis of Impact 4.10-2 in the 2005 LRDP Amendment 2 EIR concluded that development under the 2005 LRDP, as amended, could result in significant and unavoidable impacts to on-campus sensitive buildings located in close proximity to the construction sites from excessive groundborne vibration.

Construction of the proposed project is anticipated to begin in November 2017 with completion in March 2019. Construction activities would include demolition for approximately 3 weeks, site preparation and grading for approximately 4 weeks, building construction and utility installation for approximately 12 months, and paving for approximately 2 weeks (not consecutive).

On-Campus Receptors

There are no vibration-sensitive uses (e.g., research buildings or residential buildings) within 300 feet of the project site. There is a classroom on the first floor of the western portion of Sproul Hall that may be exposed to vibration during construction.

Construction activities would include building and hardscape demolition and removal, excavation and grading, and paving. The proposed project would not include pile driving or blasting, which are the construction activities that generate the highest vibration levels. Heavy trucks would transport materials to and from the project area. During the demolition and grading phases, the operation of heavy or large construction equipment such as bulldozers, excavators, and loaded trucks have the potential to generate perceptible vibration levels at nearby buildings.

As described under the analysis of Impact 4.10-2 in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR, where construction occurs more than 50 feet from campus classroom buildings, office buildings, and student housing buildings or where construction occurs more than 300 feet from research buildings with vibration-sensitive equipment, the impact would be less than significant. Based on the information presented in Table 4.10-4 of the LRDP EIRs, Vibration Levels for Construction Equipment, vibration levels from large bulldozers and loaded trucks could reach up to 86 to 87 VdB at buildings located within 25 feet of the equipment in use. This would exceed the 83 VdB threshold for institutional buildings. At a distance of 50 feet, vibration levels for this equipment would not exceed 81 VdB.

Demolition and grading for the proposed project could occur within 50 feet of the H&SS building and a classroom at Sproul Hall; however, no vibration-sensitive uses are located at the H&SS building. The vibration impact to the classroom at Sproul Hall would be potentially significant, even with limits on hours of construction where necessary, as described in PP 4.10-2. MM 4.10-2 from the 2005 LRDP Amendment 2 EIR is incorporated into the project and requires notification of affected persons about the planned construction in order to minimize the impact. Further, additional project MM BARN VIB-1, which prohibits the use of large heavy equipment within 50 feet of occupied academic buildings, is required and would reduce potential vibration impacts to a less than significant level.

Off-Campus Receptors

Potential vibration impacts from construction activities to off-campus uses are addressed under the analysis of Impact 4.10-3 in 2005 LRDP EIR. The nearest off-campus residential uses to the project area are single-family homes on North University Drive, approximately 2,200 feet south of the Barn Complex and west of I-215/SR-60. Based on Table 4.10-8 of the 2005 LRDP EIR, vibration levels at the nearest off-campus residences from construction activities at the project area would be less than 75 VdB, which is the highest vibration level at 100 feet. No significant construction-related vibration impact to off-campus uses would result, which is consistent with the findings of the 2005 LRDP EIR.

Heavy trucks would transport materials to and from the campus when construction activities occur. Demolition would include the existing 1,625-sf Barn Stable, 1,650-sf Barn Theater (assuming implementation of the Barn Theater Replacement Option), and 690-sf University Club Room, for a total of approximately 3,965 sf of buildings and an estimated 30,000 sf of pavement. It is estimated that demolition would require approximately 71 round trips to a construction and demolition waste disposal site. Grading, building, and paving would occur over an approximately 13-month period; there would be an average of approximately 3 round trips per day. Construction traffic would use I-215, University Avenue, or Martin Luther King Jr. Boulevard to Canyon Crest Drive and West Campus Drive to the project site. These trucks typically generate groundborne vibration velocity levels of around 63 VdB at 50 feet and could reach 72 VdB where trucks pass over bumps in the road; these vibration levels would be less than the Federal Railway Administration's 80 VdB vibration impact threshold for residences referenced in Table 4.10-8 of the 2005 LRDP Amendment 2 EIR. Therefore, construction of the proposed project would not expose occupants of on- or off-campus buildings to excessive groundborne vibration levels from heavy trucks, and this impact would be less than significant, which is consistent with the findings in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR.

Operational Vibration

As described in the 2005 LRDP EIR, the existing campus facilities are not a major source of vibration. The proposed project would accommodate activities similar to the existing dining and entertainment uses at the project site and operation of the proposed project would not result in

vibration levels that could expose persons on or off campus to excessive groundborne vibration or noise levels. This impact would be less than significant, which is consistent with findings of the 2005 LRDP EIR, as amended.

Additional Project-Level Mitigation Measures

No additional project-level mitigation is required for construction-related vibration to off-campus uses. MM BARN VIB-1 would reduce potential vibration impacts during construction to a less than significant level.

MM BARN VIB-1 The campus shall require by contract specifications that large bulldozers; large, heavy trucks; vibratory rollers; and other similar equipment not be used within 50 feet of occupied **academic** buildings. The work shall be done with medium-sized equipment or smaller within these prescribed distances. Vibratory rollers operated in the static mode would be allowed.

Level of Significance

The proposed project would have less than significant temporary construction vibration impacts to off-campus receptors.

With incorporation of PP 4.10-2 (limits on construction hours), MM 4.10-2 (notification of affected persons about the planned construction and potential vibration), and project-level MM BARN VIB-1 (prohibition of heavy equipment use within 50 feet of buildings), the proposed project would have a less than significant impact for temporary construction vibration impacts to occupied on-campus buildings. This impact would be less than the significant and unavoidable impact determined in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒	☐

Discussion

The analysis of Impacts 4.10-5 and 4.10-6 in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR concluded that development under the 2005 LRDP, as amended, would result in less than significant long-term operational impacts related to

- on- or off-campus ambient roadway (traffic) noise levels and
- on- or off-campus ambient stationary source noise levels.

The 2005 LRDP Amendment 2 EIR addressed potential traffic-related noise impacts associated with the remaining development under the 2005 LRDP, as amended, which includes the proposed project. For purposes of analysis in this IS/MND, it is expected that the proposed project could result in an increased campus employment of approximately nine persons. It is assumed that the change in vehicle trip generation associated with this increase in population would be negligible

and there would not be a perceptible change in traffic noise. The impact would be less than significant.

As discussed in Section V.16, Transportation and Traffic, of this IS/MND, under existing conditions, the majority of guests at the Barn Dining for general dining activities (not events) are affiliated with UCR and walk to the project site from other locations on campus. While the proposed project would increase the number of daily dining guests, it is expected that these guests would continue to walk to the Barn Complex and there would not be an increase in traffic or traffic-related noise.

With implementation of the proposed project, there would be an increase in the number of meetings/events on an annual basis (from approximately 80 to 130 annual events to approximately 540 meetings/events). However, this increase would be spread throughout the year. The distribution of event traffic on campus is based on where guests are directed to park. Parking for large events at the expanded Barn Complex would be directed to Parking Lots 1 or 6. These lots are closest to the project site and are currently used to park event attendees coming to events on campus. It is likely that events moving from a current location on campus to the expanded Barn Complex would be parked in the same location they are under existing conditions. Therefore, there would not be a substantial increase in traffic noise associated with events at the Barn Complex.

With respect to stationary sources of noise, heating, ventilation, and air conditioning (HVAC) units would be retained and may be upgraded on buildings to be renovated and new HVAC units would be installed on the roofs of the proposed new buildings. The equipment would be shielded by parapets or other screening materials. As identified under the analysis of Impact 4.10-6 in the 2005 LRDP Amendment 2 EIR, the type of equipment currently installed on new on-campus buildings generates noise levels up to 66 dBA L_{eq}, or 73 dBA Community Noise Equivalent Level (CNEL) if operating for 24 hours, when measured at 50 feet from the source. The nearest noise-sensitive receptors to the proposed project site are the off-campus single-family homes on North University Drive, approximately 2,200 feet south of the Barn Complex. At that distance, and not taking into account any intervening uses that would provide noise attenuation, noise from the operation of typical HVAC units would be less than 35 dBA L_{eq} and 42 dBA CNEL and would not be perceptible. The noise impacts from stationary sources would be less than significant, which is consistent with the findings of the 2005 LRDP Amendment 2 EIR.

In summary, the proposed project would not result in substantial, permanent operational noise impacts. The impact would be less than significant, which is consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have less than significant impacts related to excessive groundborne noise levels and resulting in a substantial, permanent increase in ambient noise levels in the project vicinity above existing noise levels.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project (including construction)?	☐	☐	☐	☒	☐

Discussion

The analysis of Impacts 4.10-7 and 4.10-8 in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR concluded that development under the 2005 LRDP, as amended, would result in significant and unavoidable impacts related to

- on-campus ambient noise levels during construction and
- off-campus ambient noise levels during construction.

The analysis of Impact 4.10-9 in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR concluded that development on campus would result in less than significant short-term construction-related impacts related to

- ambient noise levels due to special events.

<u>On-Campus Receptors</u>

During construction, nearby noise-sensitive receptors would be exposed to occasional increased noise levels associated with the operation of heavy equipment (e.g., loaders and bulldozers) during the demolition and grading phase. For the purpose of this analysis and consistent with the 2005 LRDP EIR, noise impacts during construction would be considered significant if activities lasting more than 1 day would increase the ambient noise levels by 10 dBA L_{eq} or more over a 1-hour period at any on-campus or off-campus noise-sensitive location.

The closest on-campus noise-sensitive receptors during grading would be the residences located approximately 2,300 feet northwest and northeast of the project site. Construction equipment noise would not be constant because of the variations of power, cycles, and equipment location. Worst-case one-hour noise levels were calculated assuming a bulldozer and loader would be operating near the northern site boundary during grading. Not taking into consideration intervening buildings and terrain, noise levels could reach 52 dBA L_{eq} at the residential building facades. After applying an assumed 20 dBA exterior-to-interior noise reduction with all windows closed, the interior average noise levels due to construction would be 32 dBA L_{eq} inside the building. Additional reduction would occur due to intervening buildings. It is therefore unlikely that construction noise from the site would be heard at on-campus residences, and no impact would occur.

The proposed project incorporates PPs 4.10-2 and 4.10-7(a), which require hours of construction to be limited to 7:00 AM to 9:00 PM Monday through Friday and 8:00 AM to 6:00 PM on Saturday. Noise impacts would be minimized with PP 4.10-7(b), which requires the muffling or shielding of equipment, and PP 4.10-7(c), which requires that stationary construction equipment material and vehicle staging be placed to direct noise away from sensitive receptors.

Off-Campus Receptors

As previously noted, the nearest off-campus noise-sensitive receptors are off-campus single-family homes on North University Drive, approximately 2,200 feet south of the Barn Complex area. At this distance, construction activity noise levels from the site would be reduced by at least 33 dBA due to distance; additional reductions would occur due to intervening buildings and terrain. It is therefore unlikely that construction noise from the site would be heard at off-campus residences, and no impact would occur.

With respect to construction vehicle noise impacts, heavy trucks exporting demolition spoils would use designated haul routes. As discussed above, construction traffic would use I-215, University Avenue, or Martin Luther King Jr. Boulevard to Canyon Crest Drive and West Campus Drive to the project site. There are residences along I-215/SR-60. Therefore, project-generated haul trucks (an average of approximately five round trips per day or one to two passbys per hour) may pass off-campus noise-sensitive receptors along I-215/SR-60. The additional truck noise on off-campus roadway segments would be mixed with existing traffic noise from I-215/SR-60. Individual truck passbys may be occasionally noticeable; however, because of the large volume of existing traffic on I-215/SR-60, the change in the overall average noise level would not be perceptible, resulting in a less than significant impact.

Construction activities for the proposed project would result in a less than significant noise impact to off-campus sensitive receptors.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have less than significant temporary construction noise impacts to on-campus and off-campus receptors.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☐	☒

Discussion

As discussed in the Initial Study for the 2005 LRDP Amendment 2 EIR, development under the 2005 LRDP, as amended, was determined to have no impact related to noise from public or private airport/airstrip operations and was not carried forward for further discussion in the Draft EIR. The UCR campus is not located within the boundaries of any airport land use plan; is more

than two miles from the nearest public airport; and is not located in the vicinity of a private airstrip. Consistent with the findings of the 2005 LRDP Amendment 2 EIR, implementation of the proposed project would not expose people in the project area to excessive noise levels related to public or private airport operations.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to public use airports or private airstrips.

13. Population and Housing

The analysis of population and housing is tiered from the 2005 LRDP Amendment 2 EIR and was addressed in Section 4.11, Population and Housing, of that document. Relevant elements of the proposed project related to population and housing include the addition of potentially 9 career staff positions and 91 student employee positions on campus.

There were no applicable PSs, PPs, or MMs adopted as part of the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR related to population and housing.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒	☐

Discussion

The analysis of Impacts 4.11-1 and 4.11-2 in the 2005 LRDP Amendment 2 EIR determined that, although development under the 2005 LRDP Amendment 2 EIR and cumulative development would directly induce substantial population growth, because the projected housing supply in the area would be adequate to serve the additional population, there would be a less than significant impact with implementation of PS Land Use 4 (related to provision of on-campus housing).

As further discussed in Section II, Project Description, of this IS/MND, there are currently 45 individuals employed at the Barn Group, including career staff (8 individuals) and students (37 individuals). With implementation of the proposed project, it is estimated there would be up to 17 career staff and up to 128 students employed with events (78 not including events). Therefore, there would be a potential increase of 9 career staff, which could be new employees on campus, and a potential increase of 91 student employees at the Barn Complex (41 student employees not including events). It is expected that the career staff positions would be filled by the local labor pool, and the student positions would be filled by students already on campus. It should be noted that the number of career and student staff at the Barn Complex at any given time would vary

based on work shifts and the events being held. As discussed in Section V.10, Land Use and Planning, of this IS/MND, this increase in the on-campus population is within the remaining projected growth on campus, as identified in the 2005 LRDP, as amended.

The 2005 LRDP, as amended (refer to Table 1, Projected Campus Population, of the LRDP, and Table 3.0-4 of the 2005 LRDP Amendment 2 EIR), includes campus visitors in the category of "other individuals". This category includes the "average weekday number of other individuals, including campus visitors, patients, childcare students, student family members (living on campus), daytime extension students, ASUCR, KUCR & Highlander non-student staff, vendors, and construction workers". Other individuals do not include evening or weekend extension students or evening or weekend visitors. The proposed project addresses existing deficiencies at the Barn Group that limit its use. With the increase in capacity, the number of guests/visitors at the Barn Complex would increase compared to existing conditions. It is anticipated that most of the daytime guests/visitors would continue to be individuals who are already on campus, and these individuals would not increase the average weekday number of other individuals on campus. While it is estimated that the percentage of off-campus guests at events at the Barn Complex (not affiliated with UCR) would increase from 20 percent to 25 to 30 percent, the majority of these events would occur in the evenings or on weekdays. Therefore, the proposed project would not increase the average weekday number of other individuals on campus, since this category does not include evening or weekend visitors.

Because the projected housing supply in both the City of Riverside and the region was determined adequate for the additional non-student population associated with implementation of the 2005 LRDP, as amended, it can be concluded that there would be adequate supply for an additional nine career staff positions at the Barn Complex. However, it is not likely that all of these positions would be new to the City or region.

Therefore, the proposed project would not result in substantial population growth or growth beyond that anticipated with implementation of the 2005 LRDP, as amended. This impact is less than significant, consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to inducing substantial population growth in the area either directly or indirectly.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☐	☒
c) Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☐	☒

Discussion

The IS prepared for the 2005 LRDP Amendment 2 EIR concluded that there would be no impacts related to the displacement of existing housing or people since implementation of the 2005 LRDP, as amended, would not involve the demolition or removal of housing. There are no existing residential uses located within the project site. Therefore, the proposed project would not require the construction of replacement housing consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impacts related to (1) displacement of a substantial amount of existing housing that would necessitate the construction of replacement housing or (2) displacement of substantial numbers of people that would necessitate the construction of replacement housing.

14. Public Services

The analysis of the provision of public services on campus (i.e., fire, police, schools, and other public facilities) is tiered from the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR and is addressed in Section 4.12, Public Services, of those documents. As described previously in Section II, Project Description, of this IS/MND, relevant elements of the proposed project related to public services include the expansion of dining facilities and event space at the existing Barn Group. Existing fire and emergency access would be maintained (through an existing access road between the project site and Sproul Hall), and additional access would be provided from the proposed loading dock and service yard driveway at West Campus Drive.

The following applicable PPs were adopted as part of the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR; they have been incorporated as part of the proposed project and are assumed in the analysis presented in this section.

PP 4.12-1(a) As development occurs, the following measures will be incorporated:

(i) New structures would be designed with adequate fire protection features in compliance with State law and the requirements of the State Fire Marshal. Building

designs would be reviewed by appropriate campus staff and government agencies.

(ii) Prior to implementation of individual projects, the adequacy of water supply and water pressure will be determined in order to ensure sufficient fire protection services.

(iii) Adequate access will be provided to within 50 feet of the main entrance of occupied buildings to accommodate emergency ambulance service.

(iv) Adequate access for fire apparatus will be provided within 50 feet of stand pipes and sprinkler outlets.

(v) Service roads, plazas, and pedestrian walks that may be used for fire or emergency vehicles will be constructed to withstand loads of up to 45,000 pounds.

(vi) As implementation of the LRDP occurs, campus fire prevention staffing needs would be assessed; increases in staffing would be determined through such needs assessments.

PP 4.12-1(b)

(i) Accident prevention features shall be reviewed and incorporated into new structures to minimize the need for emergency response from the City of Riverside.

(ii) Increased staffing levels for local fire agencies shall be encouraged to meet needs generated by LRDP project related on-campus population increases.

PP 4.12-2(a)

As development under the LRDP occurs, the Campus will hire additional police officers and support staff as necessary to maintain an adequate level of service, staff, and equipment, and will expand the existing police facility when additional space is required.

PP 4.12-2(b)

The Campus will continue to participate in the "UNET" program (for coordinated police response and staffing of a community service center), which provides law enforcement services in the vicinity of the campus, with equal participation of UCR and City police staffs.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:					
a) Fire protection?	☐	☐	☐	☒	☐

Discussion

The analysis of Impacts 4.12-1 and 4.12-3 in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR concluded that, with implementation of PP 4.12-1(a), PP 4.12-1(b), and MM 4.12-1, there would be less than significant direct and cumulative impacts related to the need for new or physically altered fire protection facilities to accommodate the increased demand resulting from implementation of the 2005 LRDP, as amended, and to maintain acceptable service levels. As identified in the 2005 LRDP Amendment 2 EIR, the City of Riverside Fire Department (RFD) indicated that it would be desirable to add a fire station near the campus in order to meet national standards for fire and life safety services with the addition of planned development under the 2005 LRDP, as amended. The 2005 LRDP Amendment 2 EIR concluded that the environmental impact resulting from the potential for the RFD to construct new or expanded fire protection facilities would be less than significant.

As discussed in Section II, Project Description, of this IS/MND, with the Barn Theater Replacement Option, there would be a net increase of approximately 10,765 gsf of building space at the project site; the proposed project would have a net increase of approximately 10,700 gsf. There would be extended operating hours compared to existing conditions and an increase in the number of events held at the project site. The proposed project would increase the on-campus population by nine individuals (career staff); however, this increase in population is within the growth projections for the campus as identified in the 2005 LRDP, as amended, and analyzed in the 2005 LRDP EIR and the 2005 LRDP Amendment 2 EIR. The proposed project would also result in an increase in the number of student employees at the project site and the number of guest/visitors, but most of these individuals are already on campus and would not represent an increase in the campus population.

The RFD is responsible for fire suppression, and the UCR EH&S is responsible for inspection, fire protection engineering, and fire prevention. The campus has a Memorandum of Understanding (MOU) with the State Fire Marshal to provide additional support, and the Campus Fire Marshal is a designated Deputy State Fire Marshal. The proposed project would comply with all regulations of Sections 13000 et seq. of the *California Health and Safety Code,* which pertain to fire protection systems, including provision of smoke alarms, fire extinguishers, appropriate building access, and emergency response notification systems. The proposed project incorporates PP 4.12-1(a), which requires new structures to be designed with adequate fire protection features in compliance with State law. It also requires adequacy of water supply and water pressure to be determined prior to implementation of individual projects to ensure sufficient fire protection services for the campus. PP 4.12-1(b) requires accident prevention features to be included in new structures to minimize the demand for emergency response services from RFD.

The existing service road between the project site and Sproul Hall serves as a fire access lane and would continue to serve as a fire access lane during construction and operation of the proposed project. As such, existing emergency access would be maintained. Additionally, the proposed access road from West Campus Drive to the proposed new loading dock and service yard would also provide emergency access.

The Campus Fire Marshal has determined that the RFD can adequately provide fire protection and emergency medical response services without resulting in the need for additional staff or facilities from other departments (Corrin 2017). As such, no new, expanded, or altered fire protection services or facilities would be required to serve the proposed project, and no physical environmental impacts related to the provision of fire protection services would result.

Because emergency access and fire flows would be adequate to serve the proposed project and no new, expanded, or altered fire protection services or facilities would be required beyond those included as part of the proposed project, impacts associated with the provision of fire protection services from implementation of the proposed project, which incorporates PP 4.12-1(a) and PP 4.12-1(b), are considered less than significant; this is consistent with the findings of the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact on fire protection services; no new or altered fire protection services would be required.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Police protection?	☐	☐	☐	☒	☐

Discussion

The analysis of Impacts 4.12-2 and 4.12-3 in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR identified that the incremental increase in the campus population may result in increased response times by the UC Police Department, Riverside (UCPDR). The increased population on campus would require additional routine services to provide additional patrols of the campus and maintain police presence. Additional administrative staff may be necessary to support the additional patrol personnel. In order to maintain adequate levels of police protection to serve the anticipated increase in campus population, the UCPDR may need to purchase additional equipment and hire additional personnel. However, with implementation of PP 4.12-2(a) and PP 4.12-2(b), there would be less than significant direct and cumulative impacts related to the need for new or physically altered police facilities to accommodate the increased demand resulting from implementation of the 2005 LRDP, as amended, and to maintain acceptable service levels.

The anticipated increase in staffing and equipment of the UCPDR with the addition of planned development under the 2005 LRDP, as amended, could require provision of additional space,

which could include renovation of the existing UCPDR facility, expansion of the existing facility, or the acquisition of a satellite facility (similar to the storefront facility at University Village). The potential environmental effects associated with expanding the existing facility or providing a satellite facility were evaluated in the 2005 LRDP Amendment 2 EIR at a program level, and it was concluded that there would be a less than significant impact.

The UCPDR is responsible for providing police services to the UCR campus. The UCPDR has an MOU with the City of Riverside, whereby the UCPDR and the Riverside Police Department (RPD) provide reciprocal assistance to each other. The two departments jointly operate a community policing enterprise known as the University Neighborhood Enhancement Team (UNET) in a 17.5-square-mile area in the City of Riverside. In addition to UNET, the UCR campus beat officers handle incidents within the City. In turn, RPD provides the UCPDR with emergency backup and, infrequently, assists in handling emergency calls.

As discussed above, the proposed project would increase the campus population by up to nine individuals (career staff); however, this increase is within the growth projections for the campus as identified in the 2005 LRDP, as amended, and analyzed in the 2005 LRDP EIR and the 2005 LRDP Amendment 2 EIR. There would also be an increase in the number of student employees. While there may be an increased demand for police services resulting from the increase in events at the Barn Complex and the associated increase in guests/visitors, the types and volume of service calls for police services at the proposed project would be similar to the existing Barn Group facilities on site. Additionally, the proposed buildings incorporate crime prevention related design features, including, but not limited to, security cameras, electronic access/controls, and environmental design features to help prevent or deter criminal activity. PP 4.12-2(a), which ensures the hiring of additional officers as needed to maintain adequate service levels, and PP 4.12-2(b), which ensures continued UCR participation in the UNET program, are also incorporated into the proposed project. The UCPDR has determined that the proposed project can be adequately served without the need for additional staff or expanded police facilities (Freese 2017).

Therefore, consistent with the findings of the 2005 LRDP EIR and the 2005 LRDP Amendment 2 EIR, no new or expanded police facilities would be required and no physical environmental impacts would result. There would be no impact.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact to police services; no new or altered police facilities would be required.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Schools?	☐	☐	☐	☒	☐

Discussion

As identified in the 2005 LRDP EIR and the IS for the 2005 LRDP Amendment 2 EIR, implementation of the proposed 2005 LRDP Amendment 2 would result in new students in the City of Riverside and surrounding areas, and funds would be available from private residential and commercial development to pay for new facilities. In addition, the RUSD and neighboring school districts have a number of options available to accommodate new students. Therefore, it was concluded that implementation of the 2005 LRDP, as amended, would not result in substantial adverse physical impacts associated with the provision of new or physically altered school facilities.

The proposed project involves the expansion of the Barn Group facilities, which would continue to be used as a dining facility and event space. As such, the proposed project would not include new student, faculty, or staff housing and would not result in a direct increase in new students within the RUSD service area. The introduction of nine new career staff positions could generate an indirect increase in new students within the RUSD through the provision of employment opportunities. However, the increase in population is consistent with the growth projections assumed in the 2005 LRDP, as amended, and analyzed in the 2005 LRDP EIR and the 2005 LRDP Amendment 2 EIR. As such, the proposed project would not result in an increase in new students within the RUSD service area that was not anticipated in 2005 in the 2005 LRDP EIR or LRDP Amendment 2 EIR. Therefore, consistent with the previous findings, substantial adverse impacts associated with new or physically altered school facilities would not result from implementation of the proposed project, and there would be a less than significant impact.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact to schools; no new or altered school facilities would be required.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Parks?	☐	☐	☐	☒	☐

Discussion

The analysis of the proposed project's impacts on parks and other recreation facilities is provided in Section V.15, Recreation, of this IS/MND.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not involve the development of new and expanded recreational facilities, and no new or altered park/recreation facilities would be required as a result of the proposed project.

	Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
e)	Other public facilities?	☐	☐	☐	☐	☒
f)	Create other public service impacts?	☐	☐	☐	☐	☒

Discussion

As identified in the 2005 LRDP EIR and IS for the 2005 LRDP Amendment 2 EIR, implementation of the proposed 2005 LRDP, as amended, would not result in substantial adverse physical impacts associated with the provision of new or physically altered library facilities, and this impact would be less than significant. In addition, UCR provides libraries that are open to the public and are used by its campus population, thus reducing demand on City resources. It was also identified that implementation of planned development under the 2005 LRDP, as amended, would increase the demand on each of the four existing libraries on campus and that satellite libraries may also be developed as part of professional school development. The potential environmental effects associated with the development of satellite libraries were evaluated in the 2005 LRDP EIR at a program level, and it was concluded that there would be a less than significant impact.

As discussed previously, the proposed project would increase the on-campus population by nine individuals (career staff), and this increase would be within the growth projections for the campus. As such, the proposed project would not result in an increased demand for on- or off-campus library services or other public services not anticipated in the 2005 LRDP EIR or 2005 LRDP Amendment 2 EIR. Therefore, consistent with the findings of these EIRs, substantial adverse impacts associated with new or physically altered libraries or other public services would not result from implementation of the proposed project.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact on library services or other public services.

15. Recreation

The analysis of recreation is tiered from the 2005 LRDP EIR and was addressed in Section 4.13, Recreation, of that document. The proposed project does not include the development of any recreational facilities. However, as shown on Figure 10, Conceptual Landscape Plan, the proposed project provides landscape areas throughout the project site. Additionally, the proposed project includes improvements to the existing East Courtyard and construction of a new West Courtyard.

There were no applicable PSs, PPs, or MMs adopted as part of the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR related to recreation.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.13-1 in the 2005 LRDP EIR concluded that the 2005 LRDP includes the implementation of recreational facilities that would be sufficient to serve the planned population growth on campus. Further, it was concluded that with implementation of PS Open Space 7, the increased demand for recreational facilities from additional persons in the City of Riverside would not increase the use of existing neighborhood and regional parks or other recreational facilities such that the substantial physical deterioration of the facility would occur or be accelerated. Therefore, the impact was determined to be less than significant.

As discussed previously, the proposed project would increase the campus population by up to nine individuals (career staff). These positions are expected to be filled by the local labor pool, and this increase would be within the growth projections for the campus. As such, there could be a limited increase in the demand for on-campus recreational facilities associated with the increase in population. However, the proposed project would not result in an increased demand for recreational facilities not anticipated in the 2005 LRDP EIR. The addition of needed on-campus recreational facilities is planned in order to meet the increased demand for recreational facilities generated by the planned growth in the campus population and would be expected to decrease the reliance on existing off-campus parks and recreational facilities by UCR students, faculty, and staff.

Therefore, consistent with the findings of the 2005 LRDP EIR, the proposed project would result in a less than significant impact related to substantial or accelerated physical deterioration of existing neighborhood or regional parks or other recreational facilities.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to an increase in 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.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?	☐	☐	☐	☐	☒

Discussion

The analysis of Impact 4.13-2 in the 2005 LRDP EIR identified that the implementation of the 2005 LRDP would include the development of new recreational facilities that could result in adverse physical impacts on the environment during the construction period. The development of new recreational facilities is one component of the overall LRDP program and, as such, is part of the whole of the action that is analyzed in this 2005 LRDP EIR. The 2005 LRDP EIR concluded that there would be less than significant impacts related to the construction of recreational facilities with implementation of relevant construction-related PSs, PPs, and MMs, including, but not limited to, those related to air quality, noise, traffic, and agriculture.

While there are no recreational facilities included as part of the proposed project, as described in Section II, Project Description, of this IS/MND, the proposed project does include new landscape and hardscape improvements throughout the project site; new pedestrian pathways, including the proposed new pathway that extends east-west within the Barn Complex and the pathway connecting to West Campus Drive east of the project site; improvements to East Courtyard; and construction of a new West Courtyard. The proposed West Courtyard would be constructed between the Barn Dining and new Faculty/Staff Dining and would be used daily as an outdoor eating area for faculty and staff. On a regular basis, it would also be part of site-wide ticketed events, in which up to 350 attendees can simultaneously be in the West Courtyard. A new stage is proposed and would be connected to the Faculty/Staff Dining building. Additionally, a Ticketing Tower would be constructed at the entry to the Barn Complex.

This IS provides project-specific environmental review of the construction and operation of the various project components identified above. Local and regional air quality impacts are addressed under Section V.3, Air Quality; noise and vibration impacts are addressed under Section V.12, Noise; and traffic impacts are addressed under Section V.16, Transportation and Traffic. No additional impacts associated with these improvements would occur beyond those addressed for the proposed project and evaluated in the 2005 LRDP EIR; the proposed project impacts would be less than significant.

The proposed project would not require the construction of new recreational facilities or expansion of existing recreational facilities on or off campus. Therefore, no additional physical impacts would occur with implementation of the proposed project.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to the construction or expansion of recreational facilities.

16. Transportation and Traffic

The analysis of transportation and traffic is tiered from the 2005 LRDP Amendment 2 EIR and was addressed in Section 4.14, Transportation and Traffic, of that document. As described previously in Section II, Project Description, of this IS/MND, relevant elements of the proposed project related to transportation and traffic include (1) an increase in traffic associated with vendors and deliveries and new career staff on campus to serve at the Barn Complex; (2) relocation of the existing access driveway at West Campus Drive to serve the proposed loading dock and service area; (3) construction of new pedestrian walkways within and east of the project site; (4) installation of bike storage on site; (5) temporary traffic associated with food trucks at the temporary dining facility; and (6) temporary construction activities that would involve heavy trucks on the identified construction routes (as described in Section II, Project Description, under "Construction Activities").

The following applicable PSs, PPs, and MMs were adopted as part of the 2005 LRDP Amendment and/or 2005 LRDP Amendment 2 EIR and are incorporated as part of the proposed project and assumed in the analysis presented in this section.

PS Campus and Community 4	Provide strong connections within the campus and its edges to promote walking, bicycling and transit use, rather than vehicular traffic.
PS Transportation 3	Provide a continuous network of bicycle lanes and paths throughout the campus, connecting to off campus bicycle routes.
PS Transportation 5	Provide bicycle parking at convenient locations.
PP 4.14-1	The campus shall continue to implement a Transportation Demand Management program that meets or exceeds all trip reduction and AVR requirements of the SCAQMD. The TDM program may be subject to modification as new technologies are developed or alternate program elements are found to be more effective. *(This is identical to Air Quality PP 4.3-1.)*
PP 4.14-2	The Campus will periodically assess construction schedules of major projects to determine the potential for overlapping construction activities to result in periods of heavy construction vehicle traffic on individual roadway segments, and adjust construction schedules, work hours, or access routes to the extent feasible to reduce construction-related traffic congestion.

PP 4.14-5	To the extent feasible, the Campus shall maintain at least one unobstructed lane in both directions on campus roadways. At any time only a single lane is available, the Campus shall provide a temporary traffic signal, signal carriers (i.e., flagpersons), or other appropriate traffic controls to allow travel in both directions. If construction activities require the complete closure of a roadway segment, the Campus shall provide alternate routes and appropriate signage. *(This is identical to Hazards and Hazardous Materials PP 4.7-7[a].)*
PP 4.14-6	For any construction-related closure of pedestrian routes, the Campus shall provide alternate routes and appropriate signage and provide curb cuts and street crossings to assure alternate routes are accessible.
PP 4.14-8	To maintain adequate access for emergency vehicles when construction projects would result in roadway closures, the Office of Architects and Engineers shall consult with the UCPD, EH&S, and the RFD to disclose roadway closures and identify alternative travel routes.
MM 4.14-1(b)	**Travel Demand Management.** To reduce on- and off-campus vehicle trips and resulting impacts, the University will enhance its Transportation Demand Management (TDM) program. TDM strategies will include measures to increase transit and Shuttle use, encourage alternative transportation modes including bicycle transportation, implement parking policies that reduce demand, and other mechanisms that reduce vehicle trips to and from the campus. The University shall monitor the performance of campus TDM strategies through annual surveys.
MM 4.14-1(d)	**Sustainability and Monitoring.** The University shall review individual projects proposed under the amended 2005 LRDP for consistency with UC sustainable transportation policy and UCR TDM strategies to ensure that bicycle and pedestrian improvements, alternative fuel infrastructure, transit stops, and other project features that promote alternative transportation are incorporated into each project to the extent feasible.
MM 4.14-11	If on-campus parking is not available, off-site construction worker parking shall be provided with shuttle service to the remote parking location.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☐	☒	☐

Discussion

The analysis of Impacts 4.14-1 through 4.14-4 in the 2005 LRDP Amendment 2 EIR, which addresses intersection and roadway capacity, concluded that, with implementation of PS Land Use 4, PS Land Use 7, PS Transportation 1 through 6, PP 4.14-1, MM 4.14-1(a), and the Campus Traffic Mitigation Program (CTMP), composed of MM 4.14-1(b) through MM 4.14-1(f), development under the 2005 LRDP, as amended, would result in the following:

- less than significant impacts to local roadways under existing plus project conditions and in 2020 and no mitigation is required (Impacts 4.14-3 and 4.14-4);
- significant and unavoidable impacts to 13 of the 32 study area intersections under the existing plus project condition and 17 intersections under the year 2020 condition; these intersections are under the jurisdiction of the City of Riverside or California Department of Transportation (Caltrans) (Impacts 4.14-1 and 4.14-2).

As discussed in the 2005 LRDP Amendment 2 EIR, all of the intersection improvements described in the CTMP would fall under the jurisdiction of the City and/or Caltrans. However, because the City and/or Caltrans have not programmed any improvements to these facilities at the time of preparation of the EIR, the construction of the improvements cannot be ensured, as it depends on actions by the City and/or Caltrans. Furthermore, improvements that would restore operations to acceptable levels are not feasible at some of the 17 total affected intersections under the jurisdiction of the City and/or Caltrans. For these reasons, the identified off-campus intersection impacts (Impacts 4.14-1 and 4.14-2) remain significant and unavoidable.

The analysis of Impact 4.14-5 concluded that, even with implementation of PP 4.14-2, development under the 2005 LRDP, as amended, would result in a significant and unavoidable impact to intersection and roadway capacity due to temporary construction traffic.

Unless otherwise noted, the analysis below is applicable to the proposed project and the Barn Theater Replacement Option.

Short-Term Construction Traffic

Construction activities associated with the proposed project could result in temporary closure of on-campus traffic lanes or roadway segments in the project vicinity to permit the delivery of construction materials; to transport exported soil; or to provide adequate site access during

construction of utility connections or other project-related features located adjacent to, or within, West Campus Drive. The proposed project does not involve the import or export of soils; however, heavy truck trips would be generated by other construction activities. Notably, as previously discussed under Section V.2, Air Quality, of this IS/MND, demolition activities associated with the Barn Theater Replacement Option, which also includes demolition of the existing Barn Theater, would generate approximately 71 round truck trips. This would occur over an approximate 3-week period (15 working days). Therefore, trucks would make approximately five round trips per weekday during each week demolition material is exported, representing the period of highest heavy construction vehicle traffic. Fewer trips would be generated under the proposed project, which would retain the Barn Theater.

Using the conservative assumption that these trips would be generated by a tractor-trailer combination (for which each truck trip is equivalent to 2.5 vehicle trips), peak construction traffic of approximately 13 car equivalent round trips per day could result. Because these trips would occur over a typical eight-hour construction day, approximately two trips would be generated during an average hour. With a typical construction day starting at 7:00 AM, approximately two equivalent trips would be generated during the AM peak hour during the period of heaviest construction activity. Construction would typically be completed each day prior to the PM peak hour; therefore, no PM peak hour impacts are anticipated. The addition of two equivalent trips during the AM peak hour, in itself, would not degrade intersection levels of service (LOS) sufficiently to exceed the identified significance criteria. It should also be noted that there would be an increase in construction traffic associated with construction workers traveling to and from the campus. The average number of construction workers would vary on a daily basis depending on the stage of construction. It is estimated there would be a range of approximately 8 to 60 construction workers per day at the project site during construction, with a substantial number of months having 30 to 40 construction workers. With the start of construction at 7:00 AM and ending before the PM peak hour, the construction workers would be traveling to and from the construction site during off-peak traffic hours. Additionally, the construction workers would be directed to the designated parking areas within a short walking distance of the project site (e.g., Lot 4, Lot 30, and/or Lot 32). Therefore, project-specific construction traffic impacts from the Barn Theater Replacement Option and the proposed project, which would have fewer construction-related trips, would be less than significant.

There is a chance that construction of the proposed project may overlap with construction of other on-campus projects that are either proposed or approved; however, it is not anticipated that they would have overlapping construction traffic routes. Additionally, the proposed project would not require lane closures or other access restrictions for extended periods of time. Proposed construction access to the project site would be from I-215, University Avenue, or Martin Luther King Jr. Boulevard to Canyon Crest Drive and West Campus Drive to the project site. The proposed project incorporates PP 4.14-2, which requires the campus to assess construction schedules of major projects periodically to determine the potential for overlapping construction activities and adjust construction schedules, work hours, or access routes to the extent feasible to reduce construction-related traffic congestion. Additionally, the proposed project incorporates PP 4.14-5, which requires one travel lane in each direction, to minimize construction traffic impacts to the extent feasible. Therefore, potential project-related traffic impacts associated with lane closures and access restrictions during construction would be less than significant. Although the 2005 LRDP Amendment 2 EIR concluded that construction traffic could be significant at some locations along the identified access routes, for the reasons discussed above, in the event there is an overlap of construction activities on campus, it is concluded that the Barn Theater Replacement Option and the proposed project would result in a less than significant cumulative traffic construction impact.

Long-Term Operational Traffic

Operations associated with the proposed project would generate increased operational traffic at the project site primarily associated with daily vendor and delivery activities, new career staff (approximately nine new employees at the Barn Complex), and increased events and meetings. The operations with the Barn Theater Replacement Option would be the same as with the proposed project. Although UCR is not subject to municipal regulations, for reference, the City of Riverside's *Traffic Impact Analysis Preparation Guide* (Riverside 2016) requires that traffic impacts be analyzed when a project will add 50 or more peak hour trips up to a 5-mile radius of a project location.

There are currently an average of ten vendor and delivery trips each day at the Barn Group that generally occur between 6:00 AM and 12:00 PM. With the proposed project, the number of trips by new vendors not currently servicing the campus to support dining services is expected to increase; however, the increase would be nominal (two or less trips). Additionally, there would be a nominal number of commissary deliveries from the Barn Complex to other dining locations on campus each day. Vendor and delivery trips are expected to be spread throughout the morning hours, with a nominal number of new trips during the peak traffic hours. Entertainment vendor trips for evening and weekend events would also not occur during peak traffic hours. The number of daily vendor and delivery trips generated during the peak hours would not be sufficient to cause a significant traffic impact at intersections in the vicinity of the project site.

With respect to traffic associated with other operations, under existing conditions, the majority of guests at the Barn Dining for general dining activities (not events) are affiliated with UCR (estimated to be approximately 65 percent staff and faculty and 35 percent students). A negligible number of guests are not affiliated with UCR. These guests walk to the project site from other locations on campus, and there is a negligible number of trips generated (estimated at less than five trips on a daily basis). While the proposed project would increase the number of daily dining guests, it is expected that these guests would continue to walk to the Barn Complex and there would not be an increase in trips generated.

Approximately 80 events were held at the Barn Group during the 2015/2016 fiscal year; historically, approximately 80 to 130 events are scheduled per year. Events are currently constrained by the existing size of the Barn Group. Under existing conditions, for events, there is maximum capacity of 250 people (standing) for shows at the Barn. With the proposed project, there would be up to 540 events/meetings per year, and it is estimated that the maximum attendance would occur at band/entertainment events (up to approximately 500 guests).

The distribution of event traffic on campus is based on where guests are directed to park. Currently, event parking on campus is directed to larger parking lots that have available capacity during the day and time of the event. Parking for large events at the expanded Barn Complex would be directed to Parking Lots 1 or 6. These lots are the closest large lots near the project site with capacity for event parking. These lots are currently used to park event attendees coming to events on campus. It is likely that events moving from a current location on campus to the expanded Barn Complex would be parked in the same location they are under existing conditions. With the exception of event programming coming to the campus, traffic levels entering the campus core from University Avenue and Martin Luther King Jr. Boulevard would be the same with the project as they are under existing conditions.

To the extent there would be additional events on campus, these events would not be taking place at the same time as other events at the Barn so there would not be an overall increase in traffic levels but only additional days where traffic levels may be higher than non-event days. Further, event traffic would be managed by the UCR Transportation & Parking Services Department Event

Services staff consistent with existing conditions. Standard measures employed to eliminate/minimize vehicle traffic congestion, include:

- The distribution of event parking permits takes place inside parking lots with ample cueing space to keep event participants from creating traffic on campus roadways. This process replaces the distribution of permits from roadside kiosks that are used for small events on campus.

- Employees trained to direct vehicle traffic on roadways are stationed at intersections and congestion points to restore vehicle movement if situations such as compressed arrival times occurs and vehicle congestion takes place.

- During the planning of parking for events on campus, a secondary location is selected. Event participants can be redirected to these alternate locations if event attendance levels or vehicle flows dictate a need to move vehicles off roadways at a faster pace to ensure unrelated vehicle traffic flows with little or no impact.

Continued implementation of event management practices would ensure that traffic impacts during events are less than significant.

A discussion of project impacts related to non-vehicular circulation is provided under Threshold f below.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact for construction-related and operational project-related traffic.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☐	☒

The analysis of Impacts 4.14-6 and 4.14-7 in the 2005 LRDP Amendment 2 EIR, which addressed the Riverside County Congestion Management Program (CMP) under existing plus project conditions and in 2020, determined that the operating conditions of all freeway segments operating unacceptably would continue to do so with the addition of 2005 LRDP-related traffic. In addition, the freeway segment LOS under existing plus project conditions for I-215 northbound, between SR-60 and Central Avenue, and I-215 northbound, between Martin Luther King Jr. Boulevard and University Avenue, would decrease from LOS E to LOS F in the AM peak hour with the addition of project traffic. There are no feasible mitigation measures available for these

impacts, and the EIR concluded there would be a significant and unavoidable impact to the affected freeway segments.

As previously discussed, the proposed project would result in less than significant traffic impacts. University Avenue between Market Street and SR-91 is identified as the closest segment that is part of the County's Arterial CMP. The proposed project would not generate traffic volumes that would impact this CMP facility. The proposed project would not conflict with the Riverside County CMP. No impact would result, and no mitigation is required.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to a conflict with an applicable CMP, including, but not limited to, LOS standards and travel demand measures or other standards established by the Riverside County CMP for designated roads or highways.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☐	☒

Discussion

Based on the IS prepared for the 2005 LRDP Amendment 2 EIR, implementation of the 2005 LRDP, as amended, would have no impact related to air traffic patterns. The closest airports to the campus are Flabob Airport, located approximately four miles to the west, and March Joint Air Reserve Base, located approximately six miles to the southeast. The IS concluded development under the 2005 LRDP, as amended, would not increase air traffic levels or result in a change in the location of air traffic patterns resulting in substantial safety risks. Therefore, consistent with the findings of the 2005 LRDP Amendment 2 EIR, there would be no impact from implementation of the proposed project related to air traffic patterns.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to a change in air traffic patterns.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒	☐

Discussion

The analysis of Impacts 4.14-8 through 4.14-10 in the 2005 LRDP Amendment 2 EIR, which addresses transportation hazards, concluded that, with implementation of PP 4.14-4, PP 4.14-5, and PP 4.14-6, development under the 2005 LRDP, as amended, would result in less than significant impacts related to (1) vehicular traffic hazards due to design or land use incompatibilities during long-term operation; (2) vehicular traffic hazards during construction due to closure of traffic lands or roadway segments; or (3) pedestrian hazards during construction due to closure of sidewalks or paths.

Vehicular Hazards during Construction

As discussed under Threshold a, construction activities associated with the proposed project could result in temporary closure of traffic lanes or roadway segments in the project vicinity to permit the delivery of construction materials; to transport demolition materials; to provide adequate site access; or during construction of other project-related features located adjacent to or within West Campus Drive, the roadway adjacent to the project site. However, disruption to West Campus Drive is expected to be minimal (e.g., for utility line connections) as the majority of construction activity would occur within the project site.

The temporary reduction of roadway capacity, the narrowing of traffic lanes, and the occasional interruption of traffic flow on streets associated with proposed project-related construction activities could pose hazards to vehicular traffic due to localized traffic congestion, decreased turning radii, or the condition of roadway surfaces. To minimize traffic disruption and congestion, the proposed project incorporates PP 4.14-2, which requires coordination of major construction projects on campus, and PP 4.14-5, which requires one travel lane in each direction to minimize construction traffic impacts to the extent feasible. With implementation of these PPs, construction-related traffic disruptions would be less than significant.

Pedestrian and Bicycle Hazards during Construction

Existing key pedestrian routes in the vicinity of the project site that can also be used by bicyclists, include, but are not limited to, the sidewalk on the east side of the project site; Eucalyptus Walk; Library Mall; the pedestrian pathways that serve the H&SS building; and the sidewalks along West Campus Drive. There are also on-street bikeways along both sides of West Campus Drive. During construction, these pedestrian and bicyclist movements would be maintained, with the exception of the sidewalk and bikeway on the east/north side of West Campus Drive, which would be closed to accommodate construction activities within and adjacent to the roadway (e.g., construction of new curb cut and curb ramps for the loading dock/service yard driveway, removal of the existing curb cut and curb ramps for the Barn Dining's existing driveway, and utility connections).

Additionally, during construction of the proposed project, a temporary dining facility would be located east of the project site and south of Sproul Hall. Food trucks would park at the concrete plaza located at the intersection of Eucalyptus Walk and Library Mall; however, they would be located along the east and west sides of the plaza so as not to obstruct or otherwise cause safety hazards for pedestrians and bicyclists traveling through this area.

PP 4.14-6 is incorporated into the proposed project; therefore, alternate pedestrian routes, which also accommodate bicyclists, would be identified to maintain the same travel movement and signage would be installed to facilitate wayfinding. PP 4.14-5, which requires use of flag persons to ensure traffic control during construction, would also ensure that there is safe movement through the construction access area. Therefore, consistent with the findings of the 2005 LRDP Amendment 2 EIR, there would be less than significant impacts related to pedestrian and bicycle hazards during construction.

Vehicular Hazards during Operation

The proposed project does not include permanent modifications to on-campus or City of Riverside roadways. With the exception of the access to the service yard and loading dock, there would be no vehicular circulation within the project site with implementation of the proposed project. However, as shown on Figure 5, a new service yard and loading dock would be constructed west of and adjacent to the new Kitchen Addition. Access would continue to be from West Campus Drive; however, from a location farther to the west. The new loading dock would accommodate two simultaneous truck deliveries. Maneuvering space would be provided on West Campus Drive. This new movement would have the trucks backing into the loading dock. When exiting the drivers would pull forward into the roadway. The new movement would improve traffic conditions compared to the current process that involves the trucks pulling into Parking Lot 4 across the street and back across West Campus Drive into the existing narrow driveway.

Therefore, implementation of the proposed project would not increase hazards due to design features or incompatible uses. Consistent with the findings of the 2005 LRDP Amendment 2 EIR, operation of the proposed project would result in a less than significant impact related to vehicular hazards.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to a substantial increase in traffic hazards due to a design feature or incompatible uses.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Would the project result in inadequate emergency access?	☐	☐	☐	☒	☐

Discussion

The analysis of Impacts 4.14-11 and 4.14-12 in the 2005 LRDP Amendment 2 EIR, which addressed emergency access, concluded that construction and operation of development under the 2005 LRDP, as amended, would result in less than significant impacts to emergency access with implementation of PS Transportation 4.

Emergency Access during Construction

Vehicular and emergency access to the project site is currently provided from West Campus Drive and includes a service driveway that provides direct access to the existing buildings and a restricted-access service road adjacent to and east of the project site that also provides access to the Accessible/Disabled parking spaces and the Sproul Hall service area northeast of the project site.

Construction activities associated with the proposed project could result in temporary closure of on-campus traffic lanes or roadway segments in the project vicinity. The reduction of roadway capacity, the narrowing of traffic lanes, and the occasional interruption of traffic flow could impair emergency access. Construction activities would be planned so that the existing service drive east of the project site would be maintained for access to Sproul Hall service area and as a fire access lane. Additionally, during construction the area designated for the loading dock would be used for construction site access and as such would also be available for emergency services access. Police, medical and rescue operations would be able to use this space.

Additionally, the proposed project incorporates PP 4.14-8 and emergency service agencies would be consulted regarding street closures to ensure adequate access for emergency vehicles during construction. Therefore, consistent with the findings of the 2005 LRDP Amendment 2 EIR, construction of the proposed project would result in less than significant impacts related to vehicular hazards during construction.

Emergency Access during Operation

Emergency vehicles access the campus via roadways such as the I-215/SR-60 freeways and University Avenue from each of the cardinal directions. Once emergency vehicles are on campus, the internal roadway network is adequate to allow these vehicles to reach their designated locations, including the project site. With implementation of the proposed project, the existing service drive east of the project site would be maintained as a fire access lane. The existing driveway providing access to the project site from West Campus Drive would be removed and a new driveway would be constructed along this roadway but to the west. However, pursuant to standard practices, fire equipment would not be directed into the site boundaries in the event of a fire or emergency. Rather, fire equipment would be staged along the roadway.

With the exception of the relocated driveway from West Campus Drive, the proposed project does not include permanent modifications to on-campus or City of Riverside roadways. Additionally,

consistent with the campus' standard procedures, the Campus Fire Marshal would review and approve the proposed project to ensure that circulation and design features allow adequate emergency vehicle access in compliance with the California Building Code. Adequate vehicle and emergency access to the project site would be maintained with proposed project implementation. Therefore, consistent with the findings of the 2005 LRDP Amendment 2 EIR, there would be less than significant impacts related to emergency access during operation of the proposed project.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to emergency access.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Would the project conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.14-13 in the 2005 LRDP Amendment 2 EIR concluded that development under the 2005 LRDP, as amended, would result in less than significant impacts related to demand for public transit with implementation of PS Transportation 1 and PP 4.14-1.

The proposed project involves the expansion of the Barn facilities on campus and would not impact public transit, bicycle, or pedestrian facilities off campus. With implementation of the proposed project, the Barn Complex would continue to serve existing faculty, staff, and students, and there would be the addition of only nine new employees to the on-campus population. The nominal increase in population is not expected to result in direct or indirect population growth in the area that would create an additional demand for alternative transportation facilities not anticipated in the 2005 LRDP Amendment 2 EIR. Additionally, while the proposed project would increase the number of events held at the Barn Complex, the hosting of events would not be a new activity on campus and it is not expected that the demand for public transit would increase substantially compared to existing conditions.

Additionally, the proposed project incorporates PS Campus and Community 4 (promote campus-wide non-vehicular transportation) and PS Transportation 3 (provide a campus-wide bicycle network to connect to off-campus bicycle routes) by maintaining and enhancing pedestrian and bicycle access through and surrounding the project site. Notably, pedestrians and bicyclists arriving to the site would have access from all directions. The entry/gateway to the east is located at the future Barn Walk and is accessible from various pedestrian paths to the north, east, and south, including the Eucalyptus Walk and the sidewalk along West Campus Drive. A new walkway would be constructed west of the project site, with access from West Campus Drive and the pedestrian path west of the H&SS building. A proposed new walkway within the Barn Complex, between the Barn Dining and Kitchen Addition to the south and the Barn Theater and Campus Meeting Room to the north, would be the main pedestrian pathway within the project site and

would provide access to all existing and proposed facilities in the Barn Complex. All pedestrian paths would be ADA accessible.

Further, the proposed project incorporates PS Transportation 5 and MM 4.14-1(b) by providing bicycle storage east of the East Courtyard, which would accommodate approximately 20 bicycles; PPs 4.3-1 and 4.14-1 by continuing to implement a TDM program; and MM 4.14-1(d) by providing bicycle storage and maintaining pedestrian and bicycle access through and surrounding the project site. These PSs, PPs, and MMs serve to reduce vehicular trips and encourage public transit among other types of alternative transportation (i.e., walking, biking).

Thus, consistent with the findings of the 2005 LRDP Amendment 2 EIR, the proposed project would not conflict with adopted policies, plans, or programs that support alternative transportation and would result in a less than significant impact.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to conflicts with applicable policies, plans, or programs supporting alternative transportation.

17. Tribal Cultural Resources

There are no relevant elements of the proposed project related to tribal cultural resources, and no PSs, PPs, or MMs are applicable. In January 2017, updates to the State CEQA Guidelines were adopted, which included the addition of a Tribal Cultural Resources section, as addressed in this section.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project 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:					
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☐	☐	☐	☒

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) 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.	☐	☐	☐	☒	☐

Discussion

Historic Resources

As previously addressed in Section V.5, Cultural Resources, of this IS/MND, in August 2016, a cultural resources records search and literature review was completed at the EIC at UCR. No historic resources, including tribal cultural resources, are located at the project site or in the vicinity. No impact would result, and no mitigation is required.

Tribal Resources and Coordination

In September 2014, Governor Brown signed AB 52 (Chapter 532, Statutes of 2014), which creates a new category of environmental resources that must be considered under CEQA: "tribal cultural resources". The legislation imposes new requirements for offering to consult with California Native American tribes regarding projects that may affect a tribal cultural resource; emphasizes a broad definition of what may be considered to be a tribal cultural resource; and includes a list of recommended MMs.

Recognizing that tribes may have expertise regarding their tribal history and practices, AB 52, which became effective on July 1, 2015, requires lead agencies to provide notice to tribes that are traditionally and culturally affiliated with the geographic area of a proposed project, if they have requested such notice in writing. The project notification is required prior to the lead agency's release of a Notice of Preparation (NOP) of an EIR or notice of intent to adopt an MND or ND. Once Native American tribes receive a project notification, they have 30 days to respond as to whether they wish to initiate consultation regarding the project, including subjects such as mitigation for any potential project impacts. If a tribe requests consultation and the lead agency and the tribe ultimately agree on mitigation to address any potentially significant impacts to tribal cultural resources, the MMs agreed upon during consultation must be recommended for inclusion in the environmental document.

To date, UCR has received two requests for project notification pursuant to AB 52 (from the Agua Caliente Band of Cahuilla Indians and the Torres Martinez Desert Cahuilla Indians). On August 25, 2016, UCR provided these tribes with notification of the proposed Barn Expansion project. On August 30, 2016, the Agua Caliente Band of Cahuilla Indians responded to this request stating that they had no comments but requested that UCR keep them informed of any updates to the project or changes in scope. No response was received from the Torres Martinez Desert Cahuilla Indians.

A Sacred Lands File Check was performed in 2003 by the Native American Heritage Commission (NAHC) for the 2005 LRDP EIR and did not indicate the presence of sites of Native American cultural or religious value on the campus. A Sacred Lands File Check was also conducted by the NAHC in August 2016 for the project site and also had negative results; however, the NAHC identified that the area is sensitive for potential cultural resources.

The proposed project is an infill development on a currently developed site, and the project site is underlain by artificial fill materials up to two feet deep, which is underlain by old alluvial fan deposits. Review of the geotechnical boring logs for the project site indicates the presence of very shallow fill materials. Although the estimated depth of excavation would be relatively shallow (up to five feet), construction of the proposed project may disturb native sediments during earth moving necessary to prepare the building pads and for installation of utility infrastructure.

Based on available information, there is a potential to encounter unknown tribal cultural resources during earth-moving activities that could disturb native sediments. The proposed project's impact to tribal cultural resources is less than significant, and no mitigation is required. However, UCR's standard contractor specifications address protection and recovery of buried artifacts, and the standard requirements are incorporated into the project as MM Barn Cult-1, presented in Section V.5, Cultural Resources, of this IS. This MM identifies steps to be taken if Native American cultural resources, are discovered during construction.

Additional Project-Level Mitigation Measures

No additional mitigation beyond MM Barn-Cult 1 is required.

Level of Significance

The proposed project would have a less than significant impact related to the potential to cause a substantial adverse change in the significance of a tribal cultural resource as defined in *Public Resources Code* Section 21074.

18. Utilities and Service Systems

The analysis of utilities and service systems (i.e., water supply, solid waste, wastewater, and energy) is tiered from the 2005 LRDP Amendment 2 EIR and was addressed in Section 4.15, Utilities, of that document. As described previously in Section II, Project Description, of this IS, relevant elements of the proposed project related to utilities and service systems include building demolition, renovation, and construction, which would result in a net increase of up to 10,765 gsf of building space at the project site with the Barn Theater Replacement Option, which would increase the demand for water and energy and the generation of solid waste and wastewater within the project site. The proposed project would be designed to achieve, at a minimum, a LEED Silver rating.

The following applicable PPs were adopted as part of the 2005 LRDP Amendment 2 EIR and are incorporated as part of the proposed project and assumed in the analysis presented in this section.

PS Conservation 5	Continue to adhere to the conservation requirements of Title 24 of the California Code of Regulations and comply with any future conservation goals or programs enacted by the University of California.

PP 4.15-1(a) Improvements to the campus water distribution system, including necessary pump capacity, will be made as required to serve new projects. Project-specific CEQA analysis of environmental effects that would occur prior to project-specific approval will consider the continued adequacy of the domestic/fire water systems, and no new development would occur without a demonstration that appropriate domestic/fire water supplies continue to be available.

PP 4.15-1(b) To further reduce the campus' impact on domestic water resources, to the extent feasible, UCR will

(i) Install hot water recirculation devices (to reduce water waste)

(ii) Continue to require all new construction to comply with applicable State laws requiring water-efficient plumbing fixtures, including but not limited to the Health and Safety Code and Title 24, California Code of Regulations, Part 5 (California Plumbing Code)

(iii) Retrofit existing plumbing fixtures that do not meet current standards on a phased basis over time

(iv) Install recovery systems for losses attributable to existing and proposed steam and chilled-water systems

(v) Prohibit using water as a means of cleaning impervious surfaces

(vi) Install water-efficient irrigation equipment to local evaporation rates to maximize water savings for landscaping and retrofit existing systems over time.

(This is identical to Hydrology PP 4.8-2(a)).

PP 4.15-1(c) The Campus shall promptly detect and repair leaks in water and irrigation pipes.

PP 4.15-1(d) The Campus shall avoid serving water at food service facilities except upon request. *(This is identical to Hydrology PP 4.8-2(c).)*

PP 4.15-5 The Campus will continue to comply with all applicable water quality requirements established by the SARWQCB. *(This is identical to Hydrology PP 4.8-1)*.

~~**MM 4.15-6(a)** UCR will work with the City of Riverside to evaluate the capacity of existing sewer trunk lines serving the campus~~

~~and estimate the future impact of LRDP implementation on available capacity.~~

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☐	☒

Discussion

As identified under the analysis of Impact 4.15-3 of the 2005 LRDP Amendment 2 EIR, the UCR Campus does not treat or discharge wastewater to any surface waters. Wastewater generated at the campus is collected and discharged into the City's sewer system from where it is conveyed to the Riverside Water Quality Control Plant (RWQCP) for treatment and disposal. Therefore, the campus is not considered a point-source of water pollution for regulatory purposes and is not subject currently to any Waste Discharge Requirements established by the Santa Ana Regional Water Quality Control Board (RWQCB). Therefore, the proposed project would not exceed wastewater treatment requirements. No impact would occur, consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to exceeding wastewater treatment requirements of the applicable Regional Water Quality Control Board (RWQCB).

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.15-2 in the 2005 LRDP Amendment 2 EIR concluded there would be a less than significant impact related to construction of new or expanded water treatment facilities with implementation of PP 4.15-1(a) and PP 4.15-1(d). The analysis of Impact 4.15-4 in the 2005 LRDP Amendment 2 EIR concluded there would be a less than significant impact related to construction of new or expanded wastewater conveyance systems with implementation of MM 4.15-4. In addition, the EIR identified that campus development under the amended 2005

LRDP would also be required to follow water conservation policies listed in the UC Sustainability Policy and adhere to goals listed in the water section of the Sustainability Action Plan (SAP).

Water

As identified in Table 4.15-4, Existing and Projected UCR Campus Water Demand, from the 2005 LRDP Amendment 2 EIR, the total water consumption on campus in 2009–2010 was 2.5 million gallons per day (mgd); the entire demand was generated on the East Campus. The projected campus-wide water demand in 2020 is estimated in the 2005 LRDP Amendment 2 EIR at 5.3 mgd, including 3.0 mgd on the East Campus. This represents an estimated increase in water demand associated with the East Campus of 0.5 mgd.

The proposed project would result in an increase in the average daily on-campus population by nine individuals, and would involve a net increase of up to 10,765 gsf of building space at the project site. Even with incorporation of PP 4.15-1(b) (implementation of water consumption reduction measures), PP 4.15-1(c) (ensures that leaks in water and irrigation pipes are repaired), and PPP 4.15-1(d) (avoid serving water at food service facilities), the proposed project would result in a net increase in water consumption of approximately 0.004 mgd. This increase would represent approximately 0.8 percent of the projected additional water demand associated with development on the East Campus assumed in the 2005 LRDP, as amended. Therefore, the proposed project's water consumption would be well within the increase anticipated in the 2005 LRDP Amendment 2 EIR.

The domestic water system at UCR consists of an underground distribution system, a pumping system, storage tanks, and connections to the City of Riverside's municipal water distribution system. The 2005 LRDP Amendment 2 EIR concluded that because the City would be able to provide the necessary water using existing or planned water facilities, implementation of the 2005 LRDP, as amended, would not require the construction of new or expanded water facilities. As required by PP 4.15-1(a), the campus has reviewed the adequacy of the domestic/fire water systems that would serve the proposed project. As identified in Section II, Project Description, domestic water and fire supply would be supplied from the existing 12-inch water main, which currently runs north-south through the western portion of the project site. Existing flow rates are sufficient with existing main sizes and distribution pumps to allow for connection of the proposed project to the campus water lines. No new or expanded water lines would be necessary beyond those within the project limits to connect the proposed project to existing lines. The impact area for installation of these water lines is within the construction impact limits identified on Figure 13 in Section II, Project Description, and the physical impacts have been addressed in the analysis throughout this IS. Therefore, consistent with the findings of the 2005 LRDP Amendment 2 EIR, this impact would be less than significant.

Wastewater Infrastructure

Wastewater on campus is collected in the sanitary sewer system on campus, which consists of a network of lines owned and maintained by UCR. Wastewater flows from the proposed project would discharge into new 6-inch sewer lines that would extend to the existing 10-inch sewer main in West Campus Drive (refer to Figure 11 in Section II, Project Description).

A Sanitary Sewer Analysis Study (Sewer Study) was completed for the proposed project to determine if the existing lines have sufficient capacity to accommodate the anticipated increase in wastewater generated by the proposed project (DBA 2015). To determine existing sewer flows, flow monitoring was performed in the existing system. This data was then analyzed to determine the peak and average contribution of wastewater from the proposed project that could be accommodated by the existing sewer system. The analysis was conducted for two lines that traverse the campus along West Campus Drive north to University Avenue (an 8-inch line and a

10-inch line), and it was subsequently determined that the 10-inch line would be used to serve the proposed project. Therefore, the following information is for the 10-inch line in West Campus Drive.

Based on the Sewer Study, there is a maximum system capacity of 0.83 mgd flowing ½ full and 1.464 mgd flowing ¾ full. Given the most conservative of values (½ full pipe flow) and a peaking factor of 2.75 it has been determined the proposed project can contribute a peak of 0.638 mgd, or an average of 0.232 mgd, of sewer effluent to the system without exceeding the current sanitary sewer systems capacity. With a net increase in water consumption of approximately 0.004 mgd, the additional wastewater that is projected to be added to the line from the proposed project is well below the amount that can be contributed without exceeding the capacity of the sewer line, and no new or upgraded sewer lines would be required.

The proposed project's increase in on-campus population was assumed in the 2005 LRDP, as amended. Therefore, the proposed project's wastewater generation would be within the increase anticipated with buildout of the 2005 LRDP, as amended, and there is sufficient remaining capacity in the sewer lines serving the East Campus. No new or expanded sewer laterals or main lines would be necessary with proposed project implementation beyond the sewer lines within the project area to connect the proposed project to the existing sewer main. The impact area for installation of these sewer lines is within the construction impact limits identified on Figure 13 in Section II, Project Description, and the physical impacts have been addressed in the analysis throughout this IS. Therefore, consistent with the findings of the 2005 LRDP Amendment 2 EIR, this impact would be less than significant.

Consistent with the findings of the 2005 LRDP Amendment 2 EIR, there would be less than significant impacts related to wastewater infrastructure or wastewater treatment facility capacity. In addition, because wastewater generation is correlated with water usage, continued water conservation practices would reduce the volume of wastewater generated. Continued implementation of PPs 4.15-1(b) and 4.15-1(c), which emphasize a variety of water conservation practices, would further reduce wastewater generation and utilization of sewer line capacity.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not require construction of new wastewater treatment facilities beyond the installation of new lines to connect to the proposed project; the physical limits of utility construction are within the impact area addressed throughout this IS. The proposed project would have a less than significant impact related to the capacity of existing wastewater systems.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒	☐

Discussion

Please refer to the analysis of drainage provided under Section V.9, Hydrology and Water Quality, of this IS. In summary, the analysis concluded that operation of the proposed project would not exceed the capacity of the existing storm drain system, and there would be a less than significant impact, consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

There is a less than significant impact related to the need for new or expanded storm drainage facilities beyond the installation of new storm waste management facilities to serve the proposed project. The physical limits of construction are within the impact area addressed throughout this IS.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.15-1 in the 2005 LRDP Amendment 2 EIR concluded there would be a less than significant impact related to water supply with implementation of PP 4.15-1(a) through PP 4.15-1(d). In addition, the EIR identified that campus development under the amended 2005 LRDP would also be required to follow water conservation policies listed in the UC Sustainability Policy; adhere to goals listed in the water section of the SAP; and comply with any future conservation goals or programs enacted by the UC.

As described in the 2005 LRDP Amendment 2 EIR, the City of Riverside Public Utilities Department (RPU) supplies domestic water to UCR. RPU's water supply consists primarily of groundwater, with additional sources, including recycled water and imported water. UCR also has rights to potable water in the Gage Canal. All existing and planned water supply entitlements, water rights, and/or water service contracts that may be used to serve development associated

with the 2005 LRDP, as amended, are set forth in the current City of Riverside Urban Water Management Plan (UWMP), prepared by for RPU by Water Systems Consulting, Inc. (WSC) in 2015 (2015 UWMP). The 2015 UWMP identifies adequate potable water supplies to meet future demands (through 2040) within the RPU's water supply service area, which includes the UCR campus, under normal weather conditions. Specifically, the 2015 UWMP projects surplus water supplies under all scenarios, including multiple dry years (WSC 2016).

The 2005 LRDP Amendment 2 EIR concluded there would be adequate water supplies for implementation of the 2005 LRDP, as amended, with implementation of PP 4.15-1(a) through PP 4.15-1(d). Therefore, because the proposed project (with a net increase of up to 10,765 gsf of building space) is within the assumed remaining development for the East Campus under the 2005 LRDP, as amended, and future development on campus is assumed in the City of Riverside UWMP, the estimated increase in water demand of 0.004 mgd would also be met with existing entitlements and resources and would not result in the need for new or expanded entitlements with continued implementation of the identified PPs. Consistent with the findings of the 2005 LRDP Amendment 2 EIR, there would be a less than significant impact related to water supply, and no mitigation is required.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

There are adequate water supplies to serve the proposed project, resulting in a less than significant impact.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Would the project result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.15-3 in the 2005 LRDP Amendment 2 EIR concluded there would be a less than significant impact related to construction of new or expanded wastewater treatment facilities with implementation of PP 4.15-5 and MM 4.15-3. As identified in the 2005 LRDP Amendment 2 EIR, the Sewerage Systems Services Program and its Treatment Services unit, administered by the RPU, collects, treats, and disposes of all wastewater generated within the City of Riverside and is responsible for compliance with State and federal requirements governing the treatment and discharge of all domestic and industrial wastewater generated in its service area, including the UCR campus. The RWQCP provides treatment of all campus-generated wastewater, with UCR operating its own collection system that connects to the City's system. The RWQCP currently treats an average of 30 mgd and has a capacity of 40 mgd. The plant is currently being expanded, with construction expected to be complete mid-2017, and will have a capacity of 46 mgd. The City's Integrated Wastewater Master Plan (IWWMP) addresses facility needs for projected wastewater influent flow through the year 2025 and identifies improvements

that would increase the capacity of the RWQCP up to 52.2 mgd, although at this time the City is increasing the treatment capacity of the RWQCP to 46 mgd (Mansell 2017).

The 2005 LRDP Amendment 2 EIR also determined that implementation of the 2005 LRDP, as amended, would not generate a volume of wastewater that would exceed the capacity of the RRWQCP wastewater treatment system in combination with the provider's existing service commitments. Because the proposed project would only result in a net increase of 10,765 gsf of building space on campus, and is within the remaining development allocation assumed for the campus in the 2005 LRDP Amendment 2 EIR, the wastewater generated would also be accommodated by the RRWQCP. Consistent with the findings of the 2005 LRDP Amendment 2 EIR, this impact would be less than significant.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not generate wastewater that exceeds the capacity of the wastewater treatment facilities resulting in a less than significant impact.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒	☐
g) Would the project comply with applicable federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.15-6 in the 2005 LRDP Amendment 2 EIR concluded there would be a less than significant impact related to landfill capacity. The analysis of Impact 4.15-7 in the 2005 LRDP Amendment 2 EIR concluded there would be a less than significant impact related to compliance with applicable federal, State, and local solid waste-related statutes and regulations. It should also be noted that further reduction in solid waste generation would occur with implementation of the UC Policy on Sustainable Practices.

The City of Riverside Solid Waste Division is responsible for the collection and handling of residential refuse, recycling, and green waste (compostable organic waste) generated within the City of Riverside. The Robert A. Nelson Transfer Station, located at 1830 Agua Mansa Road, receives refuse from western Riverside County, including the UCR campus. The transfer station is owned by the Riverside County Department of Waste Resources (RCDWR) and operated by Burrtec Waste Industries. The transfer station is permitted to accept up to 4,000 tons of solid waste per day and is currently processing approximately 1,800 tons of solid waste per day (Burrtec 2017). The operations division of the RCDWR receives, compacts, and buries refuse received at the various landfill sites at several locations in the County (UCR 2011b).

On the UCR campus, trash is collected and placed in containers located throughout the campus. The RCDWR is responsible for the landfilling of non-hazardous county waste. In this effort RCDWR operates six landfills, has a contract agreement for waste disposal with an additional private landfill, and administers several transfer station leases (RCDWR 2017). These facilities are regulated at the federal, State, and local levels and monitored for compliance.

Solid waste would be generated during construction and operation. With respect to construction-related waste generation, the proposed project includes demolition of the existing 1,625-sf Barn Stable, 1,650-sf Barn Theater (assuming implementation of the Barn Theater Replacement Option), and 690-sf University Club Room, for a total of approximately 3,965 sf of buildings. Assuming 3 to 4 cubic feet (cf) of demolition material per sf, up to approximately 15,860 cf of demolition materials would be generated (587 cy). Additionally, based on the USEPA's non-residential construction waste generation rate of 4.34 pounds per square foot (lbs/sf) (USEPA 2009), the proposed Barn Theater Replacement Option (which has the largest amount of new construction) would generate approximately 30.5 tons of solid waste.

With respect to operations, the 2005 LRDP Amendment 2 EIR assumed an annual generation factor of 0.675 ton of solid waste per 1,000 square feet of building space on campus. This factor was developed by comparing the existing occupied building space to existing generation of solid waste at the time of preparation of the EIR. Based on the identified solid waste generation factor, the net increase of up to 10,765 gsf of building space on campus with the Barn Theater Replacement Option would generate approximately 7.3 tons per year of solid waste, which is approximately 0.2 percent of the total projected solid waste generation for the development remaining on campus under the 2005 LRDP, as amended, not including the SOM (3,544 tons per year).

However, consistent with the UC Sustainability Practices Policy, the UCR campus is currently committed to diverting at least a 75 percent of its solid waste from landfills, and diverting 100 percent by 2020. UCR currently diverts approximately 95 percent of its general solid waste stream. To accomplish this, 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 Lot 30. UCR collects the recyclables and waste on campus and delivers these materials to the transfer station for hauling. Athens Services picks up the recyclable material for recycling. UCR delivers waste, in UCR haul trucks, to the Nelson Transfer Station from which Burrtec then transports 100 percent of the non-recyclable material to a waste-to-energy facility. The campus composts all green wastes on campus. In addition, the campus is carrying out a shift in its procurement practices toward recyclable, second generation, or reusable products to the extent feasible.

It is also important to note that operations at the Barn Complex would follow zero waste practices and sort the waste into three separate streams: compost, recyclables and landfill waste. A three bin system would be used for trash receptacles in the employee and customer areas. In the main servery, food and beverages would be served on compostable service wares. Food and beverages in the faculty dining room would be served on reusable china and glassware. The third-party beverage provider would also be required to serve beverages on compostable or recyclable cups for external consumption and washable glassware for internal consumption. Pre-consumer food waste and kitchen scraps would be processed in a food waste dehydrator to accelerate the compost process. The dehydrated product would either be transported to the R'Garden to finish the composting process to be later used as a soil amendment, or it would be collected with the post-consumer food waste and compostable service wares and transported to an off-campus

composting facility. Dining Services would also conduct training and marketing campaigns to educate staff and customers on zero waste practices.

Therefore the total amount of solid waste generated by construction and operation of the proposed project would be substantially reduced compared to the waste generation factors in the 2005 LRDP Amendment 2 EIR. Assuming a minimum diversion of 75 percent, the total waste generation during construction would be 7.6 tons throughout the approximate 17-month construction period, and 1.8 tons per year during operations. It should be noted that solid waste generated during demolition (buildings and paved areas) would be negligible as the majority of this material would be recycled.

As discussed in the 2005 LRDP Amendment 2 EIR, it is anticipated that solid waste from UCR would continue to be disposed at the Badlands Landfill, in the City of Moreno Valley, which had an estimated capacity of approximately 6.5 million tons as of October 2016. Based on the current permit, the landfill is expected to close in 2024. The Badlands Landfill receives a maximum of 3,000 tons per day (tpd) but is permitted for a maximum of 4,500 tpd (Cortez 2017). The approximately 1.8 tons of solid waste per year (0.005 tpd) from the proposed project would represent a negligible amount of the landfill's permitted daily capacity of 4,500 tpd and less than 0.001 percent of the estimated remaining daily capacity of 1,500 tpd. Therefore, the anticipated solid waste generation from the proposed project can be accommodated within the remaining permitted capacity of the Badlands Landfill, and there would be a less than significant impact related to solid waste disposal, consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Therefore, consistent with the findings of the 2005 LRDP Amendment 2 EIR, there would be a less than significant impact related to solid waste statutes and regulations.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to (1) landfill capacity and solid waste disposal and (2) compliance with applicable federal, State, and local statutes and regulations related to solid waste.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
h) Would the project create other utility and service system impacts?	☐	☐	☐	☒	☐

Discussion

The analysis of Impacts 4.15-8 through 4.15-10 in the 2005 LRDP Amendment 2 EIR concluded there would be a less than significant impact related to the need to construct new or expanded energy (electricity and natural gas) production or transmission facilities or to the inefficient use of energy.

Electricity

As identified in the 2005 LRDP Amendment 2 EIR, the RPU provides electricity to the UCR campus. The energy is received through a 69 kilovolt (kV) line at a substation west of the I-215/SR-60 freeway. From this point, the power is reduced to a usable voltage and distributed to individual buildings and transformers. UCR is in the process of transitioning the East Campus to 12 kV distribution lines and transformers; portions of the East Campus are currently operating under a 5kV system.

The 2005 LRDP Amendment 2 EIR concluded that the peak power demands on campus are 25.5 MVA (megavolt amps), and the total campus development under the 2005 LRDP, as amended, would demand 49 MVA, which is an increase of 23.5 MVA over existing conditions at the time. The total capacity of the existing 12 kV substation is 54 MVA, so the 2005 LRDP Amendment 2 EIR concluded that the existing campus electrical distribution system would be able to accommodate the anticipated demand of development under the 2005 LRDP, as amended, of which the proposed project is a part. Additionally, it was concluded that the RPU would have adequate infrastructure to serve the remaining and new development on campus.

The existing electric demand on-site is 50 kVa (kilovolt amps), or 0.05 MVA. The proposed project is estimated to generate a total electric demand of 658 kVa, or 0.66 MVA, which would be an increase of approximately 0.61 MVA of electric demand on the project site. This increase would be approximately 2.6 percent of the increased electric demand anticipated with the remaining development under the 2005 LRDP, as amended, and approximately 1.1 percent of the remaining capacity of the existing 12 kV substation serving the campus. It should also be noted that campus development under the 2005 LRDP, as amended, would be required to follow energy conservation policies listed in the UC Sustainability Practices Policy, minimize energy use in order for the campus to attain the GHG reduction goals listed in the campus CAP and comply with any future conservation goals or programs enacted by the UC. Therefore, the electric demand of the proposed project has been calculated taking these requirements into consideration.

As described in Section II, Project Description, electricity would be supplied to the proposed project via a connection to the existing undergrounded conduits and wiring extending from Manhole No. 12, south of the project site. Additionally, a new generator and transformer would be installed on the south side of the Kitchen Addition. The installation of electric lines would be within the construction impact footprint for the proposed project. Therefore, the potential environmental impacts from construction of the new and replacement electrical facilities are addressed as part of the proposed project analysis provided throughout this IS.

Therefore, consistent with the findings of the 2005 LRDP Amendment 2 EIR, there would be a less than significant impact related to construction of new or expanded electrical infrastructure or the inefficient use of energy.

Natural Gas

As identified in the 2005 LRDP Amendment 2 EIR, UCR uses natural gas for heating and some cooling needs for research and instructional lab purposes. Natural gas is provided to the East Campus by SoCalGas. The 2005 LRDP Amendment 2 EIR concluded that the total campus development under the 2005 LRDP, as amended, would demand 45,458 therms per day, which is an increase of 31,700 therms per day over existing conditions at the time. SoCalGas has indicated that it could provide gas service to the campus to accommodate future development under the 2005 LRDP, as amended.

A high-pressure gas distribution system owned and maintained by SoCalGas provides natural gas to the Central Utility Plant, as well as many individual buildings on campus. Separate SoCalGas gas mains also enter the campus to serve the residence halls in addition to the Canyon Crest Family Student Housing area. Natural gas at the project site would be utilized only for gas cooking equipment. The existing natural gas demand on-site is estimated at approximately 44.2 therms per day. The proposed project is estimated to generate a total natural gas demand of 88.4 therms per day, which would be an increase of approximately 44.2 therms of natural gas demand on the project site. This increase would be approximately 0.001 percent of the increased natural gas demand anticipated with the remaining development under the 2005 LRDP, as amended. It should also be noted that campus development under the 2005 LRDP, as amended, would be required to follow energy conservation policies listed in the UC Sustainability Practices Policy; minimize energy use in order for the campus to attain the GHG reduction goals listed in the campus CAP; and comply with any future conservation goals or programs enacted by the UC. Therefore, the natural demand of the proposed project has been calculated taking these requirements into consideration.

Natural gas would be supplied to the proposed project via a connection to an existing line along the south side of the Barn Dining and Kitchen Addition. The installation of natural gas lines within the project site and connections to the existing line would be within the construction impact footprint for the proposed project. Therefore, the potential environmental impacts from construction of the new and replacement natural gas facilities are addressed as part of the proposed project analysis provided throughout this IS.

Therefore, consistent with the findings of the 2005 LRDP Amendment 2 EIR, there would be a less than significant impact related to construction of new or expanded natural gas infrastructure or the inefficient use of natural gas or energy.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to provision of electricity and natural gas to the project site or the inefficient use of energy.

19. Mandatory Findings of Significance

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
MANDATORY FINDINGS OF SIGNIFICANCE – The lead agency shall find that a project may have a significant effect on the environment and thereby require an EIR to be prepared for the project where there is substantial evidence, in light of the whole record, that any of the following conditions may occur. Where prior to commencement of the environmental analysis a project proponent agrees to mitigation measures or project modifications that would avoid any significant effect on the environment or would mitigate the significant environmental effect, a lead agency need not prepare an EIR solely because without mitigation the environmental effects would have been significant (per Section 15065 of the State CEQA Guidelines):					
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, 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?	☐	☐	☐	☒	☐

Discussion

As discussed in Section V.4, Biological Resources, of this IS/MND, the proposed project would have no potential to impact special status plant and wildlife species or sensitive habitats and wildlife corridors. The proposed project incorporates PS Open Space 3 (preserve natural resources, including trees, where feasible, in Naturalistic Open Space areas), MM 4.4-4(a) (surveys for nesting bird and raptor species prior to construction), and MM 4.3-1(b) (protection of active nests during construction) from the 2005 LRDP Amendment 2 EIR, and, as a result, would have a less than significant impact on nesting species. The proposed project also includes tree retention and replacement to ensure a less than significant impact related to removal of trees. Therefore the potential for the proposed project to degrade the quality of the environment related to biological resources would result in a less than significant impact.

As discussed under Section V.5, Cultural Resources, of this IS/MND, there are no historic resources within or adjacent to the project area. Therefore, the proposed project would not have any impacts on historical resources. The proposed project would require excavation in native soils and because it incorporates PP 4.5-4 (include instructions for addressing uncovered paleontological resources in the construction specifications) and PP 4.5-5 (instruction for discovery of a human remains) from the 2005 LRDP EIR and project-specific MM BARN Cult-1 (protection of buried resources), there would be a less than significant impact related to the potential to eliminate important examples of the major periods of California history or prehistory.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project has a less than significant impact related to the potential to degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; 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.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of past, present and probable future projects)?	☐	☐	☐	☒	☐

Discussion

As identified through the analysis presented in this IS/MND, the proposed project would not result in significant environmental impacts during construction or operation with continued implementation of applicable PSs, PPs, and MMs (identified for each environmental topic analyzed above in Sections V.1 through V.17 of this IS/MND). Potential cumulative construction impacts related to air quality and traffic have been addressed in Section V.3 and V.15 of this IS/MND, respectively, and are determined to be less than significant. The potential for vibration impacts to classrooms in Sproul Hall would be project-specific as vibration from individual construction sites would not affect the same receptors; therefore, no cumulative vibration impacts would result.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have less than significant cumulatively considerable impacts.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐	☐

Discussion

As indicated in the analysis presented in this IS/MND, with the exception of construction-related vibration, implementation of the proposed project would not result in potentially significant impacts that could degrade the quality of the environment or cause substantial adverse effects on human beings, either directly or indirectly.

The vibration impact to the classroom at Sproul Hall would be potentially significant, even with limits on hours of construction where necessary (LRDP EIR PP 4.10-2), and notification of affected persons about the planned construction in order to minimize the impact (LRDP EIR MM 4.10-2). Therefore, additional project MM BARN VIB-1, which prohibits the use of large heavy equipment within 50 feet of occupied buildings, is required and would reduce potential vibration impacts to a less than significant level.

The proposed project would not result in new or more significant impacts than addressed and disclosed in the 2005 LRDP EIR and 2005 Amendment 2 LRDP EIR with continued implementation of applicable PPs and MMs (identified for each environmental topic analyzed above in Sections V.1 through V.17 of this IS/MND) from the Mitigation Monitoring and Reporting Program (MMRP) adopted as part of the 2005 LRDP EIR and the 2005 Amendment 2 LRDP EIR, and project-specific MM BARN VIB-1.

Additional Project-Level Mitigation Measures

MM BARN VIB-1 would reduce construction-related vibration impacts to a less than significant level.

Level of Significance

The proposed project would have a less than significant impact related to the potential to have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly.

Fish and Game Determination

Based on consultation with the California Dept. of Fish and Game, there is no evidence that the project has a potential for a change that would adversely affect wildlife resources or the habitat upon which the wildlife depends.

___ Yes (No Effect)

_x_ No (Pay fee)

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VI. SUPPORTING INFORMATION SOURCES

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Appendix A

Air Quality and Greenhouse Gas Emissions Calculations

UCR Barn Complex Existing 030917

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Library	1.63	1000sqft	0.04	1,625.00	0
High Turnover (Sit Down Restaurant)	4.82	1000sqft	0.11	4,820.00	0
Movie Theater (No Matinee)	1.65	1000sqft	0.04	1,650.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2019
Utility Company	Riverside Public Utilities				
CO2 Intensity (lb/MWhr)	837.74	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity per RPU

Land Use - Movie theater surrogate for Barn theater and ticketing
Construction Phase - operations only

Off-road Equipment - bldg equip per data needs

Off-road Equipment -

Trips and VMT - Demo round trips 37 bldg; 34 paving

Demolition -

Grading -

Vehicle Trips - No new trip generation in CalEEMod

Energy Use - No Title 24 natural gas use
Water And Wastewater - Existing H2O assumed 50% of future
Construction Off-road Equipment Mitigation - x
Energy Mitigation -
Water Mitigation -
Waste Mitigation -
Landscape Equipment - Assume no change in landscape maint.
Vehicle Emission Factors -
Vehicle Emission Factors -
Vehicle Emission Factors -
Fleet Mix -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblEnergyUse	LightingElect	6.83	3.42
tblEnergyUse	NT24E	28.48	14.24
tblEnergyUse	T24E	12.98	6.49
tblEnergyUse	T24NG	78.06	0.00
tblEnergyUse	T24NG	15.43	0.00
tblEnergyUse	T24NG	15.43	0.00
tblLandscapeEquipment	NumberSummerDays	250	1
tblProjectCharacteristics	CO2IntensityFactor	1325.65	837.74
tblProjectCharacteristics	OperationalYear	2018	2019
tblTripsAndVMT	HaulingTripNumber	18.00	142.00
tblVehicleTrips	ST_TR	158.37	0.00
tblVehicleTrips	ST_TR	46.55	0.00
tblVehicleTrips	ST_TR	99.28	0.00
tblVehicleTrips	SU_TR	131.84	0.00
tblVehicleTrips	SU_TR	25.49	0.00
tblVehicleTrips	SU_TR	81.90	0.00

tblVehicleTrips	WD_TR	127.15	0.00
tblVehicleTrips	WD_TR	56.24	0.00
tblVehicleTrips	WD_TR	78.06	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.0103	0.1116	0.0670	1.8000e-004	5.1500e-003	5.6600e-003	0.0108	1.0600e-003	5.4000e-003	6.4600e-003			16.7092	2.1500e-003	0.0000	16.7630
Maximum	**0.0103**	**0.1116**	**0.0670**	**1.8000e-004**	**5.1500e-003**	**5.6600e-003**	**0.0108**	**1.0600e-003**	**5.4000e-003**	**6.4600e-003**			**16.7092**	**2.1500e-003**	**0.0000**	**16.7630**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.0103	0.1116	0.0670	1.8000e-004	3.5300e-003	5.6600e-003	9.1900e-003	8.1000e-004	5.4000e-003	6.2100e-003			16.7092	2.1500e-003	0.0000	16.7630
Maximum	**0.0103**	**0.1116**	**0.0670**	**1.8000e-004**	**3.5300e-003**	**5.6600e-003**	**9.1900e-003**	**8.1000e-004**	**5.4000e-003**	**6.2100e-003**			**16.7092**	**2.1500e-003**	**0.0000**	**16.7630**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**31.46**	**0.00**	**14.99**	**23.58**	**0.00**	**3.87**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0330	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Energy	5.3900e-003	0.0490	0.0412	2.9000e-004		3.7200e-003	3.7200e-003		3.7200e-003	3.7200e-003			110.4486	3.0000e-003	1.3900e-003	110.9369
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000			13.8562	0.8189	0.0000	34.3281
Water						0.0000	0.0000		0.0000	0.0000			0.4791	2.9800e-003	7.0000e-005	0.5755
Total	**0.0384**	**0.0490**	**0.0412**	**2.9000e-004**	**0.0000**	**3.7200e-003**	**3.7200e-003**	**0.0000**	**3.7200e-003**	**3.7200e-003**			**124.7839**	**0.8249**	**1.4600e-003**	**145.8404**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0330	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Energy	5.3900e-003	0.0490	0.0412	2.9000e-004		3.7200e-003	3.7200e-003		3.7200e-003	3.7200e-003			110.4486	3.0000e-003	1.3900e-003	110.9369
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000			6.9281	0.4094	0.0000	17.1640
Water						0.0000	0.0000		0.0000	0.0000			0.4791	2.9800e-003	7.0000e-005	0.5755
Total	**0.0384**	**0.0490**	**0.0412**	**2.9000e-004**	**0.0000**	**3.7200e-003**	**3.7200e-003**	**0.0000**	**3.7200e-003**	**3.7200e-003**			**117.8558**	**0.4154**	**1.4600e-003**	**128.6764**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**5.55**	**49.64**	**0.00**	**11.77**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	12/1/2017	12/21/2017	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	142.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Clean Paved Roads

3.2 Demolition - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.9500e-003	0.0000	2.9500e-003	4.5000e-004	0.0000	4.5000e-004			0.0000	0.0000	0.0000	0.0000
Off-Road	9.0700e-003	0.0787	0.0594	9.0000e-005		5.4900e-003	5.4900e-003		5.2300e-003	5.2300e-003			8.0239	1.5800e-003	0.0000	8.0633
Total	**9.0700e-003**	**0.0787**	**0.0594**	**9.0000e-005**	**2.9500e-003**	**5.4900e-003**	**8.4400e-003**	**4.5000e-004**	**5.2300e-003**	**5.6800e-003**			**8.0239**	**1.5800e-003**	**0.0000**	**8.0633**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.5000e-004	0.0325	4.0300e-003	8.0000e-005	1.3800e-003	1.7000e-004	1.5500e-003	3.9000e-004	1.6000e-004	5.5000e-004			7.9291	5.5000e-004	0.0000	7.9429
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Worker	4.5000e-004	3.5000e-004	3.6200e-003	1.0000e-005	8.2000e-004	1.0000e-005	8.3000e-004	2.2000e-004	0.0000	2.2000e-004			0.7562	2.0000e-005	0.0000	0.7568
Total	**1.2000e-003**	**0.0329**	**7.6500e-003**	**9.0000e-005**	**2.2000e-003**	**1.8000e-004**	**2.3800e-003**	**6.1000e-004**	**1.6000e-004**	**7.7000e-004**			**8.6853**	**5.7000e-004**	**0.0000**	**8.6997**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.3300e-003	0.0000	1.3300e-003	2.0000e-004	0.0000	2.0000e-004			0.0000	0.0000	0.0000	0.0000
Off-Road	9.0700e-003	0.0787	0.0594	9.0000e-005		5.4900e-003	5.4900e-003		5.2300e-003	5.2300e-003			8.0239	1.5800e-003	0.0000	8.0633
Total	**9.0700e-003**	**0.0787**	**0.0594**	**9.0000e-005**	**1.3300e-003**	**5.4900e-003**	**6.8200e-003**	**2.0000e-004**	**5.2300e-003**	**5.4300e-003**			**8.0239**	**1.5800e-003**	**0.0000**	**8.0633**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.5000e-004	0.0325	4.0300e-003	8.0000e-005	1.3800e-003	1.7000e-004	1.5500e-003	3.9000e-004	1.6000e-004	5.5000e-004			7.9291	5.5000e-004	0.0000	7.9429
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Worker	4.5000e-004	3.5000e-004	3.6200e-003	1.0000e-005	8.2000e-004	1.0000e-005	8.3000e-004	2.2000e-004	0.0000	2.2000e-004			0.7562	2.0000e-005	0.0000	0.7568
Total	**1.2000e-003**	**0.0329**	**7.6500e-003**	**9.0000e-005**	**2.2000e-003**	**1.8000e-004**	**2.3800e-003**	**6.1000e-004**	**1.6000e-004**	**7.7000e-004**			**8.6853**	**5.7000e-004**	**0.0000**	**8.6997**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00		
Library	0.00	0.00	0.00		
Movie Theater (No Matinee)	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Library	16.60	8.40	6.90	52.00	43.00	5.00	44	44	12
Movie Theater (No Matinee)	16.60	8.40	6.90	1.80	79.20	19.00	66	17	17

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Library	0.533383	0.039495	0.183627	0.126156	0.018688	0.005561	0.017029	0.066607	0.001345	0.001247	0.004677	0.000974	0.001211
High Turnover (Sit Down Restaurant)	0.533383	0.039495	0.183627	0.126156	0.018688	0.005561	0.017029	0.066607	0.001345	0.001247	0.004677	0.000974	0.001211
Movie Theater (No Matinee)	0.533383	0.039495	0.183627	0.126156	0.018688	0.005561	0.017029	0.066607	0.001345	0.001247	0.004677	0.000974	0.001211

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000			57.1001	1.9800e-003	4.1000e-004	57.2714
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000			57.1001	1.9800e-003	4.1000e-004	57.2714
NaturalGas Mitigated	5.3900e-003	0.0490	0.0412	2.9000e-004		3.7200e-003	3.7200e-003		3.7200e-003	3.7200e-003			53.3485	1.0200e-003	9.8000e-004	53.6655
NaturalGas Unmitigated	5.3900e-003	0.0490	0.0412	2.9000e-004		3.7200e-003	3.7200e-003		3.7200e-003	3.7200e-003			53.3485	1.0200e-003	9.8000e-004	53.6655

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
High Turnover (Sit Down Restaurant)	943611	5.0900e-003	0.0463	0.0389	2.8000e-004		3.5200e-003	3.5200e-003		3.5200e-003	3.5200e-003			50.3547	9.7000e-004	9.2000e-004	50.6539
Library	27836.3	1.5000e-004	1.3600e-003	1.1500e-003	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004			1.4855	3.0000e-005	3.0000e-005	1.4943
Movie Theater (No Matinee)	28264.5	1.5000e-004	1.3900e-003	1.1600e-003	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004			1.5083	3.0000e-005	3.0000e-005	1.5173
Total		**5.3900e-003**	**0.0490**	**0.0412**	**3.0000e-004**		**3.7300e-003**	**3.7300e-003**		**3.7300e-003**	**3.7300e-003**			**53.3485**	**1.0300e-003**	**9.8000e-004**	**53.6655**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
High Turnover (Sit Down Restaurant)	943611	5.0900e-003	0.0463	0.0389	2.8000e-004		3.5200e-003	3.5200e-003		3.5200e-003	3.5200e-003			50.3547	9.7000e-004	9.2000e-004	50.6539
Library	27836.3	1.5000e-004	1.3600e-003	1.1500e-003	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004			1.4855	3.0000e-005	3.0000e-005	1.4943
Movie Theater (No Matinee)	28264.5	1.5000e-004	1.3900e-003	1.1600e-003	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004			1.5083	3.0000e-005	3.0000e-005	1.5173
Total		**5.3900e-003**	**0.0490**	**0.0412**	**3.0000e-004**		**3.7300e-003**	**3.7300e-003**		**3.7300e-003**	**3.7300e-003**			**53.3485**	**1.0300e-003**	**9.8000e-004**	**53.6655**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
High Turnover (Sit Down Restaurant)	116403	44.2323	1.5300e-003	3.2000e-004	44.3650
Library	16802.5	6.3848	2.2000e-004	5.0000e-005	6.4040
Movie Theater (No Matinee)	17061	6.4831	2.2000e-004	5.0000e-005	6.5025
Total		**57.1001**	**1.9700e-003**	**4.2000e-004**	**57.2714**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
High Turnover (Sit Down Restaurant)	116403	44.2323	1.5300e-003	3.2000e-004	44.3650
Library	16802.5	6.3848	2.2000e-004	5.0000e-005	6.4040
Movie Theater (No Matinee)	17061	6.4831	2.2000e-004	5.0000e-005	6.5025
Total		**57.1001**	**1.9700e-003**	**4.2000e-004**	**57.2714**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0330	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0330	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	3.7500e-003					0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0293					0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Total	**0.0330**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**			**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	3.7500e-003					0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0293					0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Total	**0.0330**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**			**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.0 Water Detail

7.1 Mitigation Measures Water

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.4791	2.9800e-003	7.0000e-005	0.5755
Unmitigated	0.4791	2.9800e-003	7.0000e-005	0.5755

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
High Turnover (Sit Down Restaurant)	0.091 / 0	0.4791	2.9800e-003	7.0000e-005	0.5755
Library	0 / 0	0.0000	0.0000	0.0000	0.0000
Movie Theater (No Matinee)	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.4791**	**2.9800e-003**	**7.0000e-005**	**0.5755**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
High Turnover (Sit Down Restaurant)	0.091 / 0	0.4791	2.9800e-003	7.0000e-005	0.5755
Library	0 / 0	0.0000	0.0000	0.0000	0.0000
Movie Theater (No Matinee)	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.4791**	**2.9800e-003**	**7.0000e-005**	**0.5755**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	6.9281	0.4094	0.0000	17.1640
Unmitigated	13.8562	0.8189	0.0000	34.3281

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
High Turnover (Sit Down Restaurant)	57.36	11.6436	0.6881	0.0000	28.8464
Library	1.5	0.3045	0.0180	0.0000	0.7544
Movie Theater (No Matinee)	9.4	1.9081	0.1128	0.0000	4.7273
Total		**13.8562**	**0.8189**	**0.0000**	**34.3281**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
High Turnover (Sit Down Restaurant)	28.68	5.8218	0.3441	0.0000	14.4232
Library	0.75	0.1522	9.0000e-003	0.0000	0.3772
Movie Theater (No Matinee)	4.7	0.9541	0.0564	0.0000	2.3636
Total		**6.9281**	**0.4094**	**0.0000**	**17.1640**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

UCR Barn Complex Future 030717

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Library	2.42	1000sqft	0.21	2,415.00	0
High Turnover (Sit Down Restaurant)	13.95	1000sqft	1.19	13,950.00	0
Movie Theater (No Matinee)	2.87	1000sqft	0.25	2,865.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2019
Utility Company	Riverside Public Utilities				
CO2 Intensity (lb/MWhr)	837.74	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity per RPU

Land Use - Movie theater surrogate for Barn theater and ticketing

Library surrogate for Campus Meeting Room

Construction Phase - Demo 12/1-21/17;grad12/26-1/22/18;build1/23/18-1/22/19;pave1/9-22/19;coat1/9-3/5/19

Off-road Equipment - bldg equip per data needs

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Trips and VMT - Demo round trips 37 bldg; 34 paving

Worker and vendor trips increased per UCR and to account for renovations

Demolition -

Grading -

Vehicle Trips - No new trip generation in CalEEMod

Manual delivery truck calc

Landscape Equipment - Assume no change in landscape maint.

Energy Use - No Title 24 natural gas use

Restaurant also default/2 to approx. setting and CAP data

Water And Wastewater - Water use per UCR for restroom; assume 500 gpd for kitchen

No change in outdoor use

Construction Off-road Equipment Mitigation - x

Energy Mitigation - Assume 10% better than 2016 Title 24

Water Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3

tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	10.00	40.00
tblConstructionPhase	NumDays	200.00	261.00
tblConstructionPhase	NumDays	20.00	15.00
tblConstructionPhase	NumDays	4.00	20.00
tblEnergyUse	LightingElect	6.83	3.42
tblEnergyUse	NT24E	28.48	14.24
tblEnergyUse	T24E	12.98	6.49
tblEnergyUse	T24NG	78.06	0.00
tblEnergyUse	T24NG	15.43	0.00
tblEnergyUse	T24NG	15.43	0.00
tblFleetMix	FleetMixLandUseSubType	Library	High Turnover (Sit Down Restaurant)
tblFleetMix	FleetMixLandUseSubType	High Turnover (Sit Down Restaurant)	Library
tblLandscapeEquipment	NumberSummerDays	250	1
tblLandUse	BuildingSpaceSquareFeet	2,420.00	2,415.00
tblLandUse	BuildingSpaceSquareFeet	2,870.00	2,865.00
tblLandUse	LandUseSquareFeet	2,420.00	2,415.00
tblLandUse	LandUseSquareFeet	2,870.00	2,865.00
tblLandUse	LotAcreage	0.06	0.21
tblLandUse	LotAcreage	0.32	1.19
tblLandUse	LotAcreage	0.07	0.25
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	UsageHours	8.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	1325.65	837.74
tblProjectCharacteristics	OperationalYear	2018	2019
tblTripsAndVMT	HaulingTripNumber	18.00	142.00
tblTripsAndVMT	VendorTripNumber	3.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripNumber	8.00	80.00
tblTripsAndVMT	WorkerTripNumber	2.00	6.00
tblVehicleTrips	ST_TR	158.37	0.00
tblVehicleTrips	ST_TR	46.55	0.00
tblVehicleTrips	ST_TR	99.28	0.00
tblVehicleTrips	SU_TR	131.84	0.00
tblVehicleTrips	SU_TR	25.49	0.00
tblVehicleTrips	SU_TR	81.90	0.00
tblVehicleTrips	WD_TR	127.15	0.00
tblVehicleTrips	WD_TR	56.24	0.00
tblVehicleTrips	WD_TR	78.06	0.00
tblWater	IndoorWaterUseRate	4,234,295.29	182,000.00
tblWater	IndoorWaterUseRate	75,719.16	0.00
tblWater	IndoorWaterUseRate	1,152,596.20	0.00
tblWater	OutdoorWaterUseRate	270,274.17	0.00
tblWater	OutdoorWaterUseRate	118,432.53	0.00
tblWater	OutdoorWaterUseRate	73,569.97	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	2.9159	29.6680	16.5432	0.0328	5.0037	1.6639	5.8780	2.5493	1.5559	3.3537			3,328.3108	0.6737	0.0000	3,345.1537
2018	1.8297	17.0984	10.6985	0.0215	5.0037	0.7953	5.7990	2.5493	0.7317	3.2810			2,111.6046	0.4450	0.0000	2,120.6159
2019	4.7553	10.9863	10.0745	0.0212	0.9326	0.5844	1.5171	0.2482	0.5458	0.7941			2,070.0996	0.4197	0.0000	2,078.8986
Maximum	**4.7553**	**29.6680**	**16.5432**	**0.0328**	**5.0037**	**1.6639**	**5.8780**	**2.5493**	**1.5559**	**3.3537**			**3,328.3108**	**0.6737**	**0.0000**	**3,345.1537**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	0.7156	15.0119	16.4013	0.0328	2.3008	0.7344	2.6120	1.1602	0.7337	1.4714			3,328.3108	0.6737	0.0000	3,345.1537
2018	0.8188	7.3830	10.6784	0.0215	2.3008	0.3735	2.6120	1.1602	0.3728	1.4714			2,111.6046	0.4450	0.0000	2,120.6159
2019	4.5483	7.2985	10.3688	0.0212	0.9326	0.3890	1.3052	0.2482	0.3889	0.6201			2,070.0996	0.4197	0.0000	2,078.8986
Maximum	**4.5483**	**15.0119**	**16.4013**	**0.0328**	**2.3008**	**0.7344**	**2.6120**	**1.1602**	**0.7337**	**1.4714**			**3,328.3108**	**0.6737**	**0.0000**	**3,345.1537**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**35.98**	**48.59**	**-0.35**	**0.00**	**49.41**	**50.82**	**50.51**	**51.96**	**47.22**	**52.04**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.4298	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005			4.2100e-003	1.0000e-005		4.5000e-003
Energy	0.0834	0.7578	0.6366	4.5500e-003		0.0576	0.0576		0.0576	0.0576			909.4079	0.0174	0.0167	914.8120
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Total	**0.5131**	**0.7579**	**0.6386**	**4.5500e-003**	**0.0000**	**0.0576**	**0.0576**	**0.0000**	**0.0576**	**0.0576**			**909.4121**	**0.0174**	**0.0167**	**914.8165**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.4298	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005			4.2100e-003	1.0000e-005		4.5000e-003
Energy	0.0834	0.7578	0.6366	4.5500e-003		0.0576	0.0576		0.0576	0.0576			909.4079	0.0174	0.0167	914.8120
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Total	**0.5131**	**0.7579**	**0.6386**	**4.5500e-003**	**0.0000**	**0.0576**	**0.0576**	**0.0000**	**0.0576**	**0.0576**			**909.4121**	**0.0174**	**0.0167**	**914.8165**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	12/1/2017	12/21/2017	5	15	
2	Grading	Grading	12/22/2017	1/18/2018	5	20	
3	Building Construction	Building Construction	1/19/2018	1/18/2019	5	261	
4	Paving	Paving	1/19/2019	2/1/2019	5	10	
5	Architectural Coating	Architectural Coating	2/2/2019	3/29/2019	5	40	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 7.5

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 28,845; Non-Residential Outdoor: 9,615; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Generator Sets	0	0.00	84	0.74

Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	142.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	80.00	6.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	6.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2618	0.0000	0.2618	0.0396	0.0000	0.0396			0.0000			0.0000
Off-Road	2.7625	26.7594	15.5573	0.0241		1.6477	1.6477		1.5404	1.5404			2,421.4229	0.6125		2,436.7347
Total	**2.7625**	**26.7594**	**15.5573**	**0.0241**	**0.2618**	**1.6477**	**1.9095**	**0.0396**	**1.5404**	**1.5800**			**2,421.4229**	**0.6125**		**2,436.7347**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0686	2.8494	0.3907	7.2300e-003	0.1657	0.0153	0.1810	0.0454	0.0147	0.0601			766.0146	0.0566		767.4303
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0848	0.0591	0.5951	1.4200e-003	0.1453	9.3000e-004	0.1462	0.0385	8.6000e-004	0.0394			140.8733	4.6100e-003		140.9886
Total	**0.1534**	**2.9086**	**0.9858**	**8.6500e-003**	**0.3110**	**0.0162**	**0.3272**	**0.0840**	**0.0155**	**0.0995**			**906.8879**	**0.0612**		**908.4190**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1178	0.0000	0.1178	0.0178	0.0000	0.0178			0.0000			0.0000
Off-Road	0.5621	12.1033	15.4154	0.0241		0.7182	0.7182		0.7182	0.7182			2,421.4229	0.6125		2,436.7347
Total	**0.5621**	**12.1033**	**15.4154**	**0.0241**	**0.1178**	**0.7182**	**0.8360**	**0.0178**	**0.7182**	**0.7360**			**2,421.4229**	**0.6125**		**2,436.7347**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0686	2.8494	0.3907	7.2300e-003	0.1657	0.0153	0.1810	0.0454	0.0147	0.0601			766.0146	0.0566		767.4303
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0848	0.0591	0.5951	1.4200e-003	0.1453	9.3000e-004	0.1462	0.0385	8.6000e-004	0.0394			140.8733	4.6100e-003		140.9886
Total	**0.1534**	**2.9086**	**0.9858**	**8.6500e-003**	**0.3110**	**0.0162**	**0.3272**	**0.0840**	**0.0155**	**0.0995**			**906.8879**	**0.0612**		**908.4190**

3.3 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9143	0.0000	4.9143	2.5256	0.0000	2.5256			0.0000			0.0000
Off-Road	1.6023	18.2915	7.0342	0.0141		0.8738	0.8738		0.8039	0.8039			1,444.8958	0.4427		1,455.9636
Total	**1.6023**	**18.2915**	**7.0342**	**0.0141**	**4.9143**	**0.8738**	**5.7880**	**2.5256**	**0.8039**	**3.3295**			**1,444.8958**	**0.4427**		**1,455.9636**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0522	0.0364	0.3662	8.7000e-004	0.0894	5.7000e-004	0.0900	0.0237	5.3000e-004	0.0242			86.6913	2.8400e-003		86.7622
Total	**0.0522**	**0.0364**	**0.3662**	**8.7000e-004**	**0.0894**	**5.7000e-004**	**0.0900**	**0.0237**	**5.3000e-004**	**0.0242**			**86.6913**	**2.8400e-003**		**86.7622**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.2114	0.0000	2.2114	1.1365	0.0000	1.1365			0.0000			0.0000
Off-Road	0.3450	6.9025	8.0841	0.0141		0.3106	0.3106		0.3106	0.3106			1,444.8958	0.4427		1,455.9636
Total	**0.3450**	**6.9025**	**8.0841**	**0.0141**	**2.2114**	**0.3106**	**2.5220**	**1.1365**	**0.3106**	**1.4471**			**1,444.8958**	**0.4427**		**1,455.9636**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0522	0.0364	0.3662	8.7000e-004	0.0894	5.7000e-004	0.0900	0.0237	5.3000e-004	0.0242			86.6913	2.8400e-003		86.7622
Total	**0.0522**	**0.0364**	**0.3662**	**8.7000e-004**	**0.0894**	**5.7000e-004**	**0.0900**	**0.0237**	**5.3000e-004**	**0.0242**			**86.6913**	**2.8400e-003**		**86.7622**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9143	0.0000	4.9143	2.5256	0.0000	2.5256			0.0000			0.0000
Off-Road	1.4972	17.0666	6.7630	0.0141		0.7947	0.7947		0.7311	0.7311			1,421.2605	0.4425		1,432.3219
Total	**1.4972**	**17.0666**	**6.7630**	**0.0141**	**4.9143**	**0.7947**	**5.7090**	**2.5256**	**0.7311**	**3.2568**			**1,421.2605**	**0.4425**		**1,432.3219**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0470	0.0317	0.3216	8.5000e-004	0.0894	5.6000e-004	0.0900	0.0237	5.1000e-004	0.0242			84.2175	2.4900e-003		84.2797
Total	**0.0470**	**0.0317**	**0.3216**	**8.5000e-004**	**0.0894**	**5.6000e-004**	**0.0900**	**0.0237**	**5.1000e-004**	**0.0242**			**84.2175**	**2.4900e-003**		**84.2797**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.2114	0.0000	2.2114	1.1365	0.0000	1.1365			0.0000			0.0000
Off-Road	0.3450	6.9025	8.0841	0.0141		0.3106	0.3106		0.3106	0.3106			1,421.2605	0.4425		1,432.3219
Total	**0.3450**	**6.9025**	**8.0841**	**0.0141**	**2.2114**	**0.3106**	**2.5220**	**1.1365**	**0.3106**	**1.4471**			**1,421.2605**	**0.4425**		**1,432.3219**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0470	0.0317	0.3216	8.5000e-004	0.0894	5.6000e-004	0.0900	0.0237	5.1000e-004	0.0242			84.2175	2.4900e-003		84.2797
Total	**0.0470**	**0.0317**	**0.3216**	**8.5000e-004**	**0.0894**	**5.6000e-004**	**0.0900**	**0.0237**	**5.1000e-004**	**0.0242**			**84.2175**	**2.4900e-003**		**84.2797**

3.4 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3366	11.1316	7.3198	0.0115		0.6632	0.6632		0.6192	0.6192			1,108.1895	0.3202		1,116.1945
Total	**1.3366**	**11.1316**	**7.3198**	**0.0115**		**0.6632**	**0.6632**		**0.6192**	**0.6192**			**1,108.1895**	**0.3202**		**1,116.1945**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0232	0.7284	0.1627	1.5300e-003	0.0384	6.1900e-003	0.0446	0.0111	5.9200e-003	0.0170			161.2405	0.0153		161.6240
Worker	0.4700	0.3174	3.2161	8.4600e-003	0.8942	5.5900e-003	0.8998	0.2372	5.1500e-003	0.2423			842.1746	0.0249		842.7974
Total	**0.4931**	**1.0458**	**3.3787**	**9.9900e-003**	**0.9326**	**0.0118**	**0.9444**	**0.2482**	**0.0111**	**0.2593**			**1,003.4151**	**0.0403**		**1,004.4214**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3257	6.3372	7.2997	0.0115		0.3618	0.3618		0.3618	0.3618			1,108.1895	0.3202		1,116.1945
Total	**0.3257**	**6.3372**	**7.2997**	**0.0115**		**0.3618**	**0.3618**		**0.3618**	**0.3618**			**1,108.1895**	**0.3202**		**1,116.1945**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0232	0.7284	0.1627	1.5300e-003	0.0384	6.1900e-003	0.0446	0.0111	5.9200e-003	0.0170			161.2405	0.0153		161.6240
Worker	0.4700	0.3174	3.2161	8.4600e-003	0.8942	5.5900e-003	0.8998	0.2372	5.1500e-003	0.2423			842.1746	0.0249		842.7974
Total	**0.4931**	**1.0458**	**3.3787**	**9.9900e-003**	**0.9326**	**0.0118**	**0.9444**	**0.2482**	**0.0111**	**0.2593**			**1,003.4151**	**0.0403**		**1,004.4214**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1777	10.0250	7.0453	0.0115		0.5737	0.5737		0.5357	0.5357			1,093.5227	0.3150		1,101.3981
Total	**1.1777**	**10.0250**	**7.0453**	**0.0115**		**0.5737**	**0.5737**		**0.5357**	**0.5357**			**1,093.5227**	**0.3150**		**1,101.3981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0210	0.6815	0.1488	1.5200e-003	0.0384	5.2500e-003	0.0437	0.0111	5.0200e-003	0.0161			160.1632	0.0148		160.5329
Worker	0.4304	0.2798	2.8804	8.2000e-003	0.8942	5.5200e-003	0.8997	0.2372	5.0800e-003	0.2422			816.4137	0.0222		816.9675
Total	**0.4514**	**0.9613**	**3.0293**	**9.7200e-003**	**0.9326**	**0.0108**	**0.9434**	**0.2482**	**0.0101**	**0.2583**			**976.5769**	**0.0369**		**977.5005**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3257	6.3372	7.2997	0.0115		0.3618	0.3618		0.3618	0.3618			1,093.5227	0.3150		1,101.3981
Total	**0.3257**	**6.3372**	**7.2997**	**0.0115**		**0.3618**	**0.3618**		**0.3618**	**0.3618**			**1,093.5227**	**0.3150**		**1,101.3981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0210	0.6815	0.1488	1.5200e-003	0.0384	5.2500e-003	0.0437	0.0111	5.0200e-003	0.0161			160.1632	0.0148		160.5329
Worker	0.4304	0.2798	2.8804	8.2000e-003	0.8942	5.5200e-003	0.8997	0.2372	5.0800e-003	0.2422			816.4137	0.0222		816.9675
Total	**0.4514**	**0.9613**	**3.0293**	**9.7200e-003**	**0.9326**	**0.0108**	**0.9434**	**0.2482**	**0.0101**	**0.2583**			**976.5769**	**0.0369**		**977.5005**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9038	9.1743	8.9025	0.0135		0.5225	0.5225		0.4815	0.4815			1,325.0953	0.4112		1,335.3751
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9038**	**9.1743**	**8.9025**	**0.0135**		**0.5225**	**0.5225**		**0.4815**	**0.4815**			**1,325.0953**	**0.4112**		**1,335.3751**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	6.9900e-003	0.2272	0.0496	5.1000e-004	0.0128	1.7500e-003	0.0146	3.6900e-003	1.6700e-003	5.3600e-003			53.3877	4.9300e-003		53.5110
Worker	0.0699	0.0455	0.4681	1.3300e-003	0.1453	9.0000e-004	0.1462	0.0385	8.3000e-004	0.0394			132.6672	3.6000e-003		132.7572
Total	**0.0769**	**0.2726**	**0.5177**	**1.8400e-003**	**0.1581**	**2.6500e-003**	**0.1608**	**0.0422**	**2.5000e-003**	**0.0447**			**186.0550**	**8.5300e-003**		**186.2682**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3195	6.6399	9.8512	0.0135		0.3864	0.3864		0.3864	0.3864			1,325.0953	0.4112		1,335.3751
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.3195**	**6.6399**	**9.8512**	**0.0135**		**0.3864**	**0.3864**		**0.3864**	**0.3864**			**1,325.0953**	**0.4112**		**1,335.3751**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	6.9900e-003	0.2272	0.0496	5.1000e-004	0.0128	1.7500e-003	0.0146	3.6900e-003	1.6700e-003	5.3600e-003			53.3877	4.9300e-003		53.5110
Worker	0.0699	0.0455	0.4681	1.3300e-003	0.1453	9.0000e-004	0.1462	0.0385	8.3000e-004	0.0394			132.6672	3.6000e-003		132.7572
Total	**0.0769**	**0.2726**	**0.5177**	**1.8400e-003**	**0.1581**	**2.6500e-003**	**0.1608**	**0.0422**	**2.5000e-003**	**0.0447**			**186.0550**	**8.5300e-003**		**186.2682**

3.6 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	4.4566					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288			281.4481	0.0238		282.0423
Total	**4.7230**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**			**281.4481**	**0.0238**		**282.0423**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0323	0.0210	0.2160	6.1000e-004	0.0671	4.1000e-004	0.0675	0.0178	3.8000e-004	0.0182			61.2310	1.6600e-003		61.2726
Total	**0.0323**	**0.0210**	**0.2160**	**6.1000e-004**	**0.0671**	**4.1000e-004**	**0.0675**	**0.0178**	**3.8000e-004**	**0.0182**			**61.2310**	**1.6600e-003**		**61.2726**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	4.4566					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0594	1.3570	1.8324	2.9700e-003		0.0951	0.0951		0.0951	0.0951			281.4481	0.0238		282.0423
Total	**4.5160**	**1.3570**	**1.8324**	**2.9700e-003**		**0.0951**	**0.0951**		**0.0951**	**0.0951**			**281.4481**	**0.0238**		**282.0423**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0323	0.0210	0.2160	6.1000e-004	0.0671	4.1000e-004	0.0675	0.0178	3.8000e-004	0.0182			61.2310	1.6600e-003		61.2726
Total	**0.0323**	**0.0210**	**0.2160**	**6.1000e-004**	**0.0671**	**4.1000e-004**	**0.0675**	**0.0178**	**3.8000e-004**	**0.0182**			**61.2310**	**1.6600e-003**		**61.2726**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00		
Library	0.00	0.00	0.00		
Movie Theater (No Matinee)	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
High Turnover (Sit Down Restaurant)	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Library	16.60	8.40	6.90	52.00	43.00	5.00	44	44	12
Movie Theater (No Matinee)	16.60	8.40	6.90	1.80	79.20	19.00	66	17	17

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
High Turnover (Sit Down Restaurant)	0.533383	0.039495	0.183627	0.126156	0.018688	0.005561	0.017029	0.066607	0.001345	0.001247	0.004677	0.000974	0.001211
Library	0.533383	0.039495	0.183627	0.126156	0.018688	0.005561	0.017029	0.066607	0.001345	0.001247	0.004677	0.000974	0.001211
Movie Theater (No Matinee)	0.533383	0.039495	0.183627	0.126156	0.018688	0.005561	0.017029	0.066607	0.001345	0.001247	0.004677	0.000974	0.001211

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0834	0.7578	0.6366	4.5500e-003		0.0576	0.0576		0.0576	0.0576			909.4079	0.0174	0.0167	914.8120
NaturalGas Unmitigated	0.0834	0.7578	0.6366	4.5500e-003		0.0576	0.0576		0.0576	0.0576			909.4079	0.0174	0.0167	914.8120

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
High Turnover (Sit Down Restaurant)	7482.17	0.0807	0.7336	0.6162	4.4000e-003		0.0558	0.0558		0.0558	0.0558			880.2551	0.0169	0.0161	885.4860
Library	113.34	1.2200e-003	0.0111	9.3300e-003	7.0000e-005		8.4000e-004	8.4000e-004		8.4000e-004	8.4000e-004			13.3341	2.6000e-004	2.4000e-004	13.4133
Movie Theater (No Matinee)	134.459	1.4500e-003	0.0132	0.0111	8.0000e-005		1.0000e-003	1.0000e-003		1.0000e-003	1.0000e-003			15.8187	3.0000e-004	2.9000e-004	15.9127
Total		**0.0834**	**0.7578**	**0.6366**	**4.5500e-003**		**0.0576**	**0.0576**		**0.0576**	**0.0576**			**909.4079**	**0.0174**	**0.0167**	**914.8120**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
High Turnover (Sit Down Restaurant)	7.48217	0.0807	0.7336	0.6162	4.4000e-003		0.0558	0.0558		0.0558	0.0558			880.2551	0.0169	0.0161	885.4860
Library	0.11334	1.2200e-003	0.0111	9.3300e-003	7.0000e-005		8.4000e-004	8.4000e-004		8.4000e-004	8.4000e-004			13.3341	2.6000e-004	2.4000e-004	13.4133
Movie Theater (No Matinee)	0.134459	1.4500e-003	0.0132	0.0111	8.0000e-005		1.0000e-003	1.0000e-003		1.0000e-003	1.0000e-003			15.8187	3.0000e-004	2.9000e-004	15.9127
Total		**0.0834**	**0.7578**	**0.6366**	**4.5500e-003**		**0.0576**	**0.0576**		**0.0576**	**0.0576**			**909.4079**	**0.0174**	**0.0167**	**914.8120**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.4298	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005			4.2100e-003	1.0000e-005		4.5000e-003
Unmitigated	0.4298	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005			4.2100e-003	1.0000e-005		4.5000e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0488					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.3808					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.9000e-004	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005			4.2100e-003	1.0000e-005		4.5000e-003
Total	**0.4298**	**2.0000e-005**	**1.9800e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**			**4.2100e-003**	**1.0000e-005**		**4.5000e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0488					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.3808					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.9000e-004	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005			4.2100e-003	1.0000e-005		4.5000e-003
Total	**0.4298**	**2.0000e-005**	**1.9800e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**			**4.2100e-003**	**1.0000e-005**		**4.5000e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

UCR Barn Complex Future 030717

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Library	2.42	1000sqft	0.21	2,415.00	0
High Turnover (Sit Down Restaurant)	13.95	1000sqft	1.19	13,950.00	0
Movie Theater (No Matinee)	2.87	1000sqft	0.25	2,865.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2019
Utility Company	Riverside Public Utilities				
CO2 Intensity (lb/MWhr)	837.74	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity per RPU

Land Use - Movie theater surrogate for Barn theater and ticketing

Library surrogate for Campus Meeting Room

Construction Phase - Demo 12/1-21/17;grad12/26-1/22/18;build1/23/18-1/22/19;pave1/9-22/19;coat1/9-3/5/19

Off-road Equipment - bldg equip per data needs

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Trips and VMT - Demo round trips 37 bldg; 34 paving

Worker and vendor trips increased per UCR and to account for renovations

Demolition -

Grading -

Vehicle Trips - No new trip generation in CalEEMod

Manual delivery truck calc

Landscape Equipment - Assume no change in landscape maint.

Energy Use - No Title 24 natural gas use

Restaurant also default/2 to approx. setting and CAP data

Water And Wastewater - Water use per UCR for restroom; assume 500 gpd for kitchen

No change in outdoor use

Construction Off-road Equipment Mitigation - x

Energy Mitigation - Assume 10% better than 2016 Title 24

Water Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3

tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	10.00	40.00
tblConstructionPhase	NumDays	200.00	261.00
tblConstructionPhase	NumDays	20.00	15.00
tblConstructionPhase	NumDays	4.00	20.00
tblEnergyUse	LightingElect	6.83	3.42
tblEnergyUse	NT24E	28.48	14.24
tblEnergyUse	T24E	12.98	6.49
tblEnergyUse	T24NG	78.06	0.00
tblEnergyUse	T24NG	15.43	0.00
tblEnergyUse	T24NG	15.43	0.00
tblFleetMix	FleetMixLandUseSubType	Library	High Turnover (Sit Down Restaurant)
tblFleetMix	FleetMixLandUseSubType	High Turnover (Sit Down Restaurant)	Library
tblLandscapeEquipment	NumberSummerDays	250	1
tblLandUse	BuildingSpaceSquareFeet	2,420.00	2,415.00
tblLandUse	BuildingSpaceSquareFeet	2,870.00	2,865.00
tblLandUse	LandUseSquareFeet	2,420.00	2,415.00
tblLandUse	LandUseSquareFeet	2,870.00	2,865.00
tblLandUse	LotAcreage	0.06	0.21
tblLandUse	LotAcreage	0.32	1.19
tblLandUse	LotAcreage	0.07	0.25
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	UsageHours	8.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	1325.65	837.74
tblProjectCharacteristics	OperationalYear	2018	2019
tblTripsAndVMT	HaulingTripNumber	18.00	142.00
tblTripsAndVMT	VendorTripNumber	3.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripNumber	8.00	80.00
tblTripsAndVMT	WorkerTripNumber	2.00	6.00
tblVehicleTrips	ST_TR	158.37	0.00
tblVehicleTrips	ST_TR	46.55	0.00
tblVehicleTrips	ST_TR	99.28	0.00
tblVehicleTrips	SU_TR	131.84	0.00
tblVehicleTrips	SU_TR	25.49	0.00
tblVehicleTrips	SU_TR	81.90	0.00
tblVehicleTrips	WD_TR	127.15	0.00
tblVehicleTrips	WD_TR	56.24	0.00
tblVehicleTrips	WD_TR	78.06	0.00
tblWater	IndoorWaterUseRate	4,234,295.29	182,000.00
tblWater	IndoorWaterUseRate	75,719.16	0.00
tblWater	IndoorWaterUseRate	1,152,596.20	0.00
tblWater	OutdoorWaterUseRate	270,274.17	0.00
tblWater	OutdoorWaterUseRate	118,432.53	0.00
tblWater	OutdoorWaterUseRate	73,569.97	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	2.9150	29.6285	16.6218	0.0331	5.0037	1.6637	5.8780	2.5493	1.5557	3.3537			3,363.2169	0.6696	0.0000	3,379.9578
2018	1.8403	17.0972	11.4174	0.0225	5.0037	0.7953	5.7990	2.5493	0.7317	3.2810			2,214.2857	0.4453	0.0000	2,223.3508
2019	4.7560	10.9783	10.7273	0.0222	0.9326	0.5844	1.5170	0.2482	0.5458	0.7940			2,169.9221	0.4198	0.0000	2,178.7673
Maximum	**4.7560**	**29.6285**	**16.6218**	**0.0331**	**5.0037**	**1.6637**	**5.8780**	**2.5493**	**1.5557**	**3.3537**			**3,363.2169**	**0.6696**	**0.0000**	**3,379.9578**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	0.7147	14.9724	16.4799	0.0331	2.3008	0.7342	2.6120	1.1602	0.7335	1.4714			3,363.2169	0.6696	0.0000	3,379.9578
2018	0.8294	7.3725	11.3973	0.0225	2.3008	0.3735	2.6120	1.1602	0.3728	1.4714			2,214.2857	0.4453	0.0000	2,223.3508
2019	4.5490	7.2906	10.9817	0.0222	0.9326	0.3890	1.3051	0.2482	0.3889	0.6200			2,169.9221	0.4198	0.0000	2,178.7673
Maximum	**4.5490**	**14.9724**	**16.4799**	**0.0331**	**2.3008**	**0.7342**	**2.6120**	**1.1602**	**0.7335**	**1.4714**			**3,363.2169**	**0.6696**	**0.0000**	**3,379.9578**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**35.94**	**48.64**	**-0.24**	**0.00**	**49.41**	**50.82**	**50.51**	**51.96**	**47.23**	**52.04**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.4298	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005			4.2100e-003	1.0000e-005		4.5000e-003
Energy	0.0834	0.7578	0.6366	4.5500e-003		0.0576	0.0576		0.0576	0.0576			909.4079	0.0174	0.0167	914.8120
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Total	**0.5131**	**0.7579**	**0.6386**	**4.5500e-003**	**0.0000**	**0.0576**	**0.0576**	**0.0000**	**0.0576**	**0.0576**			**909.4121**	**0.0174**	**0.0167**	**914.8165**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.4298	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005			4.2100e-003	1.0000e-005		4.5000e-003
Energy	0.0834	0.7578	0.6366	4.5500e-003		0.0576	0.0576		0.0576	0.0576			909.4079	0.0174	0.0167	914.8120
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Total	**0.5131**	**0.7579**	**0.6386**	**4.5500e-003**	**0.0000**	**0.0576**	**0.0576**	**0.0000**	**0.0576**	**0.0576**			**909.4121**	**0.0174**	**0.0167**	**914.8165**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	12/1/2017	12/21/2017	5	15	
2	Grading	Grading	12/22/2017	1/18/2018	5	20	
3	Building Construction	Building Construction	1/19/2018	1/18/2019	5	261	
4	Paving	Paving	1/19/2019	2/1/2019	5	10	
5	Architectural Coating	Architectural Coating	2/2/2019	3/29/2019	5	40	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 7.5

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 28,845; Non-Residential Outdoor: 9,615; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Generator Sets	0	0.00	84	0.74

Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	142.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	80.00	6.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	6.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2618	0.0000	0.2618	0.0396	0.0000	0.0396			0.0000			0.0000
Off-Road	2.7625	26.7594	15.5573	0.0241		1.6477	1.6477		1.5404	1.5404			2,421.4229	0.6125		2,436.7347
Total	**2.7625**	**26.7594**	**15.5573**	**0.0241**	**0.2618**	**1.6477**	**1.9095**	**0.0396**	**1.5404**	**1.5800**			**2,421.4229**	**0.6125**		**2,436.7347**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0656	2.8121	0.3348	7.4100e-003	0.1657	0.0151	0.1807	0.0454	0.0144	0.0599			784.8225	0.0519		786.1199
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0869	0.0570	0.7297	1.5800e-003	0.1453	9.3000e-004	0.1462	0.0385	8.6000e-004	0.0394			156.9714	5.2700e-003		157.1032
Total	**0.1525**	**2.8691**	**1.0645**	**8.9900e-003**	**0.3110**	**0.0160**	**0.3270**	**0.0840**	**0.0153**	**0.0993**			**941.7940**	**0.0572**		**943.2231**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1178	0.0000	0.1178	0.0178	0.0000	0.0178			0.0000			0.0000
Off-Road	0.5621	12.1033	15.4154	0.0241		0.7182	0.7182		0.7182	0.7182			2,421.4229	0.6125		2,436.7347
Total	**0.5621**	**12.1033**	**15.4154**	**0.0241**	**0.1178**	**0.7182**	**0.8360**	**0.0178**	**0.7182**	**0.7360**			**2,421.4229**	**0.6125**		**2,436.7347**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0656	2.8121	0.3348	7.4100e-003	0.1657	0.0151	0.1807	0.0454	0.0144	0.0599			784.8225	0.0519		786.1199
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0869	0.0570	0.7297	1.5800e-003	0.1453	9.3000e-004	0.1462	0.0385	8.6000e-004	0.0394			156.9714	5.2700e-003		157.1032
Total	**0.1525**	**2.8691**	**1.0645**	**8.9900e-003**	**0.3110**	**0.0160**	**0.3270**	**0.0840**	**0.0153**	**0.0993**			**941.7940**	**0.0572**		**943.2231**

3.3 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9143	0.0000	4.9143	2.5256	0.0000	2.5256			0.0000			0.0000
Off-Road	1.6023	18.2915	7.0342	0.0141		0.8738	0.8738		0.8039	0.8039			1,444.8958	0.4427		1,455.9636
Total	**1.6023**	**18.2915**	**7.0342**	**0.0141**	**4.9143**	**0.8738**	**5.7880**	**2.5256**	**0.8039**	**3.3295**			**1,444.8958**	**0.4427**		**1,455.9636**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0535	0.0351	0.4491	9.7000e-004	0.0894	5.7000e-004	0.0900	0.0237	5.3000e-004	0.0242			96.5978	3.2400e-003		96.6789
Total	**0.0535**	**0.0351**	**0.4491**	**9.7000e-004**	**0.0894**	**5.7000e-004**	**0.0900**	**0.0237**	**5.3000e-004**	**0.0242**			**96.5978**	**3.2400e-003**		**96.6789**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.2114	0.0000	2.2114	1.1365	0.0000	1.1365			0.0000			0.0000
Off-Road	0.3450	6.9025	8.0841	0.0141		0.3106	0.3106		0.3106	0.3106			1,444.8958	0.4427		1,455.9636
Total	**0.3450**	**6.9025**	**8.0841**	**0.0141**	**2.2114**	**0.3106**	**2.5220**	**1.1365**	**0.3106**	**1.4471**			**1,444.8958**	**0.4427**		**1,455.9636**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0535	0.0351	0.4491	9.7000e-004	0.0894	5.7000e-004	0.0900	0.0237	5.3000e-004	0.0242			96.5978	3.2400e-003		96.6789
Total	**0.0535**	**0.0351**	**0.4491**	**9.7000e-004**	**0.0894**	**5.7000e-004**	**0.0900**	**0.0237**	**5.3000e-004**	**0.0242**			**96.5978**	**3.2400e-003**		**96.6789**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9143	0.0000	4.9143	2.5256	0.0000	2.5256			0.0000			0.0000
Off-Road	1.4972	17.0666	6.7630	0.0141		0.7947	0.7947		0.7311	0.7311			1,421.2605	0.4425		1,432.3219
Total	**1.4972**	**17.0666**	**6.7630**	**0.0141**	**4.9143**	**0.7947**	**5.7090**	**2.5256**	**0.7311**	**3.2568**			**1,421.2605**	**0.4425**		**1,432.3219**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0482	0.0306	0.3957	9.4000e-004	0.0894	5.6000e-004	0.0900	0.0237	5.1000e-004	0.0242			93.8617	2.8600e-003		93.9332
Total	**0.0482**	**0.0306**	**0.3957**	**9.4000e-004**	**0.0894**	**5.6000e-004**	**0.0900**	**0.0237**	**5.1000e-004**	**0.0242**			**93.8617**	**2.8600e-003**		**93.9332**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.2114	0.0000	2.2114	1.1365	0.0000	1.1365			0.0000			0.0000
Off-Road	0.3450	6.9025	8.0841	0.0141		0.3106	0.3106		0.3106	0.3106			1,421.2605	0.4425		1,432.3219
Total	**0.3450**	**6.9025**	**8.0841**	**0.0141**	**2.2114**	**0.3106**	**2.5220**	**1.1365**	**0.3106**	**1.4471**			**1,421.2605**	**0.4425**		**1,432.3219**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0482	0.0306	0.3957	9.4000e-004	0.0894	5.6000e-004	0.0900	0.0237	5.1000e-004	0.0242			93.8617	2.8600e-003		93.9332
Total	**0.0482**	**0.0306**	**0.3957**	**9.4000e-004**	**0.0894**	**5.6000e-004**	**0.0900**	**0.0237**	**5.1000e-004**	**0.0242**			**93.8617**	**2.8600e-003**		**93.9332**

3.4 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3366	11.1316	7.3198	0.0115		0.6632	0.6632		0.6192	0.6192			1,108.1895	0.3202		1,116.1945
Total	**1.3366**	**11.1316**	**7.3198**	**0.0115**		**0.6632**	**0.6632**		**0.6192**	**0.6192**			**1,108.1895**	**0.3202**		**1,116.1945**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0221	0.7290	0.1410	1.5900e-003	0.0384	6.1100e-003	0.0445	0.0111	5.8500e-003	0.0169			167.4790	0.0138		167.8248
Worker	0.4816	0.3063	3.9566	9.4300e-003	0.8942	5.5900e-003	0.8998	0.2372	5.1500e-003	0.2423			938.6172	0.0286		939.3315
Total	**0.5037**	**1.0353**	**4.0976**	**0.0110**	**0.9326**	**0.0117**	**0.9443**	**0.2482**	**0.0110**	**0.2592**			**1,106.0962**	**0.0424**		**1,107.1563**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3257	6.3372	7.2997	0.0115		0.3618	0.3618		0.3618	0.3618			1,108.1895	0.3202		1,116.1945
Total	**0.3257**	**6.3372**	**7.2997**	**0.0115**		**0.3618**	**0.3618**		**0.3618**	**0.3618**			**1,108.1895**	**0.3202**		**1,116.1945**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0221	0.7290	0.1410	1.5900e-003	0.0384	6.1100e-003	0.0445	0.0111	5.8500e-003	0.0169			167.4790	0.0138		167.8248
Worker	0.4816	0.3063	3.9566	9.4300e-003	0.8942	5.5900e-003	0.8998	0.2372	5.1500e-003	0.2423			938.6172	0.0286		939.3315
Total	**0.5037**	**1.0353**	**4.0976**	**0.0110**	**0.9326**	**0.0117**	**0.9443**	**0.2482**	**0.0110**	**0.2592**			**1,106.0962**	**0.0424**		**1,107.1563**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1777	10.0250	7.0453	0.0115		0.5737	0.5737		0.5357	0.5357			1,093.5227	0.3150		1,101.3981
Total	**1.1777**	**10.0250**	**7.0453**	**0.0115**		**0.5737**	**0.5737**		**0.5357**	**0.5357**			**1,093.5227**	**0.3150**		**1,101.3981**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0200	0.6830	0.1280	1.5800e-003	0.0384	5.1900e-003	0.0436	0.0111	4.9600e-003	0.0160			166.3816	0.0133		166.7144
Worker	0.4405	0.2703	3.5540	9.1400e-003	0.8942	5.5200e-003	0.8997	0.2372	5.0800e-003	0.2422			910.0179	0.0255		910.6548
Total	**0.4605**	**0.9533**	**3.6820**	**0.0107**	**0.9326**	**0.0107**	**0.9433**	**0.2482**	**0.0100**	**0.2583**			**1,076.3994**	**0.0388**		**1,077.3692**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3257	6.3372	7.2997	0.0115		0.3618	0.3618		0.3618	0.3618			1,093.5227	0.3150		1,101.3981
Total	**0.3257**	**6.3372**	**7.2997**	**0.0115**		**0.3618**	**0.3618**		**0.3618**	**0.3618**			**1,093.5227**	**0.3150**		**1,101.3981**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0200	0.6830	0.1280	1.5800e-003	0.0384	5.1900e-003	0.0436	0.0111	4.9600e-003	0.0160			166.3816	0.0133		166.7144
Worker	0.4405	0.2703	3.5540	9.1400e-003	0.8942	5.5200e-003	0.8997	0.2372	5.0800e-003	0.2422			910.0179	0.0255		910.6548
Total	**0.4605**	**0.9533**	**3.6820**	**0.0107**	**0.9326**	**0.0107**	**0.9433**	**0.2482**	**0.0100**	**0.2583**			**1,076.3994**	**0.0388**		**1,077.3692**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9038	9.1743	8.9025	0.0135		0.5225	0.5225		0.4815	0.4815			1,325.0953	0.4112		1,335.3751
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9038**	**9.1743**	**8.9025**	**0.0135**		**0.5225**	**0.5225**		**0.4815**	**0.4815**			**1,325.0953**	**0.4112**		**1,335.3751**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	6.6600e-003	0.2277	0.0427	5.3000e-004	0.0128	1.7300e-003	0.0145	3.6900e-003	1.6500e-003	5.3400e-003			55.4605	4.4400e-003		55.5715
Worker	0.0716	0.0439	0.5775	1.4900e-003	0.1453	9.0000e-004	0.1462	0.0385	8.3000e-004	0.0394			147.8779	4.1400e-003		147.9814
Total	**0.0782**	**0.2716**	**0.6202**	**2.0200e-003**	**0.1581**	**2.6300e-003**	**0.1608**	**0.0422**	**2.4800e-003**	**0.0447**			**203.3384**	**8.5800e-003**		**203.5529**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3195	6.6399	9.8512	0.0135		0.3864	0.3864		0.3864	0.3864			1,325.0953	0.4112		1,335.3751
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.3195**	**6.6399**	**9.8512**	**0.0135**		**0.3864**	**0.3864**		**0.3864**	**0.3864**			**1,325.0953**	**0.4112**		**1,335.3751**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	6.6600e-003	0.2277	0.0427	5.3000e-004	0.0128	1.7300e-003	0.0145	3.6900e-003	1.6500e-003	5.3400e-003			55.4605	4.4400e-003		55.5715
Worker	0.0716	0.0439	0.5775	1.4900e-003	0.1453	9.0000e-004	0.1462	0.0385	8.3000e-004	0.0394			147.8779	4.1400e-003		147.9814
Total	**0.0782**	**0.2716**	**0.6202**	**2.0200e-003**	**0.1581**	**2.6300e-003**	**0.1608**	**0.0422**	**2.4800e-003**	**0.0447**			**203.3384**	**8.5800e-003**		**203.5529**

3.6 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	4.4566					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2664	1.8354	1.8413	2.9700e-003		0.1288	0.1288		0.1288	0.1288			281.4481	0.0238		282.0423
Total	**4.7230**	**1.8354**	**1.8413**	**2.9700e-003**		**0.1288**	**0.1288**		**0.1288**	**0.1288**			**281.4481**	**0.0238**		**282.0423**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0330	0.0203	0.2666	6.9000e-004	0.0671	4.1000e-004	0.0675	0.0178	3.8000e-004	0.0182			68.2513	1.9100e-003		68.2991
Total	**0.0330**	**0.0203**	**0.2666**	**6.9000e-004**	**0.0671**	**4.1000e-004**	**0.0675**	**0.0178**	**3.8000e-004**	**0.0182**			**68.2513**	**1.9100e-003**		**68.2991**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	4.4566					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0594	1.3570	1.8324	2.9700e-003		0.0951	0.0951		0.0951	0.0951			281.4481	0.0238		282.0423
Total	**4.5160**	**1.3570**	**1.8324**	**2.9700e-003**		**0.0951**	**0.0951**		**0.0951**	**0.0951**			**281.4481**	**0.0238**		**282.0423**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Worker	0.0330	0.0203	0.2666	6.9000e-004	0.0671	4.1000e-004	0.0675	0.0178	3.8000e-004	0.0182			68.2513	1.9100e-003		68.2991
Total	**0.0330**	**0.0203**	**0.2666**	**6.9000e-004**	**0.0671**	**4.1000e-004**	**0.0675**	**0.0178**	**3.8000e-004**	**0.0182**			**68.2513**	**1.9100e-003**		**68.2991**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00		
Library	0.00	0.00	0.00		
Movie Theater (No Matinee)	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
High Turnover (Sit Down Restaurant)	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Library	16.60	8.40	6.90	52.00	43.00	5.00	44	44	12
Movie Theater (No Matinee)	16.60	8.40	6.90	1.80	79.20	19.00	66	17	17

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
High Turnover (Sit Down Restaurant)	0.533383	0.039495	0.183627	0.126156	0.018688	0.005561	0.017029	0.066607	0.001345	0.001247	0.004677	0.000974	0.001211
Library	0.533383	0.039495	0.183627	0.126156	0.018688	0.005561	0.017029	0.066607	0.001345	0.001247	0.004677	0.000974	0.001211
Movie Theater (No Matinee)	0.533383	0.039495	0.183627	0.126156	0.018688	0.005561	0.017029	0.066607	0.001345	0.001247	0.004677	0.000974	0.001211

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0834	0.7578	0.6366	4.5500e-003		0.0576	0.0576		0.0576	0.0576			909.4079	0.0174	0.0167	914.8120
NaturalGas Unmitigated	0.0834	0.7578	0.6366	4.5500e-003		0.0576	0.0576		0.0576	0.0576			909.4079	0.0174	0.0167	914.8120

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
High Turnover (Sit Down Restaurant)	7482.17	0.0807	0.7336	0.6162	4.4000e-003		0.0558	0.0558		0.0558	0.0558			880.2551	0.0169	0.0161	885.4860
Library	113.34	1.2200e-003	0.0111	9.3300e-003	7.0000e-005		8.4000e-004	8.4000e-004		8.4000e-004	8.4000e-004			13.3341	2.6000e-004	2.4000e-004	13.4133
Movie Theater (No Matinee)	134.459	1.4500e-003	0.0132	0.0111	8.0000e-005		1.0000e-003	1.0000e-003		1.0000e-003	1.0000e-003			15.8187	3.0000e-004	2.9000e-004	15.9127
Total		**0.0834**	**0.7578**	**0.6366**	**4.5500e-003**		**0.0576**	**0.0576**		**0.0576**	**0.0576**			**909.4079**	**0.0174**	**0.0167**	**914.8120**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
High Turnover (Sit Down Restaurant)	7.48217	0.0807	0.7336	0.6162	4.4000e-003		0.0558	0.0558		0.0558	0.0558			880.2551	0.0169	0.0161	885.4860
Library	0.11334	1.2200e-003	0.0111	9.3300e-003	7.0000e-005		8.4000e-004	8.4000e-004		8.4000e-004	8.4000e-004			13.3341	2.6000e-004	2.4000e-004	13.4133
Movie Theater (No Matinee)	0.134459	1.4500e-003	0.0132	0.0111	8.0000e-005		1.0000e-003	1.0000e-003		1.0000e-003	1.0000e-003			15.8187	3.0000e-004	2.9000e-004	15.9127
Total		**0.0834**	**0.7578**	**0.6366**	**4.5500e-003**		**0.0576**	**0.0576**		**0.0576**	**0.0576**			**909.4079**	**0.0174**	**0.0167**	**914.8120**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.4298	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005			4.2100e-003	1.0000e-005		4.5000e-003
Unmitigated	0.4298	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005			4.2100e-003	1.0000e-005		4.5000e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0488					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.3808					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.9000e-004	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005			4.2100e-003	1.0000e-005		4.5000e-003
Total	**0.4298**	**2.0000e-005**	**1.9800e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**			**4.2100e-003**	**1.0000e-005**		**4.5000e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0488					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.3808					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.9000e-004	2.0000e-005	1.9800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005			4.2100e-003	1.0000e-005		4.5000e-003
Total	**0.4298**	**2.0000e-005**	**1.9800e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**			**4.2100e-003**	**1.0000e-005**		**4.5000e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

UCR Barn Complex Future 030717

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Library	2.42	1000sqft	0.21	2,415.00	0
High Turnover (Sit Down Restaurant)	13.95	1000sqft	1.19	13,950.00	0
Movie Theater (No Matinee)	2.87	1000sqft	0.25	2,865.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2019
Utility Company	Riverside Public Utilities				
CO2 Intensity (lb/MWhr)	837.74	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 intensity per RPU

Land Use - Movie theater surrogate for Barn theater and ticketing

Library surrogate for Campus Meeting Room

Construction Phase - Demo 12/1-21/17;grad12/26-1/22/18;build1/23/18-1/22/19;pave1/9-22/19;coat1/9-3/5/19

Off-road Equipment - bldg equip per data needs

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Trips and VMT - Demo round trips 37 bldg; 34 paving

Worker and vendor trips increased per UCR and to account for renovations

Demolition -

Grading -

Vehicle Trips - No new trip generation in CalEEMod

Manual delivery truck calc

Landscape Equipment - Assume no change in landscape maint.

Energy Use - No Title 24 natural gas use

Restaurant also default/2 to approx. setting and CAP data

Water And Wastewater - Water use per UCR for restroom; assume 500 gpd for kitchen

No change in outdoor use

Construction Off-road Equipment Mitigation - x

Energy Mitigation - Assume 10% better than 2016 Title 24

Water Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3

tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	10.00	40.00
tblConstructionPhase	NumDays	200.00	261.00
tblConstructionPhase	NumDays	20.00	15.00
tblConstructionPhase	NumDays	4.00	20.00
tblEnergyUse	LightingElect	6.83	3.42
tblEnergyUse	NT24E	28.48	14.24
tblEnergyUse	T24E	12.98	6.49
tblEnergyUse	T24NG	78.06	0.00
tblEnergyUse	T24NG	15.43	0.00
tblEnergyUse	T24NG	15.43	0.00
tblFleetMix	FleetMixLandUseSubType	Library	High Turnover (Sit Down Restaurant)
tblFleetMix	FleetMixLandUseSubType	High Turnover (Sit Down Restaurant)	Library
tblLandscapeEquipment	NumberSummerDays	250	1
tblLandUse	BuildingSpaceSquareFeet	2,420.00	2,415.00
tblLandUse	BuildingSpaceSquareFeet	2,870.00	2,865.00
tblLandUse	LandUseSquareFeet	2,420.00	2,415.00
tblLandUse	LandUseSquareFeet	2,870.00	2,865.00
tblLandUse	LotAcreage	0.06	0.21
tblLandUse	LotAcreage	0.32	1.19
tblLandUse	LotAcreage	0.07	0.25
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	UsageHours	8.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	1325.65	837.74
tblProjectCharacteristics	OperationalYear	2018	2019
tblTripsAndVMT	HaulingTripNumber	18.00	142.00
tblTripsAndVMT	VendorTripNumber	3.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripNumber	8.00	80.00
tblTripsAndVMT	WorkerTripNumber	2.00	6.00
tblVehicleTrips	ST_TR	158.37	0.00
tblVehicleTrips	ST_TR	46.55	0.00
tblVehicleTrips	ST_TR	99.28	0.00
tblVehicleTrips	SU_TR	131.84	0.00
tblVehicleTrips	SU_TR	25.49	0.00
tblVehicleTrips	SU_TR	81.90	0.00
tblVehicleTrips	WD_TR	127.15	0.00
tblVehicleTrips	WD_TR	56.24	0.00
tblVehicleTrips	WD_TR	78.06	0.00
tblWater	IndoorWaterUseRate	4,234,295.29	182,000.00
tblWater	IndoorWaterUseRate	75,719.16	0.00
tblWater	IndoorWaterUseRate	1,152,596.20	0.00
tblWater	OutdoorWaterUseRate	270,274.17	0.00
tblWater	OutdoorWaterUseRate	118,432.53	0.00
tblWater	OutdoorWaterUseRate	73,569.97	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.0268	0.2778	0.1463	2.9000e-004	0.0537	0.0151	0.0688	0.0262	0.0141	0.0403			26.9186	5.7800e-003	0.0000	27.0631
2018	0.2323	1.6264	1.3908	2.7900e-003	0.1630	0.0889	0.2520	0.0556	0.0830	0.1386			248.9810	0.0432	0.0000	250.0612
2019	0.1111	0.1615	0.1601	3.0000e-004	8.5200e-003	9.3000e-003	0.0178	2.2700e-003	8.8200e-003	0.0111			26.4234	4.6000e-003	0.0000	26.5384
Maximum	**0.2323**	**1.6264**	**1.3908**	**2.7900e-003**	**0.1630**	**0.0889**	**0.2520**	**0.0556**	**0.0830**	**0.1386**			**248.9810**	**0.0432**	**0.0000**	**250.0612**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	6.4900e-003	0.1337	0.1484	2.9000e-004	0.0256	6.4400e-003	0.0320	0.0122	6.4400e-003	0.0186			26.9185	5.7800e-003	0.0000	27.0630
2018	0.0994	0.9631	1.3975	2.7900e-003	0.1360	0.0483	0.1843	0.0417	0.0482	0.0899			248.9808	0.0432	0.0000	250.0610
2019	0.0981	0.1134	0.1665	3.0000e-004	8.5200e-003	6.4600e-003	0.0150	2.2700e-003	6.4600e-003	8.7300e-003			26.4234	4.6000e-003	0.0000	26.5384
Maximum	**0.0994**	**0.9631**	**1.3975**	**2.7900e-003**	**0.1360**	**0.0483**	**0.1843**	**0.0417**	**0.0482**	**0.0899**			**248.9808**	**0.0432**	**0.0000**	**250.0610**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**44.91**	**41.41**	**-0.90**	**0.00**	**24.48**	**45.98**	**31.68**	**33.21**	**42.26**	**38.27**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**12-1-2017**	**2-28-2018**	0.6407	0.3114
2	**3-1-2018**	**5-31-2018**	0.4602	0.2695
3	**6-1-2018**	**8-31-2018**	0.4602	0.2695
4	**9-1-2018**	**11-30-2018**	0.4552	0.2666
5	**12-1-2018**	**2-28-2019**	0.3521	0.2364
6	**3-1-2019**	**5-31-2019**	0.0685	0.0614
		Highest	0.6407	0.3114

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0784	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Energy	0.0152	0.1383	0.1162	8.3000e-004		0.0105	0.0105		0.0105	0.0105			299.3251	8.0400e-003	3.8300e-003	300.6660
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000			37.4701	2.2144	0.0000	92.8306
Water						0.0000	0.0000		0.0000	0.0000			0.9583	5.9600e-003	1.5000e-004	1.1510
Total	**0.0936**	**0.1383**	**0.1162**	**8.3000e-004**	**0.0000**	**0.0105**	**0.0105**	**0.0000**	**0.0105**	**0.0105**			**337.7534**	**2.2284**	**3.9800e-003**	**394.6476**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0784	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Energy	0.0152	0.1383	0.1162	8.3000e-004		0.0105	0.0105		0.0105	0.0105			293.6646	7.8400e-003	3.7900e-003	294.9886
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000			18.7351	1.1072	0.0000	46.4153
Water						0.0000	0.0000		0.0000	0.0000			0.9583	5.9600e-003	1.5000e-004	1.1510
Total	**0.0936**	**0.1383**	**0.1162**	**8.3000e-004**	**0.0000**	**0.0105**	**0.0105**	**0.0000**	**0.0105**	**0.0105**			**313.3579**	**1.1210**	**3.9400e-003**	**342.5549**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**7.22**	**49.69**	**1.01**	**13.20**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	12/1/2017	12/21/2017	5	15	
2	Grading	Grading	12/22/2017	1/18/2018	5	20	
3	Building Construction	Building Construction	1/19/2018	1/18/2019	5	261	
4	Paving	Paving	1/19/2019	2/1/2019	5	10	
5	Architectural Coating	Architectural Coating	2/2/2019	3/29/2019	5	40	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 7.5

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 28,845; Non-Residential Outdoor: 9,615; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Generator Sets	0	0.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42

Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	142.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	80.00	6.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	6.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.9600e-003	0.0000	1.9600e-003	3.0000e-004	0.0000	3.0000e-004			0.0000	0.0000	0.0000	0.0000
Off-Road	0.0207	0.2007	0.1167	1.8000e-004		0.0124	0.0124		0.0116	0.0116			16.4751	4.1700e-003	0.0000	16.5793
Total	**0.0207**	**0.2007**	**0.1167**	**1.8000e-004**	**1.9600e-003**	**0.0124**	**0.0143**	**3.0000e-004**	**0.0116**	**0.0119**			**16.4751**	**4.1700e-003**	**0.0000**	**16.5793**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.0000e-004	0.0217	2.6900e-003	6.0000e-005	1.2200e-003	1.1000e-004	1.3400e-003	3.4000e-004	1.1000e-004	4.5000e-004			5.2861	3.7000e-004	0.0000	5.2953
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Worker	5.9000e-004	4.6000e-004	4.7000e-003	1.0000e-005	1.0700e-003	1.0000e-005	1.0800e-003	2.8000e-004	1.0000e-005	2.9000e-004			0.9830	3.0000e-005	0.0000	0.9839
Total	**1.0900e-003**	**0.0221**	**7.3900e-003**	**7.0000e-005**	**2.2900e-003**	**1.2000e-004**	**2.4200e-003**	**6.2000e-004**	**1.2000e-004**	**7.4000e-004**			**6.2691**	**4.0000e-004**	**0.0000**	**6.2791**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					8.8000e-004	0.0000	8.8000e-004	1.3000e-004	0.0000	1.3000e-004			0.0000	0.0000	0.0000	0.0000
Off-Road	4.2200e-003	0.0908	0.1156	1.8000e-004		5.3900e-003	5.3900e-003		5.3900e-003	5.3900e-003			16.4751	4.1700e-003	0.0000	16.5792
Total	**4.2200e-003**	**0.0908**	**0.1156**	**1.8000e-004**	**8.8000e-004**	**5.3900e-003**	**6.2700e-003**	**1.3000e-004**	**5.3900e-003**	**5.5200e-003**			**16.4751**	**4.1700e-003**	**0.0000**	**16.5792**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.0000e-004	0.0217	2.6900e-003	6.0000e-005	1.2200e-003	1.1000e-004	1.3400e-003	3.4000e-004	1.1000e-004	4.5000e-004			5.2861	3.7000e-004	0.0000	5.2953
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Worker	5.9000e-004	4.6000e-004	4.7000e-003	1.0000e-005	1.0700e-003	1.0000e-005	1.0800e-003	2.8000e-004	1.0000e-005	2.9000e-004			0.9830	3.0000e-005	0.0000	0.9839
Total	**1.0900e-003**	**0.0221**	**7.3900e-003**	**7.0000e-005**	**2.2900e-003**	**1.2000e-004**	**2.4200e-003**	**6.2000e-004**	**1.2000e-004**	**7.4000e-004**			**6.2691**	**4.0000e-004**	**0.0000**	**6.2791**

3.3 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0491	0.0000	0.0491	0.0253	0.0000	0.0253			0.0000	0.0000	0.0000	0.0000
Off-Road	4.8100e-003	0.0549	0.0211	4.0000e-005		2.6200e-003	2.6200e-003		2.4100e-003	2.4100e-003			3.9324	1.2000e-003	0.0000	3.9625
Total	**4.8100e-003**	**0.0549**	**0.0211**	**4.0000e-005**	**0.0491**	**2.6200e-003**	**0.0518**	**0.0253**	**2.4100e-003**	**0.0277**			**3.9324**	**1.2000e-003**	**0.0000**	**3.9625**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.1000e-004	1.1600e-003	0.0000	2.6000e-004	0.0000	2.7000e-004	7.0000e-005	0.0000	7.0000e-005			0.2420	1.0000e-005	0.0000	0.2422
Total	**1.4000e-004**	**1.1000e-004**	**1.1600e-003**	**0.0000**	**2.6000e-004**	**0.0000**	**2.7000e-004**	**7.0000e-005**	**0.0000**	**7.0000e-005**			**0.2420**	**1.0000e-005**	**0.0000**	**0.2422**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0221	0.0000	0.0221	0.0114	0.0000	0.0114			0.0000	0.0000	0.0000	0.0000
Off-Road	1.0300e-003	0.0207	0.0243	4.0000e-005		9.3000e-004	9.3000e-004		9.3000e-004	9.3000e-004			3.9324	1.2000e-003	0.0000	3.9625
Total	**1.0300e-003**	**0.0207**	**0.0243**	**4.0000e-005**	**0.0221**	**9.3000e-004**	**0.0230**	**0.0114**	**9.3000e-004**	**0.0123**			**3.9324**	**1.2000e-003**	**0.0000**	**3.9625**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.1000e-004	1.1600e-003	0.0000	2.6000e-004	0.0000	2.7000e-004	7.0000e-005	0.0000	7.0000e-005			0.2420	1.0000e-005	0.0000	0.2422
Total	**1.4000e-004**	**1.1000e-004**	**1.1600e-003**	**0.0000**	**2.6000e-004**	**0.0000**	**2.7000e-004**	**7.0000e-005**	**0.0000**	**7.0000e-005**			**0.2420**	**1.0000e-005**	**0.0000**	**0.2422**

3.3 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0491	0.0000	0.0491	0.0253	0.0000	0.0253			0.0000	0.0000	0.0000	0.0000
Off-Road	0.0105	0.1195	0.0473	1.0000e-004		5.5600e-003	5.5600e-003		5.1200e-003	5.1200e-003			9.0254	2.8100e-003	0.0000	9.0957
Total	**0.0105**	**0.1195**	**0.0473**	**1.0000e-004**	**0.0491**	**5.5600e-003**	**0.0547**	**0.0253**	**5.1200e-003**	**0.0304**			**9.0254**	**2.8100e-003**	**0.0000**	**9.0957**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-004	2.3000e-004	2.3700e-003	1.0000e-005	6.2000e-004	0.0000	6.2000e-004	1.6000e-004	0.0000	1.7000e-004			0.5485	2.0000e-005	0.0000	0.5490
Total	**3.0000e-004**	**2.3000e-004**	**2.3700e-003**	**1.0000e-005**	**6.2000e-004**	**0.0000**	**6.2000e-004**	**1.6000e-004**	**0.0000**	**1.7000e-004**			**0.5485**	**2.0000e-005**	**0.0000**	**0.5490**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0221	0.0000	0.0221	0.0114	0.0000	0.0114			0.0000	0.0000	0.0000	0.0000
Off-Road	2.4100e-003	0.0483	0.0566	1.0000e-004		2.1700e-003	2.1700e-003		2.1700e-003	2.1700e-003			9.0254	2.8100e-003	0.0000	9.0957
Total	**2.4100e-003**	**0.0483**	**0.0566**	**1.0000e-004**	**0.0221**	**2.1700e-003**	**0.0243**	**0.0114**	**2.1700e-003**	**0.0135**			**9.0254**	**2.8100e-003**	**0.0000**	**9.0957**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-004	2.3000e-004	2.3700e-003	1.0000e-005	6.2000e-004	0.0000	6.2000e-004	1.6000e-004	0.0000	1.7000e-004			0.5485	2.0000e-005	0.0000	0.5490
Total	**3.0000e-004**	**2.3000e-004**	**2.3700e-003**	**1.0000e-005**	**6.2000e-004**	**0.0000**	**6.2000e-004**	**1.6000e-004**	**0.0000**	**1.7000e-004**			**0.5485**	**2.0000e-005**	**0.0000**	**0.5490**

3.4 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1651	1.3748	0.9040	1.4200e-003		0.0819	0.0819		0.0765	0.0765			124.1586	0.0359	0.0000	125.0554
Total	**0.1651**	**1.3748**	**0.9040**	**1.4200e-003**		**0.0819**	**0.0819**		**0.0765**	**0.0765**			**124.1586**	**0.0359**	**0.0000**	**125.0554**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Vendor	2.7800e-003	0.0914	0.0187	1.9000e-004	4.6800e-003	7.6000e-004	5.4400e-003	1.3500e-003	7.3000e-004	2.0800e-003			18.4704	1.6200e-003	0.0000	18.5109
Worker	0.0537	0.0405	0.4184	1.0700e-003	0.1086	6.9000e-004	0.1093	0.0288	6.4000e-004	0.0295			96.7781	2.8900e-003	0.0000	96.8502
Total	**0.0564**	**0.1319**	**0.4371**	**1.2600e-003**	**0.1133**	**1.4500e-003**	**0.1147**	**0.0302**	**1.3700e-003**	**0.0316**			**115.2484**	**4.5100e-003**	**0.0000**	**115.3612**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0402	0.7827	0.9015	1.4200e-003		0.0447	0.0447		0.0447	0.0447			124.1584	0.0359	0.0000	125.0553
Total	**0.0402**	**0.7827**	**0.9015**	**1.4200e-003**		**0.0447**	**0.0447**		**0.0447**	**0.0447**			**124.1584**	**0.0359**	**0.0000**	**125.0553**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Vendor	2.7800e-003	0.0914	0.0187	1.9000e-004	4.6800e-003	7.6000e-004	5.4400e-003	1.3500e-003	7.3000e-004	2.0800e-003			18.4704	1.6200e-003	0.0000	18.5109
Worker	0.0537	0.0405	0.4184	1.0700e-003	0.1086	6.9000e-004	0.1093	0.0288	6.4000e-004	0.0295			96.7781	2.8900e-003	0.0000	96.8502
Total	**0.0564**	**0.1319**	**0.4371**	**1.2600e-003**	**0.1133**	**1.4500e-003**	**0.1147**	**0.0302**	**1.3700e-003**	**0.0316**			**115.2484**	**4.5100e-003**	**0.0000**	**115.3612**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	8.2400e-003	0.0702	0.0493	8.0000e-005		4.0200e-003	4.0200e-003		3.7500e-003	3.7500e-003			6.9442	2.0000e-003	0.0000	6.9942
Total	**8.2400e-003**	**0.0702**	**0.0493**	**8.0000e-005**		**4.0200e-003**	**4.0200e-003**		**3.7500e-003**	**3.7500e-003**			**6.9442**	**2.0000e-003**	**0.0000**	**6.9942**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Vendor	1.4000e-004	4.8500e-003	9.6000e-004	1.0000e-005	2.7000e-004	4.0000e-005	3.0000e-004	8.0000e-005	3.0000e-005	1.1000e-004			1.0400	9.0000e-005	0.0000	1.0422
Worker	2.7800e-003	2.0300e-003	0.0213	6.0000e-005	6.1600e-003	4.0000e-005	6.1900e-003	1.6300e-003	4.0000e-005	1.6700e-003			5.3178	1.5000e-004	0.0000	5.3214
Total	**2.9200e-003**	**6.8800e-003**	**0.0222**	**7.0000e-005**	**6.4300e-003**	**8.0000e-005**	**6.4900e-003**	**1.7100e-003**	**7.0000e-005**	**1.7800e-003**			**6.3578**	**2.4000e-004**	**0.0000**	**6.3636**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.2800e-003	0.0444	0.0511	8.0000e-005		2.5300e-003	2.5300e-003		2.5300e-003	2.5300e-003			6.9442	2.0000e-003	0.0000	6.9942
Total	**2.2800e-003**	**0.0444**	**0.0511**	**8.0000e-005**		**2.5300e-003**	**2.5300e-003**		**2.5300e-003**	**2.5300e-003**			**6.9442**	**2.0000e-003**	**0.0000**	**6.9942**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Vendor	1.4000e-004	4.8500e-003	9.6000e-004	1.0000e-005	2.7000e-004	4.0000e-005	3.0000e-004	8.0000e-005	3.0000e-005	1.1000e-004			1.0400	9.0000e-005	0.0000	1.0422
Worker	2.7800e-003	2.0300e-003	0.0213	6.0000e-005	6.1600e-003	4.0000e-005	6.1900e-003	1.6300e-003	4.0000e-005	1.6700e-003			5.3178	1.5000e-004	0.0000	5.3214
Total	**2.9200e-003**	**6.8800e-003**	**0.0222**	**7.0000e-005**	**6.4300e-003**	**8.0000e-005**	**6.4900e-003**	**1.7100e-003**	**7.0000e-005**	**1.7800e-003**			**6.3578**	**2.4000e-004**	**0.0000**	**6.3636**

3.5 Paving - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.5200e-003	0.0459	0.0445	7.0000e-005		2.6100e-003	2.6100e-003		2.4100e-003	2.4100e-003			6.0105	1.8700e-003	0.0000	6.0572
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Total	**4.5200e-003**	**0.0459**	**0.0445**	**7.0000e-005**		**2.6100e-003**	**2.6100e-003**		**2.4100e-003**	**2.4100e-003**			**6.0105**	**1.8700e-003**	**0.0000**	**6.0572**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-005	1.1500e-003	2.3000e-004	0.0000	6.0000e-005	1.0000e-005	7.0000e-005	2.0000e-005	1.0000e-005	3.0000e-005			0.2476	2.0000e-005	0.0000	0.2481
Worker	3.2000e-004	2.4000e-004	2.4700e-003	1.0000e-005	7.1000e-004	0.0000	7.2000e-004	1.9000e-004	0.0000	1.9000e-004			0.6173	2.0000e-005	0.0000	0.6177
Total	**3.5000e-004**	**1.3900e-003**	**2.7000e-003**	**1.0000e-005**	**7.7000e-004**	**1.0000e-005**	**7.9000e-004**	**2.1000e-004**	**1.0000e-005**	**2.2000e-004**			**0.8649**	**4.0000e-005**	**0.0000**	**0.8658**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.6000e-003	0.0332	0.0493	7.0000e-005		1.9300e-003	1.9300e-003		1.9300e-003	1.9300e-003			6.0105	1.8700e-003	0.0000	6.0572
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Total	**1.6000e-003**	**0.0332**	**0.0493**	**7.0000e-005**		**1.9300e-003**	**1.9300e-003**		**1.9300e-003**	**1.9300e-003**			**6.0105**	**1.8700e-003**	**0.0000**	**6.0572**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-005	1.1500e-003	2.3000e-004	0.0000	6.0000e-005	1.0000e-005	7.0000e-005	2.0000e-005	1.0000e-005	3.0000e-005			0.2476	2.0000e-005	0.0000	0.2481
Worker	3.2000e-004	2.4000e-004	2.4700e-003	1.0000e-005	7.1000e-004	0.0000	7.2000e-004	1.9000e-004	0.0000	1.9000e-004			0.6173	2.0000e-005	0.0000	0.6177
Total	**3.5000e-004**	**1.3900e-003**	**2.7000e-003**	**1.0000e-005**	**7.7000e-004**	**1.0000e-005**	**7.9000e-004**	**2.1000e-004**	**1.0000e-005**	**2.2000e-004**			**0.8649**	**4.0000e-005**	**0.0000**	**0.8658**

3.6 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0891					0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Off-Road	5.3300e-003	0.0367	0.0368	6.0000e-005		2.5800e-003	2.5800e-003		2.5800e-003	2.5800e-003			5.1065	4.3000e-004	0.0000	5.1173
Total	**0.0945**	**0.0367**	**0.0368**	**6.0000e-005**		**2.5800e-003**	**2.5800e-003**		**2.5800e-003**	**2.5800e-003**			**5.1065**	**4.3000e-004**	**0.0000**	**5.1173**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-004	4.3000e-004	4.5500e-003	1.0000e-005	1.3200e-003	1.0000e-005	1.3300e-003	3.5000e-004	1.0000e-005	3.6000e-004			1.1395	3.0000e-005	0.0000	1.1403
Total	**6.0000e-004**	**4.3000e-004**	**4.5500e-003**	**1.0000e-005**	**1.3200e-003**	**1.0000e-005**	**1.3300e-003**	**3.5000e-004**	**1.0000e-005**	**3.6000e-004**			**1.1395**	**3.0000e-005**	**0.0000**	**1.1403**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0891					0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Off-Road	1.1900e-003	0.0271	0.0367	6.0000e-005		1.9000e-003	1.9000e-003		1.9000e-003	1.9000e-003			5.1065	4.3000e-004	0.0000	5.1173
Total	**0.0903**	**0.0271**	**0.0367**	**6.0000e-005**		**1.9000e-003**	**1.9000e-003**		**1.9000e-003**	**1.9000e-003**			**5.1065**	**4.3000e-004**	**0.0000**	**5.1173**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-004	4.3000e-004	4.5500e-003	1.0000e-005	1.3200e-003	1.0000e-005	1.3300e-003	3.5000e-004	1.0000e-005	3.6000e-004			1.1395	3.0000e-005	0.0000	1.1403
Total	**6.0000e-004**	**4.3000e-004**	**4.5500e-003**	**1.0000e-005**	**1.3200e-003**	**1.0000e-005**	**1.3300e-003**	**3.5000e-004**	**1.0000e-005**	**3.6000e-004**			**1.1395**	**3.0000e-005**	**0.0000**	**1.1403**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00		
Library	0.00	0.00	0.00		
Movie Theater (No Matinee)	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
High Turnover (Sit Down Restaurant)	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Library	16.60	8.40	6.90	52.00	43.00	5.00	44	44	12
Movie Theater (No Matinee)	16.60	8.40	6.90	1.80	79.20	19.00	66	17	17

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
High Turnover (Sit Down Restaurant)	0.533383	0.039495	0.183627	0.126156	0.018688	0.005561	0.017029	0.066607	0.001345	0.001247	0.004677	0.000974	0.001211
Library	0.533383	0.039495	0.183627	0.126156	0.018688	0.005561	0.017029	0.066607	0.001345	0.001247	0.004677	0.000974	0.001211
Movie Theater (No Matinee)	0.533383	0.039495	0.183627	0.126156	0.018688	0.005561	0.017029	0.066607	0.001345	0.001247	0.004677	0.000974	0.001211

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000			143.1019	4.9500e-003	1.0200e-003	143.5312
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000			148.7624	5.1500e-003	1.0700e-003	149.2086
NaturalGas Mitigated	0.0152	0.1383	0.1162	8.3000e-004		0.0105	0.0105		0.0105	0.0105			150.5627	2.8900e-003	2.7600e-003	151.4574
NaturalGas Unmitigated	0.0152	0.1383	0.1162	8.3000e-004		0.0105	0.0105		0.0105	0.0105			150.5627	2.8900e-003	2.7600e-003	151.4574

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
High Turnover (Sit Down Restaurant)	2.73099e+006	0.0147	0.1339	0.1125	8.0000e-004		0.0102	0.0102		0.0102	0.0102			145.7361	2.7900e-003	2.6700e-003	146.6021
Library	41368.9	2.2000e-004	2.0300e-003	1.7000e-003	1.0000e-005		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004			2.2076	4.0000e-005	4.0000e-005	2.2207
Movie Theater (No Matinee)	49077.4	2.6000e-004	2.4100e-003	2.0200e-003	1.0000e-005		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004			2.6190	5.0000e-005	5.0000e-005	2.6345
Total		**0.0152**	**0.1383**	**0.1162**	**8.2000e-004**		**0.0105**	**0.0105**		**0.0105**	**0.0105**			**150.5627**	**2.8800e-003**	**2.7600e-003**	**151.4574**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
High Turnover (Sit Down Restaurant)	2.73099e+006	0.0147	0.1339	0.1125	8.0000e-004		0.0102	0.0102		0.0102	0.0102			145.7361	2.7900e-003	2.6700e-003	146.6021
Library	41368.9	2.2000e-004	2.0300e-003	1.7000e-003	1.0000e-005		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004			2.2076	4.0000e-005	4.0000e-005	2.2207
Movie Theater (No Matinee)	49077.4	2.6000e-004	2.4100e-003	2.0200e-003	1.0000e-005		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004			2.6190	5.0000e-005	5.0000e-005	2.6345
Total		**0.0152**	**0.1383**	**0.1162**	**8.2000e-004**		**0.0105**	**0.0105**		**0.0105**	**0.0105**			**150.5627**	**2.8800e-003**	**2.7600e-003**	**151.4574**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
High Turnover (Sit Down Restaurant)	336893	128.0166	4.4300e-003	9.2000e-004	128.4006
Library	24971.1	9.4888	3.3000e-004	7.0000e-005	9.5173
Movie Theater (No Matinee)	29624.1	11.2569	3.9000e-004	8.0000e-005	11.2907
Total		**148.7624**	**5.1500e-003**	**1.0700e-003**	**149.2086**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
High Turnover (Sit Down Restaurant)	323765	123.0282	4.2600e-003	8.8000e-004	123.3973
Library	24162.2	9.1815	3.2000e-004	7.0000e-005	9.2090
Movie Theater (No Matinee)	28664.5	10.8923	3.8000e-004	8.0000e-005	10.9250
Total		**143.1019**	**4.9600e-003**	**1.0300e-003**	**143.5312**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0784	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0784	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	8.9100e-003					0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0695					0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Total	**0.0784**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**			**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	8.9100e-003					0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0695					0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000			0.0000	0.0000	0.0000	0.0000
Total	**0.0784**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**			**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.0 Water Detail

7.1 Mitigation Measures Water

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.9583	5.9600e-003	1.5000e-004	1.1510
Unmitigated	0.9583	5.9600e-003	1.5000e-004	1.1510

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
High Turnover (Sit Down Restaurant)	0.182 / 0	0.9583	5.9600e-003	1.5000e-004	1.1510
Library	0 / 0	0.0000	0.0000	0.0000	0.0000
Movie Theater (No Matinee)	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.9583**	**5.9600e-003**	**1.5000e-004**	**1.1510**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
High Turnover (Sit Down Restaurant)	0.182 / 0	0.9583	5.9600e-003	1.5000e-004	1.1510
Library	0 / 0	0.0000	0.0000	0.0000	0.0000
Movie Theater (No Matinee)	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.9583**	**5.9600e-003**	**1.5000e-004**	**1.1510**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	18.7351	1.1072	0.0000	46.4153
Unmitigated	37.4701	2.2144	0.0000	92.8306

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
High Turnover (Sit Down Restaurant)	166	33.6965	1.9914	0.0000	83.4817
Library	2.23	0.4527	0.0268	0.0000	1.1215
Movie Theater (No Matinee)	16.36	3.3209	0.1963	0.0000	8.2275
Total		**37.4701**	**2.2144**	**0.0000**	**92.8306**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
High Turnover (Sit Down Restaurant)	83	16.8483	0.9957	0.0000	41.7408
Library	1.115	0.2263	0.0134	0.0000	0.5607
Movie Theater (No Matinee)	8.18	1.6605	0.0981	0.0000	4.1137
Total		**18.7351**	**1.1072**	**0.0000**	**46.4153**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix B

Tree Survey Data

Barn Expansion Project
Tree Data

Tree No.	Tree Species		# Main Trunks	Diameter at Breast Height (in.)	Sum of Largest 2 Trunks	Height (ft)	Canopy Diameter (ft)	Health Rating	Aesthetic Rating	To Be Removed
	Common Name	Botanical Name								
1	Western sycamore	*Platanus racemosa*	1	22.9	22.9	60	35	3	3	X
2	Western sycamore	*Platanus racemosa*	1	20.2	20.2	60	35	3	3	X
3	Western sycamore	*Platanus racemosa*	1	22.0	22.0	70	40	3	3	X
4	Western sycamore	*Platanus racemosa*	1	21.9	21.9	70	30	3	3	
5	Western sycamore	*Platanus racemosa*	1	12.0	12.0	30	20	3	3	
6	Western sycamore	*Platanus racemosa*	1	21.6	21.6	50	40	3	3	
7	Western sycamore	*Platanus racemosa*	1	15.6	15.6	65	30	3	3	
8	Western sycamore	*Platanus racemosa*	1	16.2	16.2	60	35	3	3	
9	Western sycamore	*Platanus racemosa*	1	13.7	13.7	60	30	3	3	X
10	Western sycamore	*Platanus racemosa*	1	14.6	14.6	65	25	3	3	X
11	Western sycamore	*Platanus racemosa*	1	18.7	18.7	65	40	3	3	X
12	Western sycamore	*Platanus racemosa*	1	23.9	23.9	75	55	3	3	
13	Sweetshade	*Hymenosporum flavum*	1	15.9	15.9	55	20	3	3	X
14	Sweetshade	*Hymenosporum flavum*	1	18.1	18.1	55	40	4	3	X
15	Jacaranda	*Jacaranda mimosifolia*	1	20.1	20.1	55	35	4	4	X
16	Western sycamore	*Platanus racemosa*	1	23.2	23.2	65	40	3	3	X
17	Southern live oak	*Quercus virginiana*	1	13.0	13.0	30	30	4	4	X
18	Southern live oak	*Quercus virginiana*	1	13.4	13.4	30	30	4	4	
19	Cinnamon	*Cinnamomum* sp.	2	12.0	19.5	30	30	4	3	X
20	Cinnamon	*Cinnamomum* sp.	2	11.0	19.5	20	35	4	3	X
21	Brazilian peppertree	*Schinus terebinthifolius*	1	13.1	13.1	30	35	4	4	
22	Cinnamon	*Cinnamomum* sp.	1	13.0	13.0	20	25	4	3	X
23	Western sycamore	*Platanus racemosa*	1	26.0	26.0	65	45	3	3	X
24	Lemon-scented gum	*Corymbia citriodora*	1	17.3	17.3	65	35	4	4	X
25	Lemon-scented gum	*Corymbia citriodora*	1	18.2	18.2	70	40	4	4	X
26	Cinnamon	*Cinnamomum* sp.	1	13.2	13.2	18	20	4	3	X
27	Cinnamon	*Cinnamomum* sp.	2	11.6	15.6	22	25	4	3	X
28	Western sycamore	*Platanus racemosa*	1	21.4	21.4	65	35	3	3	X
29	Western sycamore	*Platanus racemosa*	1	27.4	27.4	65	35	3	3	X
30	Western sycamore	*Platanus racemosa*	2	8.0	14.5	45	35	3	3	X
		TOTAL								
Tree health and aesthetic values are rated in the following manner: 5=excellent, 4=good, 3=average/fair, 2=poor, 1=very poor										

Appendix C

Geotechnical Investigation

GEOTECHNICAL INVESTIGATION AND PERCOLATION TESTING

UCR BARN EXPANSION PROJECT
UNIVERSITY OF CALIFORNIA
RIVERSIDE
RIVERSIDE, CALIFORNIA

GEOCON
WEST, INC.

GEOTECHNICAL
ENVIRONMENTAL
MATERIALS

PREPARED FOR

UNIVERSITY OF CALIFORNIA, RIVERSIDE
ARCHITECTS AND ENGINEERS
1223 UNIVERSITY AVENUE, SUITE 240
RIVERSIDE, CALIFORNIA 92507

JANUARY 16, 2017
PROJECT NO. T2750-22-01

Project No. 2750-22-01
January 16, 2017

University of California, Riverside
Architects and Engineers
University Village
1223 University Avenue, Suite 240
Riverside, California 92507

Attention: Mr. Drew Hecht, AIA

Subject: GEOTECHNICAL INVESTIGATION AND PERCOLATION TESTING
UCR BARN EXPANSION PROJECT
UNIVERSITY OF CALIFORNIA, RIVERSIDE
RIVERSIDE, CALIFORNIA

Dear Mr. Hecht:

Per your authorization of Geocon Proposal IE-1789 dated October 17, 2016, and the November 17, 2016 Professional Services Agreement, Geocon West, Inc. (Geocon) herein submits the results of our geotechnical investigation and percolation testing for the Barn Expansion project on the University of California, Riverside campus. The accompanying report presents our findings, conclusions and recommendations pertaining to the geotechnical aspects of the proposed building construction. The study also includes an evaluation of the geologic units and geologic hazards. The recommendations of this study should be reviewed once final project plans are developed. Based on the results of this study, it is our opinion the site is considered suitable for the proposed building and improvements provided the recommendations of this report are followed.

Should you have any questions regarding this report, or if we may be of further service, please contact the undersigned at your convenience.

Very truly yours,

GEOCON WEST, INC.

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GEOTECHNICAL INVESTIGATION

1. PURPOSE AND SCOPE

This report presents the results of our geotechnical investigation and percolation testing for the UCR Barn Expansion project that is planned to be constructed south of the existing Humanities Building and west of Sprout Hall on the University of California, Riverside (UCR) campus in Riverside, California (see *Vicinity Map*, Figure 1). The purpose of the investigation was to evaluate subsurface soil and geologic conditions at the site and, based on the conditions encountered, provide recommendations pertaining to the geotechnical aspects of the site improvements. The *UCR Barn Expansion Project Site Plan* provided by UCR Architects and Engineers was used as a reference for our investigation.

The scope of our investigation included geotechnical borings, hand pits for percolation testing, laboratory testing, engineering analyses, and the preparation of this report. A summary of the information reviewed for this study is presented in the *List of References*.

Our field investigation included excavation of three geotechnical borings in the accessible areas of the new buildings, and six hand pits that were used for percolation tests at locations selected by UCR. Appendix A presents a discussion of the field investigation and includes logs of the borings. The approximate locations of the exploratory borings and percolation tests are presented on the *Boring Location Map* (see Figure 2). We performed laboratory tests on soil samples obtained from the exploratory excavations to evaluate pertinent physical and chemical properties for engineering analysis. The results of the laboratory testing are presented in Appendix B.

References to elevations presented in this report are based on readily available topographic information. Geocon does not practice in the field of land surveying and is not responsible for the accuracy of such topographic information.

2. SITE AND PROJECT DESCRIPTION

The UCR Barn Expansion is proposed to be constructed south of the Humanities Building around the existing Barn Restaurant and Theater/Workshop building and in replacement of the Stable building. The site coordinates are 33.9722° N / -117.3305° W (WGS 84). A brief review of readily available aerial photographs indicates that some of the buildings have been onsite since at least the 1940's, and the area has gone through several development cycles including a previous addition to what is now the Barn Restaurant building in the 1950's and construction of the Theater/Workshop building in the 1980's or early 1990's (Historic Aerials, 2016).

The conceptual site plan shows that construction will include an expansion of the existing Barn Restaurant with additions to the south and west of the existing structure. A new structure will be located to the northeast of the Barn Theater/Workshop in an area that is currently landscaped, and a new structure will replace the existing Stable building that is currently located west of the restaurant and theater/workshop buildings.

The buildings for the Barn Restaurant expansion will include areas for food preparation, service, storage, shipping and receiving. The structure to the northeast will house a public restroom and campus meeting room. The structure to the west will house a dining area, office space, and food storage areas. The overall site improvements include constructing a courtyard in the center of the structures, walkways, a loading dock area, new pavements, and landscaped areas. Grading plans are not available at this time, however, based on the existing site topography, we anticipate that site grading will consist of cuts and fills of less than 5 feet.

A storm water basin is not shown on the site plan; however, we understand that the landscaped areas around the buildings will be used for storm water infiltration. We understand that the infiltration areas will be at elevations close to the current site grades and will incorporate some of the existing site landscaping.

Structural plans are not available at this time, but we anticipate that the structures will be single story, constructed of wood or light gauge steel framing with concrete slab-on-grade floors and shallow foundations. Due to preliminary nature of the design at this time, wall and column loads were not available. It is anticipated that column loads for the proposed structures will be up to 50 kips, and wall loads will be up to 4 kips per linear foot.

The site description and proposed development are based on observations made during the field investigation, a review of the referenced geologic publications and the referenced site plan. If project details differ significantly from those described, Geocon should be contacted for review and possible revision to this report.

3. GEOLOGIC SETTING

The subject site is situated within a natural geomorphic province in southwestern California known as the Peninsular Ranges, which is characterized by steep, elongated ranges and valleys that trend northwesterly. This geomorphic province encompasses an area that extends 125 miles, from the Transverse Ranges and the Los Angeles Basin on the north, south to the Mexican border, and beyond another 795 miles to the tip of Baja California (Norris and Webb, 1990; Harden, 1998). This province is believed to have begun as a thick accumulation of predominantly marine sedimentary and volcanic

rocks during the late Paleozoic and early Mesozoic. Following this accumulation, in mid-Cretaceous time, the province underwent a pronounced episode of mountain building. The accumulated rocks were then complexly metamorphosed and intruded by igneous rocks, known locally as the Southern California Batholith. A period of erosion followed the mountain building, and during the late Cretaceous and Cenozoic time, sedimentary and subordinate volcanic rocks were deposited upon the eroded surfaces of the batholithic and pre-batholithic rocks.

More specifically, the site is situated along the central-northern portion of the Perris Block, an eroded mass of Cretaceous and older crystalline rock. Thin sedimentary and volcanic units mantle the bedrock in a few places with alluvial deposits filling in the lower valley areas. The Perris Block is a structurally stable, internally unfaulted mass of crustal rocks bounded on the west by the Elsinore-Chino fault zones, on the east by the San Jacinto fault zone, and on the north by the Cucamonga fault zone (Woodford, et al., 1971). On the south, the Perris Block is bounded by a series of sedimentary basins that lie between Temecula and Anza (Morton and Matti, 1989).

Locally, as mapped by Morton and Cox (2001), the site is underlain by very old alluvial fan deposits (early Pleistocene) that are described as being mostly well-dissected, well-indurated, reddish-brown sands.

4. GEOLOGIC MATERIALS

4.1 General

During our field investigation, we encountered previously placed artificial fill overlying Old Alluvial Fan deposits. The descriptions of the soils and geologic conditions are shown on the excavation logs in Appendix A and described herein in order of increasing age.

4.2 Undocumented Artificial Fill (afu)

Approximately 2 feet of previously placed artificial fill is present across the site. The fill was likely generated as part of grading for the buildings and parking lots. Geotechnical observation and testing records of the fill placement was not provided to us, therefore the fill is considered undocumented. As encountered, this unit consists of brown to dark brown fine to coarse silty sand that is medium dense to very dense, and slightly moist to moist. In the parking and drive areas, the fill is capped with asphalt concrete. No aggregate base was encountered beneath the asphalt concrete.

4.3 Old Alluvial Fan Deposits (Qof_a)

Old Alluvial Fan deposits were encountered beneath the artificial fill in the three geotechnical borings. As encountered, these deposits consist of grayish brown to reddish brown, loose to very dense, slightly moist to moist, silty sands and poorly graded sands.

5. GROUNDWATER

We did not encounter groundwater during this current study to the maximum depths explored of 26½ feet. Based on groundwater data by California Department of Water Resources, regional groundwater is anticipated at depths of 100 feet or more below the existing ground surface (CDWR, 2016). It is not uncommon for seepage conditions to develop where none previously existed due to the permeability characteristics of the geologic units encountered. During the rainy season, localized perched water conditions may develop above silt and clay layers that may require special consideration during grading operations. Groundwater elevations are dependent on seasonal precipitation, irrigation, and land use, among other factors, and vary as a result.

6. GEOLOGIC HAZARDS

6.1 Seismic Design Parameters

The following table summarizes summarizes site-specific design criteria obtained from the 2016 California Building Code (CBC; Based on the 2015 International Building Code [IBC] and ASCE 7-10), Chapter 16 Structural Design, Section 1613 Earthquake Loads. The data were calculated using the computer program *U.S. Seismic Design Maps*, provided by the U.S. Geological Survey. The short spectral response uses a period of 0.2 second. The building structure and improvements should be designed using a Site Class D. We evaluated the Site Class based on the discussion in Section 1613.3.2 of the 2016 CBC and Table 20.3-1 of ASCE 7-10. The values presented below are for the risk-targeted maximum considered earthquake (MCE_R).

TABLE 6.1.1
2016 CBC SEISMIC DESIGN PARAMETERS

Parameter	Value	2016 CBC Reference
Site Class	D	Section 1613.3.2
MCE_R Ground Motion Spectral Response Acceleration – Class B (short), S_S	1.500 g	Figure 1613.3.1(1)
MCE_R Ground Motion Spectral Response Acceleration – Class B (1 sec), S_1	0.603 g	Figure 1613.3.1(2)
Site Coefficient, F_A	1.0	Table 1613.3.3(1)
Site Coefficient, F_V	1.5	Table 1613.3.3(2)
Site Class Modified MCE_R Spectral Response Acceleration (short), S_{MS}	1.500 g	Section 1613.3.3 (Eqn 16-37)
Site Class Modified MCE_R Spectral Response Acceleration (1 sec), S_{M1}	0.905 g	Section 1613.3.3 (Eqn 16-38)
5% Damped Design Spectral Response Acceleration (short), S_{DS}	1.000 g	Section 1613.3.4 (Eqn 16-39)
5% Damped Design Spectral Response Acceleration (1 sec), S_{D1}	0.603 g	Section 1613.3.4 (Eqn 16-40)

The table below presents the mapped maximum considered geometric mean (MCE_G) seismic design parameters for projects located in Seismic Design Categories of D through F in accordance with ASCE 7-10.

TABLE 6.1.2
ASCE 7-10 PEAK GROUND ACCELERATION

Parameter	Value	ASCE 7-10 Reference
Mapped MCE_G Peak Ground Acceleration, PGA	0.552	Figure 22-7
Site Coefficient, F_{PGA}	1.0	Table 11.8-1
Site Class Modified MCE_G Peak Ground Acceleration, PGA_M	0.552 g	Section 11.8.3 (Eqn 11.8-1)

Conformance to the criteria in Tables 6.1.1 and 6.1.2 for seismic design does not constitute any kind of guarantee or assurance that significant structural damage or ground failure will not occur if a large earthquake occurs. The primary goal of seismic design is to protect life, not to avoid all damage, since such design may be economically prohibitive.

6.2 Faulting

The site, like the rest of southern California, is located within a seismically active region near the active margin between the North American and Pacific tectonic plates. The principal source of seismic activity in southern California is movement along the northwest-trending regional faults such as the San Andreas, San Jacinto, and Elsinore fault zones.

It is our opinion, based on a review of published geologic maps and reports, that the site is not located on any known active, potentially active, or inactive fault traces. An active fault as defined by the California Geological Survey (CGS) is a fault showing evidence of activity within the last 11,000 years. The site is not located within a State of California Earthquake Fault Zone (CGS, 2016) or a Riverside County Fault Hazard Zone (RCIT, 2016). The nearest known active fault is the San Jacinto fault (San Bernardino Segment), located approximately 5.7 miles to the northeast of the site. The San Jacinto fault (San Bernardino Segment, Cao, et al., 2003) is a right-lateral, strike-slip fault, approximately 36 kilometers in length, with an estimated maximum moment magnitude (Mw) earthquake of Mw 6.7 and an associated slip-rate of 12.0 ±6.0 mm/year. The site could be subjected to moderate ground shaking in the event of a major earthquake on significant faults in the southern California and northern Baja California area. It is our opinion that due to the lack of mapped faults across the site, ground rupture due to faulting is not a design consideration for the project.

Faults within a 50 mile radius of the site are listed in Table 6.2.1. Historic earthquakes of magnitude 6.0 and greater and their magnitudes, distances and directions from the site are listed in Table 6.2.2.

Table 6.2.1
Active Faults within 50 Miles of the Site

Fault Name	Maximum Magnitude (Mw)	Geometry (Slip Character)	Slip Rate (mm/yr)	Information Source	Distance from Site (mi)	Direction from Site
San Jacinto Fault	6.7	SS	12.0	e	6	NE
San Andreas Fault	7.3	SS	24.0	e	14	NE
Cucamonga Fault	7.0	RO	5.0	e	16	NW
Elsinore Fault Zone	6.8	SS	5.0	e	16	SW
Whittier Fault	6.8	SS	2.5	e	22	WSW
North Frontal Fault Zone	6.7	RO	0.5	e	29	NNE
Pinto Mountain Fault	7.2	SS	2.5	k	35	ENE
Helendale Fault	7.0	SS	0.8	f	38	NE
Raymond	6.5	RO	1.5	k	41	WNW
Newport-Inglewood	7.1	SS	1.0	K	43	SW
Lenwood Fault	7.3	SS	0.6	e	47	NE

Geometry: SS = Strike slip, RO = reverse oblique
Information Source: e = CDMG, 1996; f = Anderson, 1984; k = CGS, 2003

Table 6.2.2
Historic Earthquake Events with Respect to the Site

Earthquake (Oldest to Youngest)	Date of Earthquake	Magnitude	Distance to Epicenter (miles)	Direction to Epicenter
San Jacinto	December 25, 1899	6.7	24	SE
San Jacinto	April 21, 1918	6.8	24	SE
Loma Linda Area	July 22, 1923	6.3	5	ENE
Long Beach	March 10, 1933	6.4	44	WSW
Buck Ridge	March 25, 1937	6.0	73	ESE
Imperial Valley	May 18, 1940	6.9	59	E
Desert Hot Springs	December 4, 1948	6.0	54	E
Arroyo Salada	March 19, 1954	6.4	87	SE
Borrego Mountain	April 8, 1968	6.5	93	SE
San Fernando	February 9, 1971	6.6	74	WNW
Joshua Tree	April 22, 1992	6.1	64	E
Landers	June 28, 1992	7.3	58	ENE
Big Bear	June 28, 1992	6.4	35	ENE
Northridge	January 17, 1994	6.7	77	WNW
Hector Mine	October 16, 1999	7.1	79	NE

6.3 Liquefaction

Liquefaction typically occurs when a site is located in a zone with seismic activity, onsite soils are cohesionless/silt or clay with low plasticity, static groundwater is encountered within 50 feet of the surface, and soil relative densities are less than about 70 percent. If the four previous criteria are met, a seismic event could result in a rapid pore-water pressure increase from the earthquake-generated ground accelerations. Seismically induced settlement may occur whether the potential for liquefaction exists or not.

The project site is mapped by Riverside County (RCIT, 2016) as having a low liquefaction potential. Based on the lack of shallow groundwater and the medium dense to very dense consistency of the older alluvium underlying the site, it is our opinion that liquefaction and seismic settlement is not a design consideration for the proposed construction.

6.4 Expansive Soil

Based on the soil classifications and the laboratory test results in Appendix B, the geologic units at the site are anticipated to possess a "very low" expansion potential (Expansion Index of 20 or less). Due to the laboratory test results and granular nature of the soils in the area, expansive soils are not anticipated to be a design consideration for the proposed construction.

6.5 Collapsible Soil

Based on consolidation testing, granular alluvial soils exhibited a potential for hydrocollapse beneath the site. Testing in the upper 6 feet indicated a hydrocollapse potential of 2.5 to 6.2 percent, which is classified as moderate (2.1 to 6.0 percent) to moderately severe (6.1 to 10 percent) by ASTM D5333. Testing of deeper alluvial soils indicated a collapse potential of 0.7 to 1.6 percent, which is classified as slight (0.1 to 2.0 percent) by ASTM D5333.

6.6 Landslides

There are no hillsides on or adjacent to the site. Therefore, the landslide hazard to the site is not a design consideration.

6.7 Slope Stability

We understand that the proposed grading at the project site includes minor cuts and fills to prepare the site for the planned buildings. There are no existing slopes adjacent to the proposed project site. Based on the existing and anticipated finish grades, slope stability is not a design consideration for this project.

6.8 Tsunamis and Seiches

A tsunami is a series of long period waves generated in the ocean by a sudden displacement of large volumes of water. Causes of tsunamis include underwater earthquakes, volcanic eruptions, or offshore slope failures. The first order driving force for locally generated tsunamis offshore southern California is expected to be tectonic deformation from large earthquakes (Legg, *et al.*, 2002). The site is located approximately 40 miles from the nearest coastline, therefore, the risk associated with tsunamis is not a design consideration.

A seiche is a run-up of water within a lake or embayment triggered by fault- or landslide-induced ground displacement. The site is not located near to or downstream of a body of water. Therefore the potential of seiches affecting the site or flooding is not a design consideration.

7. PERCOLATION TESTING

Percolation testing was performed in accordance with the procedures in Appendix A of the *Riverside County Flood Control and Water Conservation District – Low Impact Development BMP Design Handbook* (Handbook). The percolation tests were run in accordance with Section 2.3 Percolation Tests. This method requires two percolation tests per basin or a minimum of four percolation tests, and one deep excavation (extending 10 feet below percolation test elevation) per basin. The project site as planned calls for percolation within landscaped areas, with no formal basins. Soils and conditions within the tested areas are representative of the proposed percolation locations. The percolation test locations are depicted on the *Boring Location Map* (see Figure 2).

A 3-inch diameter perforated PVC pipe in silt filter sock was placed in each percolation test hole and approximately 2 inches of gravel was placed at the bottom of the PVC pipe. The test locations were pre-saturated prior to testing. Percolation testing was begun within 24 hours after the holes were presaturated. Percolation data sheets are presented in Appendix A of this report. Calculations to convert the percolation test rate to infiltration test rates in accordance with Section 2.3 of the Handbook are presented in Table 7.0 below. Please note that the Handbook requires a factor of safety of 3 be applied to these values based on the test method used.

In percolation test P-3, the infiltration rates were too rapid for the test method as described above. Therefore, as a means of determining the infiltration rates, timed intervals were taken to determine the rate that five gallons of water infiltrated into the ground through the prepared test hole. The field data and resulting infiltration results are presented in Appendix A, however the rates do not coincide with the soil classification or other tests in the area. The percolation test hole likely connected with a more permeable fill layer, and it is our opinion that it does not represent the encountered site conditions. We would recommend that the infiltration rate for test P-3 be disregarded and an anomalous test.

TABLE 7.1
INFILTRATION TEST RATES FOR PERCOLATION AREAS

Parameter	P-1	P-2	P-4	P-5	P-6
Depth (inches)	24	24	24	24	24
Test Type	Normal	Normal	Normal	Normal	Normal
Change in head over time:ΔH (inches)	1.3	0.8	5.0	3.0	1.3
Time Interval (minutes): Δt (minutes)	30	30	30	30	30
Radius of test hole: r (inches)	4	4.5	4	4	3
Percolation Rate (minutes/inch)	24	40	6.0	10.0	24
Tested Infiltration Rate: It (inches/hour)	0.26	0.17	1.3	0.62	0.18

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 General

8.1.1 It is our opinion that soil or geologic conditions were not encountered during the investigation that would preclude the proposed development of the project provided the recommendations presented herein are followed and implemented during construction.

8.1.2 Potential geologic hazards at the site include seismic shaking and collapse potential of near surface soils. Based on our investigation and available geologic information, active, potentially active or inactive faults are not present underlying or trending toward the site.

8.1.3 The previously placed fill and upper portion of the alluvium is considered unsuitable for the support of the proposed structures. Deeper areas of fill may exist on the site, particularly in building or previously landscaped areas. Remedial grading of the surficial soil will be required as discussed herein.

8.1.4 Consolidation testing of samples of the subsurface soils indicated that there is a moderate to moderately severe potential for hydrocollapse of the granular soils beneath the site. Remedial grading will address the collapse potential of the near-surface soils; however, precautionary measures will be needed to mitigate the potential for hydrocollapse of deeper soils. Proper site drainage should be maintained at all times. Landscape planters that saturate the subsurface or storm water infiltration should not be used within 20 feet of the proposed structure or other on grade improvements. Localized surface settlement should be anticipated in the vicinity of the storm water infiltration areas where water is allowed to infiltrate to the subsurface.

8.1.5 Based on the anticipated site conditions, the proposed new structures may be supported on conventional foundations bearing on newly placed engineered fill following remedial grading. Performing deep open excavations for remedial grading adjacent to the existing Barn Restaurant building could potentially remove lateral support and/or undermine the existing foundations. Therefore, the proposed addition may be supported on conventional foundations bearing on newly placed fill and/or competent alluvial soils found at or below a depth of 5 feet below the ground surface. It is the intent of the Geotechnical Engineer to allow the addition foundations to bear in both engineered fill and undisturbed alluvium, as necessary.

8.1.6 Where the recommended lateral over-excavation cannot be performed, such as adjacent to the existing structure, foundations should be deepened as necessary to bear in the competent alluvial soils. Prior to constructing the foundation system along the existing building,

a 1:1 cut slope should be created adjacent to the existing building pad. The placement of engineered fill over the cut slope will leave a wedge of fill adjacent to the existing building and equipment pad, but will not compromise the lateral support of the existing foundation. Foundations adjacent to the existing building should be designed to be deepened into the competent native soils as necessary (below a depth of 5 feet), and sections of slab underlain by the upper layer of fill and alluvium should be designed to be structurally supported by the foundation system. The structural slab will be necessary only where it will overlie a wedge of existing uncertified fill remaining from the temporary 1:1 cut slope (see Figure 3). The thickness and reinforcing for the slab will be designed by the project structural engineer.

8.1.7 It is recommended that the deepened foundations consist of a series of pad footings or end bearing, drilled, cast-in-place concrete caissons. The use of such a foundation system will not require a continuous excavation along the side of the existing foundation and therefore will maintain the necessary lateral support for the existing foundation. This minimizes excavation complexity and eliminates the need for slot cutting. Once the pad footings and caissons are placed, a grade beam can be placed at the ground surface spanning across the tops of the caissons and/or pad foundations. The appropriate span between pads/caissons should be determined by a qualified structural engineer.

8.1.8 Excavations for the addition to the existing Barn Restaurant building should be performed in such a way as to protect the existing structure and foundations. The contractor should take precautionary measures not to cause damage to the structure or undermine the foundations.

8.1.9 The site soils should generally be excavatable with conventional earth moving equipment in good working order. However, the site soils are granular and may be prone to caving. The contractor should take precautionary measures to mitigate caving when excavating into the granular materials.

8.1.10 We did not encounter groundwater during our subsurface exploration and we do not expect it to be a constraint to project development. Seepage and perched groundwater conditions may be encountered during the grading operations, especially during the rainy seasons and in areas subject to landscape irrigation.

8.1.11 Proper drainage should be maintained in order to preserve the design properties of the fill in the sheet-graded pads and slope areas. Recommendations for site drainage are provided herein.

8.2 Soil Characteristics

8.2.1 The soil encountered in the field investigation is considered to be "non-expansive" (Expansion Index [EI] of 20 or less) as defined by the 2016 California Building Code (CBC) Section 1803.5.3 with a "very low" expansion index as defined by ASTM D4829. Table 8.2.1 presents soil classifications based on the expansion index.

TABLE 8.2.1
SOIL CLASSIFICATION BASED ON EXPANSION INDEX

Expansion Index (EI)	Expansion Classification	2016 CBC Expansion Classification
0 – 20	**Very Low**	**Non-Expansive**
21 – 50	Low	Expansive
51 – 90	Medium	
91 – 130	High	
Greater Than 130	Very High	

8.2.2 Additional testing for expansion potential should be performed once final grades are achieved.

8.2.3 We performed laboratory tests on a sample of the site materials to evaluate the percentage of water-soluble sulfate content. Results from the laboratory water-soluble sulfate content tests are presented in Appendix B and indicate that the on-site materials at the location tested possess a sulfate content of 0.035% equating to a S0 or negligible sulfate exposure to concrete structures as defined by 2016 CBC Section 1904.3 and ACI 318. Table 8.2.3 presents a summary of concrete requirements set forth by 2016 CBC Section 1904.3 and ACI 318. The presence of water-soluble sulfates is not a visually discernible characteristic; therefore, other soil samples from the site could yield different concentrations. Additionally, over time landscaping activities (i.e., addition of fertilizers and other soil nutrients) may affect the concentration.

TABLE 8.2.3
REQUIREMENTS FOR CONCRETE
EXPOSED TO SULFATE-CONTAINING SOLUTIONS

Sulfate Exposure	Exposure Class	Water-Soluble Sulfate Percent by Weight	Cement Type	Maximum Water to Cement Ratio by Weight	Minimum Compressive Strength (psi)
Negligible	**S0**	**0.00-0.10**	**--**	**--**	**2,500**
Moderate	S1	0.10-0.20	II	0.50	4,000
Severe	S2	0.20-2.00	V	0.45	4,500
Very Severe	S3	> 2.00	V+ Pozzolan or Slag	0.45	4,500

8.2.4 Laboratory testing indicates the site soils have a pH of 7.3, possess 120 parts per million chloride, and have a minimum resistivity of 1,400 ohm-cm. The site would not be classified as corrosive to metal improvements in accordance with the Caltrans Corrosion Guidelines (Caltrans, 2012), which defines a corrosive site as having a pH of 5.5 or less, a chloride concentration of 500 parts per million or greater, or an electrical resistivity of 1,000 ohm-cm or less.

8.2.5 Geocon does not practice in the field of corrosion engineering. Therefore, further evaluation by a corrosion engineer may be performed if improvements that could be susceptible to corrosion are planned.

8.3 Grading

8.3.1 Grading should be performed in accordance with the *Recommended Grading Specifications* contained in Appendix C and the Grading Ordinances of the City of Riverside.

8.3.2 Prior to commencing grading, a preconstruction conference should be held at the site with the city inspector, owner or developer, grading contractor, civil engineer, and geotechnical engineer in attendance. Special soil handling and/or the grading plans can be discussed at that time.

8.3.3 Site preparation should begin with the removal of deleterious material, debris and vegetation. The depth of removal should be such that material exposed in cut areas or soil to be used as fill is relatively free of organic matter. Material generated during stripping and/or site demolition should be exported from the site.

8.3.4 Previously placed fill and the upper portion of the alluvial soils within the building areas should be removed to expose competent older alluvium with a relative density of at least 85 percent as evaluated by ASTM D1557. Removals beneath planned structures should extend at least 5 feet below existing grades or 2 feet below the bottom of the planned foundations, whichever is deeper. The remedial earthwork should extend laterally from the building foot print for a distance equal to the depth of the removal. Removals in pavement and sidewalk areas should extend at least 3 feet beneath the pavement or flatwork subgrade elevation. The actual depth of removal should be evaluated by the engineering geologist during grading operations. The bottom of the excavations should be scarified to a depth of at least 1 foot, moisture conditioned as necessary, and properly compacted prior to the placing of additional fill.

8.3.5 As an alternative to remedial grading for the additional adjacent to the existing Barn Restaurant structure, the footings may be deepened to a depth of 5 feet below adjacent grade and founded in the alluvium as described in the *Foundation Recommendations* section of this report. For this case, the remedial grading should be sloped down and out at a uniform 1:1 (h:v) slope gradient from the existing building to the depth of the remedial grading.

8.3.6 Fill generated from onsite soils should be free of deleterious material and rock fragments larger than 6 inches. Fill placed within 3 feet of proposed foundations should possess a "very low" expansion potential (EI of 20 or less).

8.3.7 The site should be brought to finish grade elevations with fill compacted in layers. Layers of fill should be no thicker than will allow for adequate bonding and compaction. Fill, including backfill and scarified ground surfaces, should be compacted to a dry density of at least 90 percent of the laboratory maximum dry density at the optimum moisture content as determined by ASTM International (ASTM) D 1557. Fill placed within 12 inches of finish subgrade elevations in pavement areas should be compacted to 95 percent of the laboratory maximum dry density. Fill materials placed below optimum moisture content may require additional moisture conditioning prior to placing additional fill.

8.3.8 Import fill (if necessary) should consist of granular materials with a "very low" expansion potential (EI of 20 or less) generally free of deleterious material and rock fragments larger than 6 inches and should be compacted as recommended herein. Geocon should be notified of the import soil source and should perform laboratory testing of import soil prior to its arrival at the site to evaluate its suitability as fill material.

8.4 Utility Trench Backfill

8.4.1 Utility trenches should be properly backfilled in accordance with the requirements of the City of Chino Hills and the latest edition of the *Standard Specifications for Public Works Construction* (Greenbook). The pipes should be bedded with well graded crushed rock or clean sands (Sand Equivalent greater than 30) to a depth of at least one foot over the pipe. We recommend that jetting only be performed if trench wall soils have an SE of 15 or greater. The use of well graded crushed rock is only acceptable if used in conjunction with filter fabric to prevent the gravel from having direct contact with soil. The remainder of the trench backfill may be derived from onsite soil or approved import soil, compacted as necessary, until the required compaction is obtained. The use of 2-sack slurry and controlled low strength material (CLSM) are also acceptable. However, consideration should be given to the possibility of

differential settlement where the slurry ends and earthen backfill begins. These transitions should be minimized and additional stabilization should be considered at these transitions.

8.4.2 Utility excavation bottoms must be observed and approved in writing by the Geotechnical Engineer (a representative of Geocon), prior to placing bedding materials, fill, gravel, concrete, or geogrid.

8.5 Earthwork Grading Factors

8.5.1 Estimates of shrinkage factors are based on empirical judgments comparing the material in its existing or natural state as encountered in the exploratory excavations to a compacted state. Variations in natural soil density and in compacted fill density render shrinkage value estimates very approximate. As an example, the contractor can compact the fill to a dry density of 90 percent or higher of the laboratory maximum dry density. Thus, the contractor has an approximately 10 percent range of control over the fill volume. Based on the measured densities from the borings and our experience, the shrinkage of the site soil is anticipated to be approximately 5 to 15 percent in the existing fill and older alluvium. Please note that this estimate is for preliminary quantity estimates only. Due to the variations in the actual shrinkage/bulking factors, a balance area should be provided to accommodate variations.

8.6 Foundations

8.6.1 The foundation recommendations presented herein are for the proposed buildings and building additions subsequent to the recommended grading. We understand that the buildings will be supported on conventional shallow foundations with a concrete slab-on-grade deriving support in newly placed engineered fill. The foundation for the building addition to the Barn Restaurant may be supported on foundations bearing in a combination of newly compacted fill and the undisturbed competent alluvium fount at or below a depth of 5 feet below the ground surface.

8.6.2 Slabs-on-grade that may receive moisture-sensitive floor coverings or may be used to store moisture-sensitive materials should be underlain by a vapor retarder placed directly beneath the slab. The vapor retarder and acceptable permeance should be specified by the project architect or developer based on the type of floor covering that will be installed. The vapor retarder design should be consistent with the guidelines presented in Section 9.3 of the American Concrete Institute's (ACI) Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials (ACI 302.2R-06) and should be installed in general conformance with ASTM E1643 (latest edition) and the manufacturer's

recommendations. A minimum thickness of 15 mils extruded polyolefin plastic is recommended; vapor retarders which contain recycled content or woven materials are not recommended. The vapor retarder should have a permeance of less than 0.01 perms demonstrated by testing before and after mandatory conditioning. The vapor retarder should be installed in direct contact with the concrete slab with proper perimeter seal. If the California Green Building Code requirements apply to this project, the vapor retarder should be underlain by 4 inches of clean aggregate. It is important that the vapor retarder be puncture resistant since it will be in direct contact with angular gravel. As an alternative to the clean aggregate suggested in the Green Building Code, it is our opinion that the concrete slab-on-grade may be underlain by a vapor retarder over 4 inches of clean sand (sand equivalent greater than 30), since the sand will serve as a capillary break and will minimize the potential for punctures and damage to the vapor barrier.

8.6.3 The bedding sand thickness should be determined by the project foundation engineer, architect, and/or developer. However, we should be contacted to provide recommendations if the bedding sand is thicker than 4 inches. Placement of 3 inches and 4 inches of sand is common practice in southern California for 5-inch and 4-inch thick slabs, respectively. The foundation engineer should provide appropriate concrete mix design criteria and curing measures that may be utilized to assure proper curing of the slab to reduce the potential for rapid moisture loss and subsequent cracking and/or slab curl.

8.6.4 Foundations for the structures may consist of either continuous strip footings and/or isolated spread footings. Conventionally reinforced continuous footings should be at least 18 inches wide and extend at least 18 inches below lowest adjacent pad grade. Isolated spread footings should have a minimum width of 24 inches and should extend at least 18 inches below lowest adjacent pad grade. Figure 3 presents a wall/column footing dimension detail depicting lowest adjacent pad grade.

8.6.5 The majority of the site soils consist of material with little to no cohesion and will be subject to caving in un-shored excavations. Therefore, the contractor's competent person should evaluate the necessity for lay back of vertical cut areas and use of formwork to maintain foundation dimensions.

8.6.6 Performing deep open excavations adjacent to the existing Barn Restaurant could potentially undermine the existing foundations and remove lateral support. Based on these considerations it is recommended that deep foundations are utilized adjacent to the existing building. Prior to constructing the deep foundation system, a 1:1 slope should be graded adjacent to the existing building. The placement of engineered fill on the cut slopes will leave a wedge of fill adjacent to the existing building and equipment pad. The foundations

adjacent to the existing building should be designed to be deepened into the competent native soils as necessary (below a depth of 5 feet), and sections of slab should be designed to be structurally supported by the foundation system. The structural slab will be necessary only where it will overlie a wedge of existing fill remaining from the temporary 1:1 cut slope (see Figure 2). The thickness and reinforcing for the slab will be designed by the project structural engineer.

8.6.7 It is recommended that the deepened foundations consist of a series of deepened pad footings or end bearing, drilled, cast-in-place concrete caissons. The use of such a foundation system will not require a continuous excavation along the side of the existing foundation and therefore will maintain the necessary lateral support for the existing foundation. This minimizes excavation complexity and eliminates the need for slot cutting. Once the pad footings and caissons are placed, a grade beam can be placed at the ground surface spanning across the tops of the caissons and/or pad foundations. The appropriate span between pads/caissons should be determined by a qualified structural engineer.

8.6.8 In order to limit settlement to less than ½ inch between existing and proposed foundations, foundations for the building addition should be designed for an allowable bearing capacity of 2,000 psf (dead plus live load). The allowable bearing pressure may be increased by one-third for transient loads due to wind or seismic forces.

8.6.9 Where proposed foundations are not adjacent to existing footings and settlement in excess of ½ inch is tolerable, the foundations may be designed for an allowable soil bearing pressure of 2,500 pounds per square foot (psf) (dead plus live load). The allowable bearing pressure may be increased by one-third for transient loads due to wind or seismic forces.

8.6.10 The maximum expected static settlement for a structure supported on a conventional foundation system with an allowable bearing pressure of 2,500 psf, and deriving support in engineered fill is estimated to be ¾ inch and to occur below the heaviest loaded structural element. Settlement of the foundation system is expected to occur on initial application of loading. Differential settlement is not expected to exceed ½ inch over a horizontal distance of 40 feet.

8.6.11 Continuous footings should be reinforced with at least four No. 4 steel reinforcing bars, two placed near the top of the footing and two near the bottom. Reinforcement for spread footings should be designed by the project structural engineer.

8.6.12 The above foundation dimensions and minimum reinforcement recommendations are based on soil conditions and building code requirements only, and are not intended to be used in lieu of those required for structural purposes.

8.6.13 Once the design and foundation loading configuration proceeds to a more finalized plan, the estimated settlements within this report should be reviewed and revised, if necessary.

8.6.14 Footing excavations should be observed by a representative of Geocon prior to placing reinforcing steel or concrete to verify that the excavations are in compliance with recommendations and the soil conditions are as anticipated.

8.6.15 Special subgrade presaturation is not deemed necessary prior to placing concrete; however, the exposed foundation and slab subgrade soil should be moisture conditioned, as necessary, to maintain a moist condition as would be expected in such concrete placement.

8.6.16 The recommendations of this report are intended to reduce the potential for differential settlement of existing soil or soil with varying thicknesses. However, even with the incorporation of the recommendations presented herein, foundations and walls placed on such conditions may still exhibit some cracking due to soil movement and/or shrinkage. The occurrence of concrete shrinkage cracks is independent of the supporting soil characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, proper concrete placement and curing, and by the placement of crack control joints at periodic intervals, in particular, where re-entrant slab corners occur.

8.6.17 Geocon should be consulted to provide additional design parameters as required by the structural engineer.

8.7 Exterior Concrete Flatwork

8.7.1 Exterior concrete flatwork not subject to vehicular traffic should be constructed in accordance with the recommendations herein assuming the subgrade materials possess an Expansion Index of 20 or less. Subgrade soils should be compacted to 90 percent relative compaction. Slab panels should be a minimum of 4 inches thick and when in excess of 8 feet square should be reinforced with 6x6-W2.9/W2.9 (6x6-6/6) welded wire mesh or No. 3 reinforcing bars spaced 18 inches center-to-center in both directions to reduce the potential for cracking. In addition, concrete flatwork should be provided with crack control joints to reduce and/or control shrinkage cracking. Crack control spacing should be determined by the project structural engineer based upon the slab thickness and intended usage. Criteria of the American Concrete Institute (ACI) should be taken into consideration when establishing

crack control spacing. Subgrade soil for exterior slabs not subjected to vehicle loads should be compacted in accordance with criteria presented in the grading section prior to concrete placement. Subgrade soil should be properly compacted and the moisture content of subgrade soil should be verified prior to placing concrete. Base materials will not be required below concrete flatwork improvements.

8.7.2 Where exterior flatwork abuts the structure at entrant or exit points, the exterior slab should be dowelled into the structure's foundation stemwall. This recommendation is intended to reduce the potential for differential elevations that could result from differential settlement or minor heave of the flatwork. Dowelling details should be designed by the project structural engineer.

8.7.3 The recommendations presented herein are intended to reduce the potential for cracking of exterior slabs as a result of differential movement. However, even with the incorporation of the recommendations presented herein, slabs-on-grade will still crack. The occurrence of concrete shrinkage cracks is independent of the soil supporting characteristics. Their occurrence may be reduced and/or controlled by limiting the slump of the concrete, the use of crack control joints and proper concrete placement and curing. Crack control joints should be spaced at intervals no greater than 12 feet. Literature provided by the Portland Concrete Association (PCA) and American Concrete Institute (ACI) present recommendations for proper concrete mix, construction, and curing practices, and should be incorporated into project construction.

8.8 Lateral Loading

8.8.1 To resist lateral loads, a passive pressure exerted by an equivalent fluid weight of 275 pounds per cubic foot (pcf) should be used for the design of footings or shear keys poured neat against new engineered fill. The allowable passive pressure assumes a horizontal surface extending at least 5 feet, or three times the surface generating the passive pressure, whichever is greater. The upper 12 inches of material in areas not protected by floor slabs or pavement should not be included in design for passive resistance.

8.8.2 If friction is to be used to resist lateral loads, an allowable coefficient of friction between new engineered fill and concrete of 0.40 should be used for design.

8.9 Preliminary Pavement Recommendations

8.9.1 The final pavement sections for roadways should be based on the R-Value of the subgrade soils encountered at final subgrade elevation. Streets should be constructed in accordance with the City of Riverside *Standard Plans*. Based on the classification of the site soils and testing from a nearby project at UCR, we have assumed a subgrade R-value of 25 for the preliminary pavement design. Preliminary flexible pavement sections are presented in Table 8.9.1.

TABLE 8.9.1
PRELIMINARY FLEXIBLE PAVEMENT SECTIONS

Location	Assumed Traffic Index	Assumed Subgrade R-Value	Asphalt Concrete (inches)	Crushed Aggregate Base (inches)
Parking lots servicing light-duty vehicles	5.0	25	3.5	6.0
Access roads for heavy truck vehicles	7.0	25	4.5	10.0

8.9.2 The upper 12 inches of the subgrade soil should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density at optimum moisture content beneath pavement sections.

8.9.3 The crushed aggregated base and asphalt concrete materials should conform to Section 200-2.2 and Section 203-6, respectively, of the *Standard Specifications for Public Works Construction* (Greenbook) and the City of Corona *Standard Plans*. Class 2 aggregate base meeting Section 26 of the Caltrans *Standard Specifications* may alternatively be used. Base materials should be compacted to a dry density of at least 95 percent of the laboratory maximum dry density at optimum moisture content. Asphalt concrete should be compacted to a density of 95 percent of the laboratory Hveem density in accordance with ASTM D 1561.

8.9.4 A rigid Portland cement concrete (PCC) pavement section should be placed in cross gutters and may be used in loading areas for the buildings, if any. We calculated the rigid pavement section in general conformance with the procedure recommended by the American Concrete Institute report ACI 330R-08 Guide for Design and Construction of Concrete Parking Lots using the parameters presented in Table 8.9.4.

TABLE 8.9.4
RIGID PAVEMENT DESIGN PARAMETERS

Design Parameter	Design Value
Modulus of subgrade reaction, k	150 pci
Modulus of rupture for concrete, M_R	550 psi
Traffic Category, TC	C and D
Average daily truck traffic, ADTT	100 and 700

8.9.5 Based on the criteria presented herein, the PCC pavement sections should have a minimum thickness as presented in Table 8.9.5.

TABLE 8.9.5
RIGID PAVEMENT RECOMMENDATIONS

Location	Portland Cement Concrete (inches)
Roadways (TC=C)	6.5
Heavy Truck Areas (TC=D)	7.5

8.9.6 The PCC pavement should be placed over subgrade soil that is compacted to a dry density of at least 95 percent of the laboratory maximum dry density at optimum moisture content. This pavement section is based on a minimum concrete compressive strength of approximately 3,500 psi (pounds per square inch). Base material will not be required beneath concrete improvements.

8.9.7 A thickened edge or integral curb should be constructed on the outside of concrete slabs subjected to wheel loads. The thickened edge should be 1.2 times the slab thickness or a minimum thickness of 2 inches, whichever results in a thicker edge, and taper back to the recommended slab thickness 4 feet behind the face of the slab (e.g., a 9-inch-thick slab would have an 11-inch-thick edge). Reinforcing steel will not be necessary within the concrete for geotechnical purposes with the possible exception of dowels at construction joints as discussed herein.

8.9.8 In order to control the location and spread of concrete shrinkage cracks, crack-control joints (weakened plane joints) should be included in the design of the concrete pavement slab in accordance with the referenced ACI report.

8.9.9 The performance of pavements is highly dependent on providing positive surface drainage away from the edge of the pavement. Ponding of water on or adjacent to the pavement surfaces will likely result in pavement distress and subgrade failure. Drainage from landscaped areas should be directed to controlled drainage structures. Landscape areas adjacent to the edge of asphalt pavements are not recommended due to the potential for surface or irrigation water to infiltrate the underlying permeable aggregate base and cause distress. Where such a condition cannot be avoided, consideration should be given to incorporating measures that will significantly reduce the potential for subsurface water migration into the aggregate base such as extending the perimeter curb at least 6 inches below the level of the base materials.

8.10 Temporary Excavations

8.10.1 Excavations on the order of 5 feet in vertical height are anticipated during grading operations. Vertical excavations up to 5 feet may be attempted where loose soils or caving sands are not present. The majority of the site soils consist of material with little to no cohesion and will be subject to caving in un-shored excavations. Therefore, the contractor's competent person should evaluate the necessity for lay back of vertical cut areas and use of formwork to maintain foundation dimensions.

8.10.2 Vertical excavations greater than 5 feet will require sloping or slot-cutting measures in order to provide a stable excavation. Following demolition of existing site improvements, it is anticipated that sufficient space is available to complete the majority of the required earthwork for this project using sloping measures. However, special excavation measures or shoring may be required. If needed, shoring recommendations can be provided in an addendum once the contractor has evaluated the need for shoring and construction details are available.

8.10.3 Where sufficient space is available, temporary un-surcharged embankments could be sloped back at a uniform 1.5:1 (h:v) slope gradient or flatter. A uniform slope does not have a vertical portion.

8.10.4 Where sloped embankments are utilized, the top of the slope should be barricaded to prevent vehicles and storage loads at the top of the slope within a horizontal distance equal to the height of the slope. If the temporary construction embankments are to be maintained during the rainy season, berms are suggested along the tops of the slopes where necessary to prevent runoff water from entering the excavation and eroding the slope faces. The contractor's personnel should inspect the soil exposed in the cut slopes during excavation so that

modifications of the slopes can be made if variations in the soil conditions occur. Excavations should be stabilized within 30 days of initial excavation.

8.11 Site Drainage and Moisture Protection

8.11.1 Adequate site drainage is critical to reduce the potential for differential soil movement, erosion and subsurface seepage. Under no circumstances should water be allowed to pond adjacent to footings. The site should be graded and maintained such that surface drainage is directed away from structures in accordance with 2016 CBC Section 1804.4 or other applicable standards. In addition, surface drainage should be directed away from the top of slopes into swales or other controlled drainage devices. Roof and pavement drainage should be directed into conduits that carry runoff away from the proposed structure.

8.11.2 Underground utilities should be leak free. Utility and irrigation lines should be checked periodically for leaks, and detected leaks should be repaired promptly. Detrimental soil movement could occur if water is allowed to infiltrate the soil for prolonged periods of time.

8.11.3 Landscape planters that saturate the subsurface should not be used within 20 feet of the proposed structure or other settlement sensitive on grade improvements. Localized surface settlement should be anticipated in areas where water is allowed to infiltrate into the subsurface.

8.11.4 Landscaping planters adjacent to paved areas are not recommended due to the potential for surface or irrigation water to infiltrate the pavement's subgrade and base course. We recommend that area drains be used to collect excess irrigation water and transmit it to drainage structures or impervious above-grade planter boxes. In addition, where landscaping is planned adjacent to the pavement, we recommend construction of a cutoff wall along the edge of the pavement that extends at least 6 inches below the bottom of the base material.

8.12 Plan Review

8.12.1 Grading, foundation, and shoring plans must be reviewed by the Geotechnical Engineer (a representative of Geocon West, Inc.), prior to finalization to verify that the plans have been prepared in substantial conformance with the recommendations of this report and to provide additional analyses or recommendations.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. The recommendations of this report pertain only to the site investigated and are based upon the assumption that the soil conditions do not deviate from those disclosed in the investigation. If any variations or undesirable conditions are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geocon should be notified so that supplemental recommendations can be given. The evaluation or identification of the potential presence of hazardous materials was not part of the scope of services provided by Geocon.

2. This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the plans, and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

3. The findings of this report are valid as of the date of this report. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and should not be relied upon after a period of three years.

4. The firm that performed the geotechnical investigation for the project should be retained to provide testing and observation services during construction to provide continuity of geotechnical interpretation and to check that the recommendations presented for geotechnical aspects of site development are incorporated during site grading, construction of improvements, and excavation of foundations. If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for their records. In addition, that firm should provide revised recommendations concerning the geotechnical aspects of the proposed development, or a written acknowledgement of their concurrence with the recommendations presented in our report. They should also perform additional analyses deemed necessary to assume the role of Geotechnical Engineer of Record.

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SOURCE: Google Maps, 2016

NOT TO SCALE

VICINITY MAP

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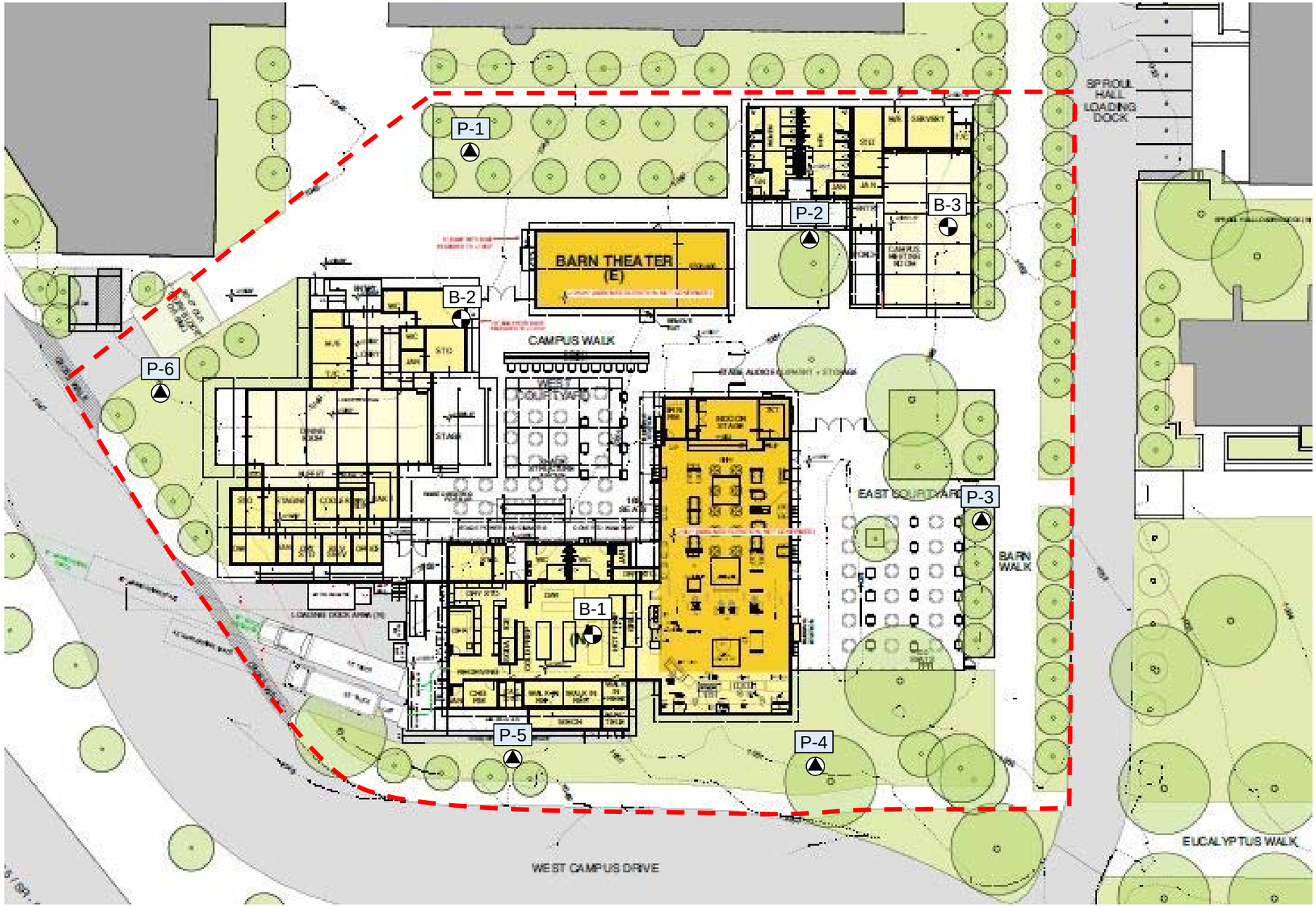
AMO		

UCR BARN EXPANSION PROJECT
UNIVERSITY OF CALIFORNIA, RIVERSIDE
RIVERSIDE, CALIFORNIA

JANUARY, 2017	PROJECT NO. T2750-22-01	FIG. 1



GEOCON LEGEND

Locations are approximate

- ..... PROJECT BOUNDARY
- B-4 ..... BORING LOCATION
- P-6 ..... HAND PIT/PERCOLATION TEST LOCATION

Source: UCR Architects and Engineers, *UCR BARN EXPANSION PROJECT, Site Plan – Showing Option 1A at Dock*, dated September 12, 2016.

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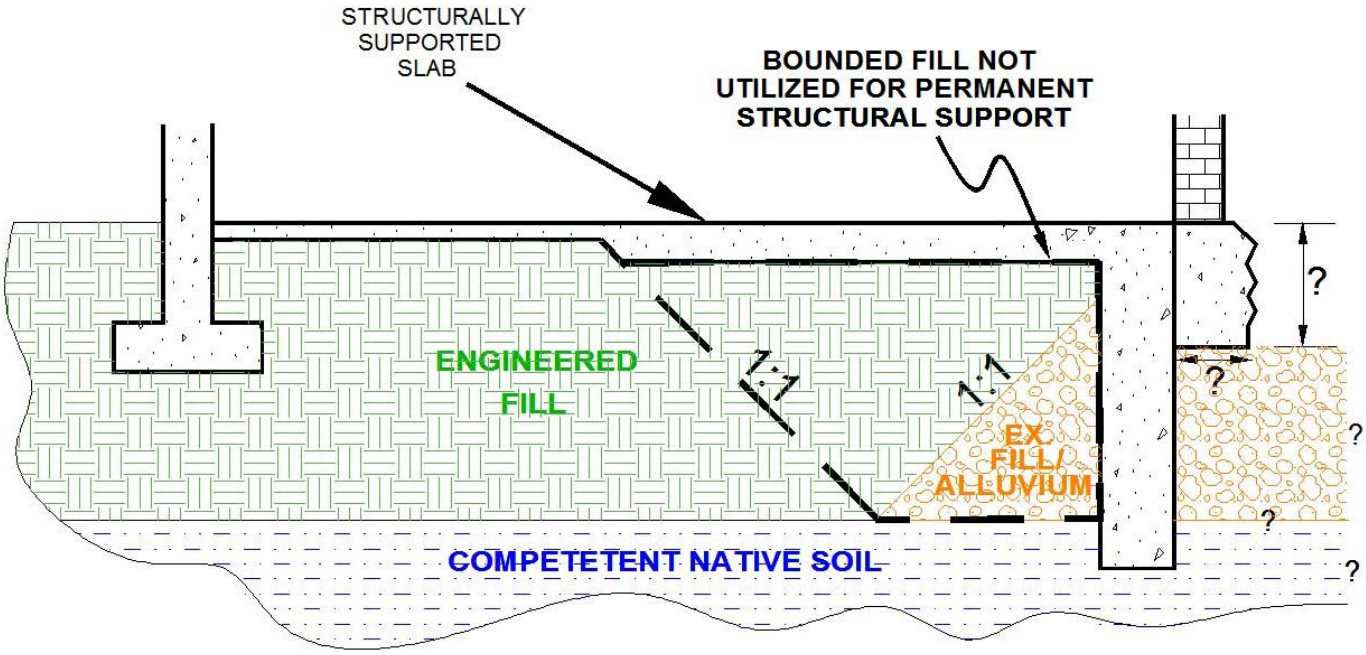
KBP

BORING LOCATION MAP

UCR BARN EXPANSION PROJECT
UNIVERSITY OF CALIFORNIA, RIVERSIDE
RIVERSIDE, CALIFORNIA

JANUARY, 2017 | PROJECT NO. T2750-22-01 | FIG. 2



TYPICAL SECTION 1

NO SCALE

NOTE: SEE REPORT FOR FOUNDATION WIDTH AND DEPTH RECOMMENDATION NO SCALE

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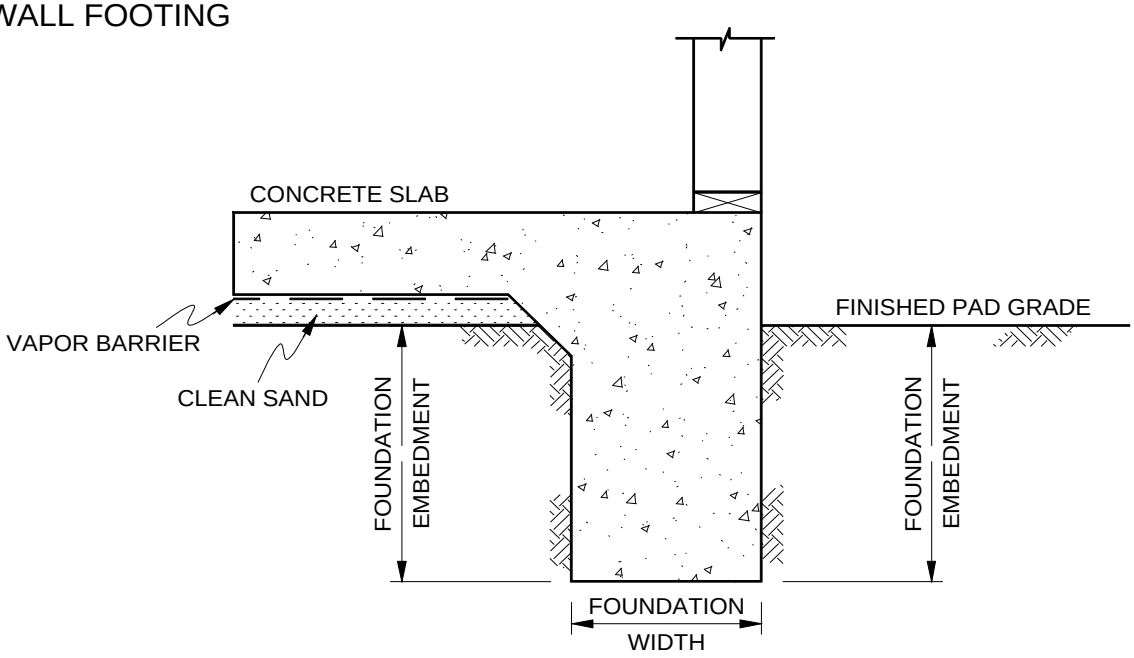
CER		

BUILDING ADDITION FOOTING DETAIL

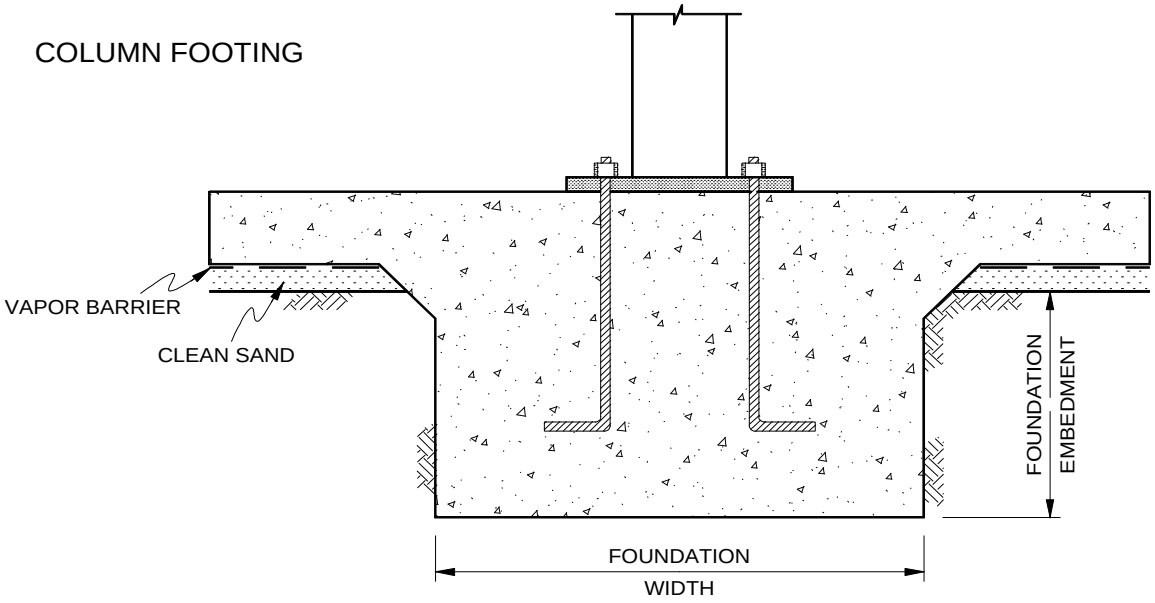
UCR BARN EXPANSION PROJECT
UNIVERSITY OF CALIFORNIA, RIVERSIDE
RIVERSIDE, CALIFORNIA

JANUARY, 2017	PROJECT NO. T2750-22-01	FIG. 3

WALL FOOTING



COLUMN FOOTING



NOTE: SEE REPORT FOR FOUNDATION WIDTH AND DEPTH RECOMMENDATION

NO SCALE

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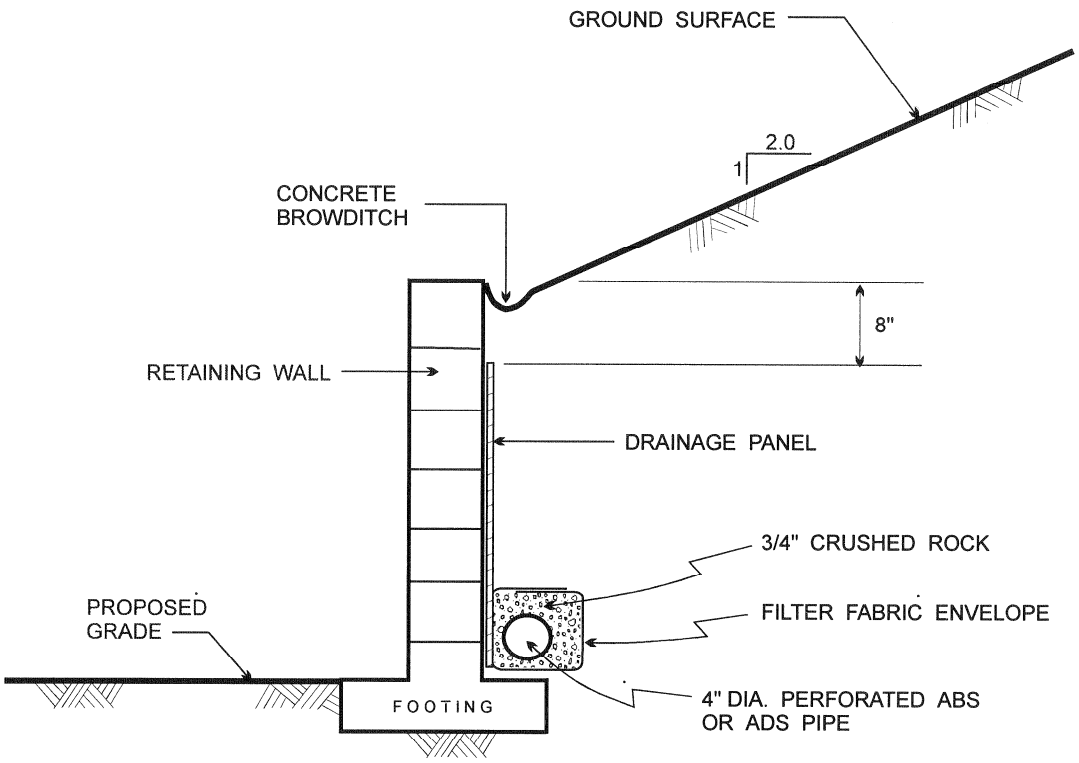
WALL / COLUMN FOOTING DETAIL

UCR BARN EXPANSION PROJECT
UNIVERSITY OF CALIFORNIA, RIVERSIDE
RIVERSIDE, CALIFORNIA

JANUARY, 2017	PROJECT NO. T2750-22-01	FIG. 4



NOTES:

1.....WALL DRAINAGE PANELS SHOULD CONSISTS OF MIRADRAIN 6000 OR EQUIVALENT

2.....FILTER FABRIC SHOULD CONSIST OF MIRAFI 140N OR APPROVED EQUIVALENT

3.....VOLUME OF CRUSHED ROCK SHOULD BE AT LEAST 1 CUBIC FOOT PER FOOT OF PIPE

4.....CONCRETE BROWDITCH RECOMMENDED FOR SLOPE HEIGHTS GREATER THAN 6 FEET

NO SCALE

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WALL DRAINAGE DETAIL

UCR BARN EXPANSION PROJECT
UNIVERSITY OF CALIFORNIA, RIVERSIDE
RIVERSIDE, CALIFORNIA

JANUARY, 2017	PROJECT NO. T2750-22-01	FIG. 5

APPENDIX A

APPENDIX A

EXPLORATORY EXCAVATIONS

We performed the field investigation on December 14, 2016. Our subsurface exploration consisted of excavating three hollow stem auger borings to maximum depths of 26.5 feet below existing grades. Representative disturbed and relatively undisturbed samples were obtained by driving a 3-inch O. D., California Modified Sampler into the "undisturbed" soil mass with blows from a 140-pound hammer falling 30 inches. The California Modified Sampler was equipped with 1-inch high by $2^{3}/_{8}$-inch diameter brass sampler rings to facilitate removal and testing. Bulk samples of disturbed soils were placed in plastic bags and sealed. We estimated elevations shown on the excavation logs based on available topographic information. We visually examined, classified, and logged the soil conditions encountered in the borings in general conformance with the ASTM International (ASTM) Practice for Description and Identification of Soils (Visual - Manual Procedure D2844). The borings were backfilled with cuttings and tamped upon completion. Borings in parking areas were capped with asphalt concrete patch. The approximate boring locations are shown on the *Boring Location Map*, Figure 2.

On the same date, six percolation test holes were hand augured to depths of 2 feet (Hand Pits 1 through 6). Soil conditions were visually examined, classified and logged per ASTM D2488, and bulk soil samples were collected. The test holes were then set for percolation testing with 2 inches of gravel and sleeved, perforated 3-inch diameter PVC pipe. Percolation test holes were partially backfilled with gravel to stabilize the pipes and were pre-saturated for percolation testing. Percolation testing was performed on December 15, 2016.

The logs of the exploratory borings and hand pits are presented on Figures A-1 through A-9 included herein. The logs depict the various soil types encountered and indicate the depths at which samples were obtained. Percolation test results are presented in Figures A-10 through A-15.

PROJECT NO. T2750-22-01

BORING B-1

ELEV. (MSL.) **1057** DATE COMPLETED **12/14/16**

EQUIPMENT **HOLLOW STEM AUGER** BY: **A. ORTON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0				SM	**ASPHALT CONCRETE** Depth = 3" (No Base)			
	B-1@1-5'				**UNDOCUMENTED ARTIFICIAL FILL (afu)** Silty SAND, very dense, slightly moist, brown; fine to coarse sand; few gravel			
2				SM				
	B-1@2.5'				**ALLUVIUM (Qofa)** Silty SAND, very dense, moist, reddish brown; fine to coarse sand	68/10"	111.2	6.8
4								
	B-1@5'				-Becomes dark yellowish brown	50/4"	111.7	6.7
6	B-1@5-7'							
	B-1@7.5'				-Increase in coarse sand	50/3"		
8								
10	B-1@10'					50/5"	117.9	7.5
12					-Becomes brown			
14								
	B-1@15'				-Large gravel in sampler	50/6"		
16								
18					-Slow advance			
20	B-1@20'				-Becomes reddish yellow	50/4"	124.2	10.0
					Total depth 20' 10" Groundwater not encountered Penetration resistance for 140 lb. hammer falling 30" by auto-hammer Backfilled with cuttings 12/14/2016; capped with asphalt patch			

Figure A-1,
Log of Boring B-1, Page 1 of 1

T2750-22-01 UCR BARN EXPANSION.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2750-22-01

BORING B-2

ELEV. (MSL.) **1060** DATE COMPLETED **12/14/16**

EQUIPMENT **HOLLOW STEM AUGER** BY: **A. ORTON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0					**ASPHALT CONCRETE** Depth = 5" (No Base)			
	B-2@1-5'			SM	**UNDOCUMENTED ARTIFICIAL FILL (afu)** Silty SAND, medium dense, moist, brown; fine to medium sand; trace coarse sand			
2	B-2@2.5'			SM	**ALLUVIUM (Qofa)** Silty SAND, medium dense, moist, brown; fine to medium sand; trace coarse sand; slightly porous	21	105.2	8.1
4	B-2@5'				-Becomes slightly moist; increase in coarse sand; trace gravel	21	105.8	4.4
6	B-2@7.5'				-Becomes loose; fine to coarse sand; trace micaceous	15	105.3	2.2
8	B-2@10'				-Increase in gravel; less cohesive	16	107.9	3.4
10	B-2@15'				-Becomes medium dense	39	105.3	3.3
12	B-2@20'				-Becomes moist; decrease in coarse sand and gravel; more cohesive	47	114.2	10.3
14				SP	Poorly Graded SAND, medium dense, slightly moist, light brown; fine to coarse sand; trace gravel			
16					Total depth 21' 6" Groundwater not encountered Penetration resistance for 140 lb. hammer falling 30" by auto-hammer Backfilled with cuttings 12/14/2016; capped with asphalt patch			
18								
20								

Figure A-2,
Log of Boring B-2, Page 1 of 1

T2750-22-01 UCR BARN EXPANSION.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2750-22-01

BORING B-3

ELEV. (MSL.) **1058** DATE COMPLETED **12/14/16**

EQUIPMENT **HOLLOW STEM AUGER** BY: **A. ORTON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0	B-3@0-5'			SM	**UNDOCUMENTED ARTIFICIAL FILL (afu)** Silty SAND, medium dense, slightly moist, brown; fine to medium sand; trace coarse sand; large (1"- 2") gravel at surface			
2	B-3@2.5'			SM	**ALLUVIUM (Qofa)** Silty SAND, medium dense, slightly moist, reddish brown; fine to medium sand; trace coarse sand; trace roots; trace porosity	26	103.7	4.1
4	B-3@5'				-Becomes moist	24	95.0	6.8
6	B-3@7.5'				-Becomes slightly moist; increase in coarse sand; non-cohesive	40	102.2	4.2
8	B-3@10'				-Becomes fine to coarse sand	24	104.3	2.5
10	B-3@12-15'							
12	B-3@15'			SP	Poorly Graded SAND, medium dense, slightly moist, grayish brown; fine to coarse sand	42	113.5	1.9
14	B-3@20'				-Trace gravel	42		
16	B-3@25'				-Becomes dense	60	108.4	2.1
18					Total depth 26' 6" Groundwater not encountered Penetration resistance for 140 lb. hammer falling 30" by auto-hammer Backfilled with cuttings 12/14/2016; capped with asphalt patch			
20								
22								
24								
26								

Figure A-3,
Log of Boring B-3, Page 1 of 1

T2750-22-01 UCR BARN EXPANSION.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2750-22-01

HAND PIT P-1

ELEV. (MSL.) **1059** DATE COMPLETED **12/14/16**

EQUIPMENT **HAND AUGER** BY: **A. ORTON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
	P-1@1-2'			SM	**UNDOCUMENTED ARTIFICIAL FILL (afu)** Silty SAND, medium dense, moist, brown; fine to coarse sand; roots			
2					Total depth 2' Groundwater not encountered Set for percolation testing 12/14/2016 Backfilled with cuttings 12/15/2016			

Figure A-4,
Log of Hand Pit P-1, Page 1 of 1

T2750-22-01 UCR BARN EXPANSION.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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PROJECT NO. T2750-22-01

HAND PIT P-2

ELEV. (MSL.) **1060** DATE COMPLETED **12/14/16**

EQUIPMENT **HAND AUGER** BY: **A. ORTON**

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	MATERIAL DESCRIPTION	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
0								
	P-2@1-2'			SM	**UNDOCUMENTED ARTIFICIAL FILL (afu)** Silty SAND, medium dense, slightly moist, brown; fine to coarse sand; trace gravel; roots			
2					Total depth 2' Groundwater not encountered Set for percolation testing 12/14/2016 Backfilled with cuttings 12/15/2016			

Figure A-5,
Log of Hand Pit P-2, Page 1 of 1

T2750-22-01 UCR BARN EXPANSION.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2750-22-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**HAND PIT P-3** ELEV. (MSL.) **1059** DATE COMPLETED **12/14/16** EQUIPMENT **HAND AUGER** BY: **A. ORTON**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED ARTIFICIAL FILL (afu)** Silty SAND, medium dense, moist, brown; fine to coarse sand; trace roots			
	P-3@1-2'							
2					Total depth 2' Groundwater not encountered Set for percolation testing 12/14/2016 Backfilled with cuttings 12/15/2016			

Figure A-6,
Log of Hand Pit P-3, Page 1 of 1

T2750-22-01 UCR BARN EXPANSION.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2750-22-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**HAND PIT P-4** ELEV. (MSL.) **1056** DATE COMPLETED **12/14/16** EQUIPMENT **HAND AUGER** BY: **A. ORTON**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0	P-4@1-2'			SM	**UNDOCUMENTED ARTIFICIAL FILL (afu)** Silty SAND, medium dense, moist, brown; fine to coarse sand; trace roots			
2					Total depth 2' Groundwater not encountered Set for percolation testing 12/14/2016 Backfilled with cuttings 12/15/2016			

Figure A-7,
Log of Hand Pit P-4, Page 1 of 1

T2750-22-01 UCR BARN EXPANSION.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PROJECT NO. T2750-22-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**HAND PIT P-5** ELEV. (MSL.) **1053** DATE COMPLETED **12/14/16** EQUIPMENT **HAND AUGER** BY: **A. ORTON**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED ARTIFICIAL FILL (afu)**			
	P-5@1-2'				Silty SAND, medium dense, moist, dark brown; fine to coarse sand; trace gravel; trace roots			
2					Total depth 2' Groundwater not encountered Set for percolation testing 12/14/2016 Backfilled with cuttings 12/15/2016			

Figure A-8,
Log of Hand Pit P-5, Page 1 of 1

T2750-22-01 UCR BARN EXPANSION.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◪ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

GEOCON

PROJECT NO. T2750-22-01

DEPTH IN FEET	SAMPLE NO.	LITHOLOGY	GROUNDWATER	SOIL CLASS (USCS)	**HAND PIT P-6** ELEV. (MSL.) **1053** DATE COMPLETED **12/14/16** EQUIPMENT **HAND AUGER** BY: **A. ORTON**	PENETRATION RESISTANCE (BLOWS/FT.)	DRY DENSITY (P.C.F.)	MOISTURE CONTENT (%)
					MATERIAL DESCRIPTION			
0				SM	**UNDOCUMENTED ARTIFICIAL FILL (afu)** Silty SAND, medium dense, moist, brown; fine to coarse sand; roots			
	P-6@1-2'							
2					Total depth 2' Groundwater not encountered Set for percolation testing 12/14/2016 Backfilled with cuttings 12/15/2016			

Figure A-9,
Log of Hand Pit P-6, Page 1 of 1

T2750-22-01 UCR BARN EXPANSION.GPJ

SAMPLE SYMBOLS

- ☐ ... SAMPLING UNSUCCESSFUL
- ◧ ... STANDARD PENETRATION TEST
- ■ ... DRIVE SAMPLE (UNDISTURBED)
- ⊠ ... DISTURBED OR BAG SAMPLE
- ◥ ... CHUNK SAMPLE
- ▼ ... WATER TABLE OR SEEPAGE

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GEOCON

PERCOLATION TEST REPORT

Project Name:		UCR Barn Expansion			**Project No.:**		T2750-22-01
Test Hole No.:		P-1			**Date Excavated:**		12/14/2016
Length of Test Pipe:			22.5	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			0.0	inches	**Presoak Date:**		12/14/2016
Depth of Test Hole:			24.0	inches	**Perc Test Date:**		12/15/2016
Check for Sandy Soil Criteria Tested by:				KBP	**Percolation Tested by:**		KBP
Water level measured from top of hole							

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Level (in)	Final Water Level (in)	Δ in Water Level (inches)	Percolation Rate (min/inch)
1	7:40 AM 8:05 AM	25	25	10.5	12.3	1.8	14
2	8:05 AM 8:30 AM	25	50	12.3	14.0	1.8	14
			Soil Criteria: Normal				

Percolation Test

Reading No.	Time	Time Interval (min)	Total Elapsed Time (min)	Initial Water Head (in)	Final Water Head (in)	Δ in Water Level (inches)	Percolation Rate (min/inch)
1	8:30 AM 9:00 AM	30	30	14.0	16.0	2.0	15
2	9:00 AM 9:30 AM	30	60	16.0	17.0	1.0	30
3	9:30 AM 10:00 AM	30	90	17.0	19.5	2.5	12
4	10:00 AM 10:30 AM	30	120	17.0	18.3	1.3	24
5	10:30 AM 11:00 AM	30	150	16.5	17.5	1.0	30
6	11:00 AM 11:30 AM	30	180	16.3	17.5	1.3	24
7	11:30 AM 12:00 PM	30	210	16.0	17.0	1.0	30
8	12:00 PM 12:30 PM	30	240	17.0	18.3	1.3	24
9	12:30 PM 1:00 PM	30	270	16.0	17.3	1.3	24
10	1:00 PM 1:30 PM	30	300	17.3	18.5	1.3	24
11	1:30 PM 2:00 PM	30	330	16.8	17.8	1.0	30
12	2:00 PM 2:30 PM	30	360	15.8	17.0	1.3	24

Infiltration Rate (in/hr):			0.26				
Radius of test hole (in):			4				**Figure A-10**
Average Head (in):			16.9				

PERCOLATION TEST REPORT							
Project Name:		UCR Barn Expansion			**Project No.:**		T2750-22-01
Test Hole No.:		P-2			**Date Excavated:**		12/14/2016
Length of Test Pipe:			23.0	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			0.0	inches	**Presoak Date:**		12/14/2016
Depth of Test Hole:			24.0	inches	**Perc Test Date:**		12/15/2016
Check for Sandy Soil Criteria Tested by:				KBP	**Percolation Tested by:**		AMO
Water level measured from top of hole							
Sandy Soil Criteria Test							
Trial No.	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
		Interval	**Elapsed**	**Level**	**Level**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(inches)**	**(min/inch)**
1	7:45 AM 8:10 AM	25	25	11.5	12.3	0.8	33
2	8:10 AM 8:35 AM	25	50	12.3	13.0	0.8	33
			Soil Criteria: Normal				
			Percolation Test				
Reading	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
No.		**Interval**	**Elapsed**	**Level**	**Level**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(inches)**	**(min/inch)**
1	8:35 AM 9:05 AM	30	30	13.0	14.0	1.0	30
2	9:05 AM 9:35 AM	30	60	14.0	14.5	0.5	60
3	9:35 AM 10:05 AM	30	90	14.5	15.3	0.8	40
4	10:05 AM 10:35 AM	30	120	15.3	15.8	0.5	60
5	10:35 AM 11:05 AM	30	150	15.8	16.3	0.5	60
6	11:05 AM 11:35 AM	30	180	16.3	16.8	0.5	60
7	11:35 AM 12:05 PM	30	210	16.8	17.5	0.8	40
8	12:05 PM 12:35 PM	30	240	17.5	18.8	1.3	24
9	12:35 PM 1:05 PM	30	270	16.5	17.3	0.8	40
10	1:05 PM 1:35 PM	30	300	17.3	18.0	0.8	40
11	1:35 PM 2:05 PM	30	330	18.0	19.5	1.5	20
12	2:05 PM 2:35 PM	30	360	16.8	17.5	0.8	40
Infiltration Rate (in/hr):			0.17				
Radius of test hole (in):			4.5				**Figure A-11**
Average Head (in):			17.1				

PERCOLATION TEST REPORT							
Project Name:		UCR Barn Expansion			**Project No.:**		T2750-22-01
Test Hole No.:		P-3			**Date Excavated:**		12/14/2016
Length of Test Pipe:			23.0	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			0.0	inches	**Presoak Date:**		12/14/2016
Depth of Test Hole:			24.0	inches	**Perc Test Date:**		12/15/2016
Check for Sandy Soil Criteria Tested by:				CER	**Percolation Tested by:**		CER
Water level measured from top of hole							
Sandy Soil Criteria Test							
Trial No.	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
		Interval	**Elapsed**	**Level**	**Level**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(inches)**	**(min/inch)**
1	7:50 AM 7:51 AM	1	1	0	23	23	0.043
2	8:15 AM 8:16 AM	1	2	0	23	23	0.043
			Soil Criteria: Sandy				
			Percolation Test				
Reading	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
No.		**Interval**	**Elapsed**	**Head**	**Head**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(inches)**	**(min/inch)**
1	8:40 AM 8:40 AM	0.75	0.75	0	23	23	0.033
2	8:54 AM 8:54 AM	0.75	1.5	0	23	23	0.033
3	9:04 AM 9:04 AM	0.75	2.25	0	23	23	0.033
Infiltration Rate (in/hr):			273				
Radius of test hole (in):			4				**Figure A-12**
Average Head (in):			11.5				

PERCOLATION TEST REPORT							
Project Name:		UCR Barn Expansion			**Project No.:**		T2750-22-01
Test Hole No.:		P-4			**Date Excavated:**		12/14/2016
Length of Test Pipe:			22.5	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			0.0	inches	**Presoak Date:**		12/14/2016
Depth of Test Hole:			24.0	inches	**Perc Test Date:**		12/15/2016
Check for Sandy Soil Criteria Tested by:				KBP	**Percolation Tested by:**		AMO
Water level measured from top of hole							
Sandy Soil Criteria Test							
Trial No.	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
		Interval	**Elapsed**	**Level**	**Level**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(inches)**	**(min/inch)**
1	7:53 AM 8:18 AM	25	25	9.5	19.0	9.5	2.6
2	8:18 AM 8:43 AM	25	50	10.5	18.5	8.0	3.1
			Soil Criteria: Normal				
			Percolation Test				
Reading	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
No.		**Interval**	**Elapsed**	**Level**	**Level**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(inches)**	**(min/inch)**
1	8:43 AM 9:13 AM	30	30	10.5	18.3	7.8	3.9
2	9:13 AM 9:43 AM	30	60	10.3	17.3	7.0	4.3
3	9:43 AM 10:13 AM	30	90	9.5	17.0	7.5	4.0
4	10:13 AM 10:43 AM	30	120	10.8	17.8	7.0	4.3
5	10:43 AM 11:13 AM	30	150	10.5	17.0	6.5	4.6
6	11:13 AM 11:43 AM	30	180	10.8	17.5	6.8	4.4
7	11:43 AM 12:13 PM	30	210	11.0	17.0	6.0	5.0
8	12:13 PM 12:43 PM	30	240	10.3	16.3	6.0	5.0
9	12:43 PM 1:13 PM	30	270	10.0	15.8	5.8	5.2
10	1:13 PM 1:43 PM	30	300	10.3	16.3	6.0	5.0
11	1:43 PM 2:13 PM	30	330	10.3	15.8	5.5	5.5
12	2:13 PM 2:43 PM	30	360	10.8	15.8	5.0	6.0
Infiltration Rate (in/hr):			1.3				
Radius of test hole (in):			4				**Figure A-13**
Average Head (in):			13.3				

PERCOLATION TEST REPORT							
Project Name:		UCR Barn Expansion			**Project No.:**		T2750-22-01
Test Hole No.:		P-5			**Date Excavated:**		12/14/2016
Length of Test Pipe:			22.5	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			0.0	inches	**Presoak Date:**		12/14/2016
Depth of Test Hole:			24.0	inches	**Perc Test Date:**		12/15/2016
Check for Sandy Soil Criteria Tested by:				KBP	**Percolation Tested by:**		AMO
Water level measured from top of hole							
Sandy Soil Criteria Test							
Trial No.	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
		Interval	**Elapsed**	**Level**	**Level**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(inches)**	**(min/inch)**
1	7:55 AM 8:20 AM	25	25	10.0	15.5	5.5	4.5
2	8:20 AM 8:45 AM	25	50	10.8	15.8	5.0	5.0
			Soil Criteria: Normal				
			Percolation Test				
Reading	**Time**	**Time**	**Total**	**Initial Water**	**Final Water**	**Δ in Water**	**Percolation**
No.		**Interval**	**Elapsed**	**Level**	**Level**	**Level**	**Rate**
		(min)	**Time (min)**	**(in)**	**(in)**	**(inches)**	**(min/inch)**
1	8:45 AM 9:15 AM	30	30	15.8	20.3	4.5	6.7
2	9:15 AM 9:45 AM	30	60	15.5	18.8	3.3	9.2
3	9:45 AM 10:15 AM	30	90	15.0	18.5	3.5	8.6
4	10:15 AM 10:45 AM	30	120	16.0	19.3	3.3	9.2
5	10:45 AM 11:15 AM	30	150	15.5	18.8	3.3	9.2
6	11:15 AM 11:45 AM	30	180	16.5	19.5	3.0	10.0
7	11:45 AM 12:15 PM	30	210	14.8	17.5	2.8	10.9
8	12:15 PM 12:45 PM	30	240	17.5	20.0	2.5	12.0
9	12:45 PM 1:15 PM	30	270	15.8	18.5	2.8	10.9
10	1:15 PM 1:45 PM	30	300	16.0	19.0	3.0	10.0
11	1:45 PM 2:15 PM	30	330	15.8	18.3	2.5	12.0
12	2:15 PM 2:45 PM	30	360	16.0	19.0	3.0	10.0
Infiltration Rate (in/hr):			0.62				
Radius of test hole (in):			4				**Figure A-14**
Average Head (in):			17.5				

PERCOLATION TEST REPORT							
Project Name:		UCR Barn Expansion			**Project No.:**		T2750-22-01
Test Hole No.:		P-6			**Date Excavated:**		12/14/2016
Length of Test Pipe:			23.5	inches	**Soil Classification:**		SM
Height of Pipe above Ground:			0.0	inches	**Presoak Date:**		12/14/2016
Depth of Test Hole:			24.0	inches	**Perc Test Date:**		12/15/2016
Check for Sandy Soil Criteria Tested by:				KBP	**Percolation Tested by:**		AMO
Water level measured from top of hole							
Sandy Soil Criteria Test							
Trial No.	**Time**	**Time Interval (min)**	**Total Elapsed Time (min)**	**Initial Water Level (in)**	**Final Water Level (in)**	**Δ in Water Level (inches)**	**Percolation Rate (min/inch)**
1	7:58 AM 8:23 AM	25	25	11.5	13.8	2.3	11
2	8:23 AM 8:48 AM	25	50	13.8	15.8	2.0	13
			Soil Criteria: Normal				
			Percolation Test				
Reading No.	**Time**	**Time Interval (min)**	**Total Elapsed Time (min)**	**Initial Water Level (in)**	**Final Water Level (in)**	**Δ in Water Level (inches)**	**Percolation Rate (min/inch)**
1	8:48 AM 9:18 AM	30	30	15.8	17.0	1.3	24
2	9:18 AM 9:48 AM	30	60	17.0	18.5	1.5	20
3	9:48 AM 10:18 AM	30	90	15.0	16.5	1.5	20
4	10:18 AM 10:48 AM	30	120	16.5	18.3	1.8	17
5	10:48 AM 11:18 AM	30	150	16.3	17.8	1.5	20
6	11:18 AM 11:48 AM	30	180	17.8	19.3	1.5	20
7	11:48 AM 12:18 PM	30	210	13.5	14.8	1.3	24
8	12:18 PM 12:48 PM	30	240	14.8	16.3	1.5	20
9	12:48 PM 1:18 PM	30	270	14.0	15.3	1.3	24
10	1:18 PM 1:48 PM	30	300	15.3	16.8	1.5	20
11	1:48 PM 2:18 PM	30	330	16.8	18.5	1.8	17
12	2:18 PM 2:48 PM	30	360	18.5	19.8	1.3	24
Infiltration Rate (in/hr):			0.18				
Radius of test hole (in):			3				**Figure A-15**
Average Head (in):			19.1				

APPENDIX B

APPENDIX B

LABORATORY TESTING

Laboratory tests were performed in general accordance with test methods of ASTM International (ASTM), California test (CT) methods or other suggested procedures. Selected samples were tested for in-place moisture and density, gradation, consolidation, direct shear strength, expansion characteristics, moisture density relationships, and corrosivity. The results of the laboratory tests are summarized in Figures B-1 through B-13. The in-place dry density and moisture content of the samples tested are presented in the boring logs, Appendix A.

SUMMARY OF LABORATORY MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST RESULTS ASTM D1557

Sample No.	Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% of dry wt.)
B-3 @ 0-5’	Silty SAND (SM), brown to reddish brown	136.0	6.5

SUMMARY OF LABORATORY EXPANSION INDEX TEST RESULTS ASTM D4829

Sample No.	Moisture Content		After Test Dry Density (pcf)	Expansion Index
	Before Test (%)	After Test (%)		
B-2 @ 1-5’	7.2	11.5	121.5	1
B-3 @ 0-5’	7.0	11.5	121.8	4

SUMMARY OF CORROSIVITY TEST RESULTS

Sample No.	Chloride Content (ppm)	Sulfate Content (%)	pH	Resistivity (ohm-centimeter)
B-2 @ 1-5’	120	0.035	7.3	1,400

Chloride content determined by California Test 422.
Water-soluble sulfate determined by California Test 417.
Resistivity and pH determined by Caltrans Test 643.

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LABORATORY TEST RESULTS

UCR BARN EXPANSION PROJECT
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JANUARY, 2017	PROJECT NO. T2750-22-01	FIG B-1

SUMMARY OF PERCENT COLLAPSE DURING ONE-DIMENSIONAL CONSOLIDATION TESTS ASTM D2435

Sample No.	In-situ Dry Density (pcf)	Moisture Content Before Test (%)	Final Moisture Content (%)	Axial Load with Water Added (psf)	Percent Collapse
B-2 @ 5’	105.8	4.4	16.5	2,000	2.5
B-2 @ 7.5’	105.3	2.2	15.8	2,000	0.7
B-2 @ 10’	107.9	3.4	14.2	2,000	1.5
B-2 @ 15’	105.3	3.3	15.7	2,000	1.3
B-3 @ 2.5’	103.7	4.1	14.0	2,000	5.3
B-3 @ 5’	95.0	6.8	17.7	2,000	6.2
B-3 @ 7.5’	102.2	4.2	18.6	2,000	1.6
B-3 @ 10’	104.3	2.5	15.2	2,000	0.9

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LABORATORY TEST RESULTS

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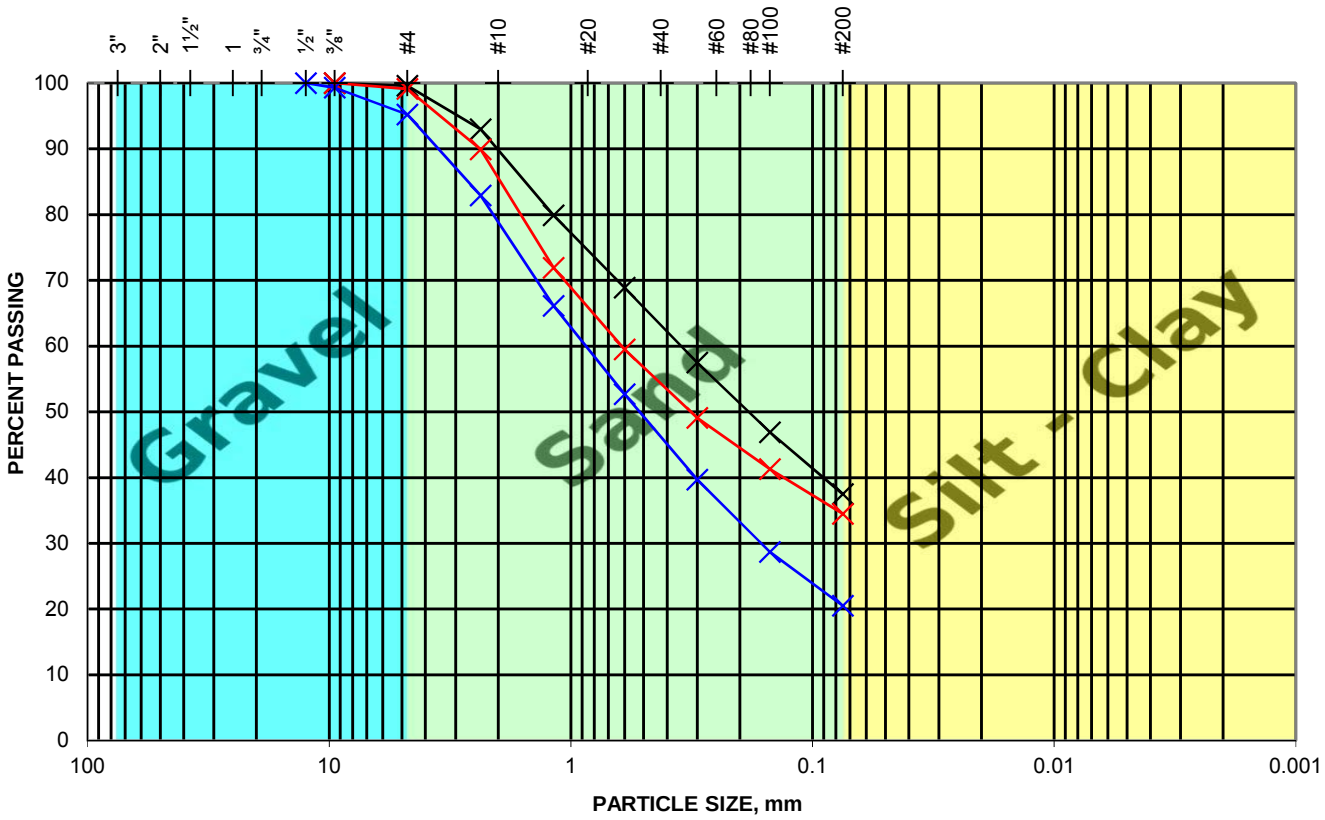
JANUARY, 2017 | PROJECT NO. T2750-22-01 | FIG B-2



SAMPLE ID	SAMPLE DESCRIPTION
P-1 @ 1-2'	SM - Silty SAND
P-3 @ 1-2'	SM - Silty SAND
P-5 @ 1-2'	SM - Silty SAND

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GRAIN SIZE DISTRIBUTION

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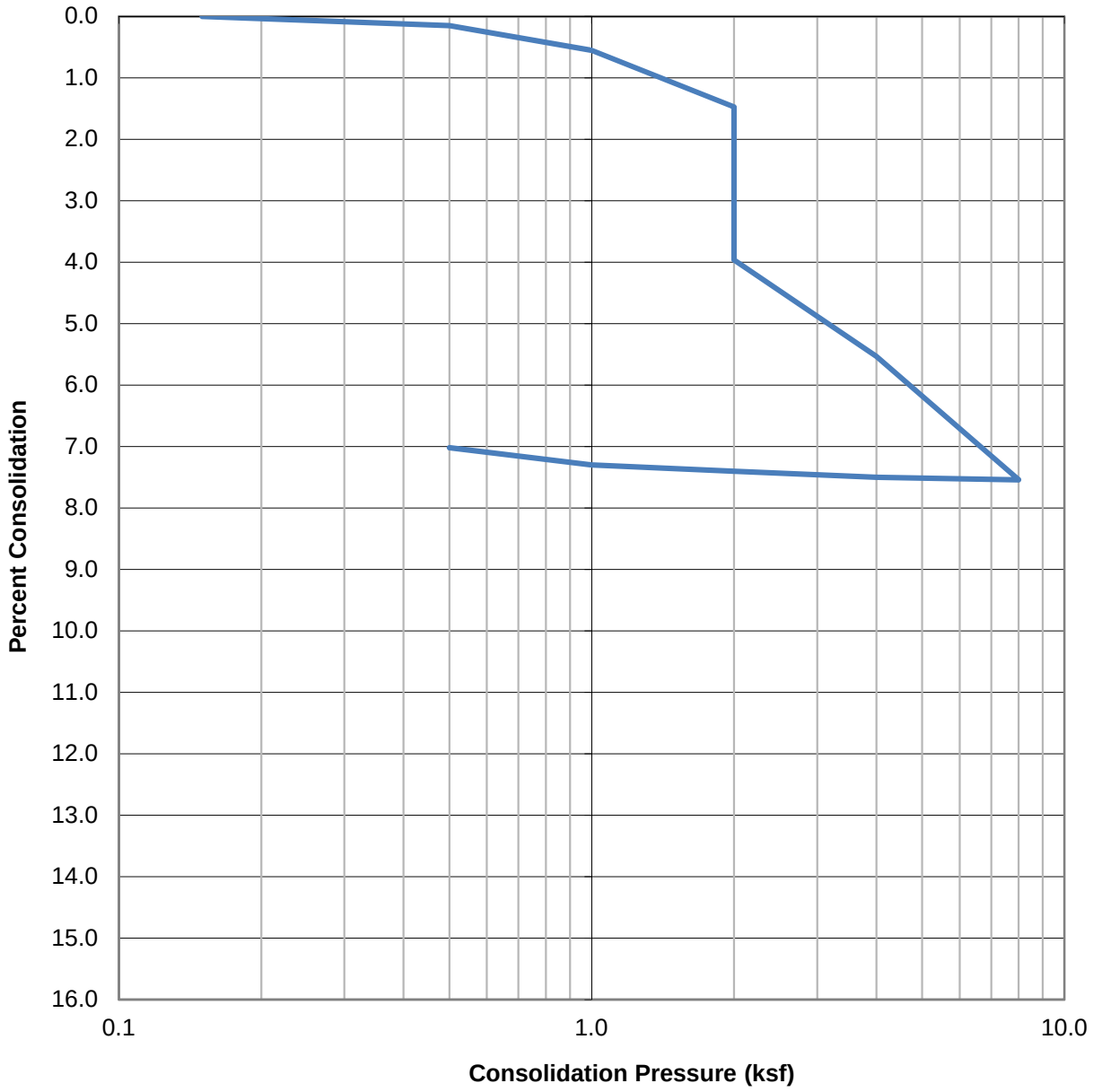
JANUARY, 2017	PROJECT NO. T2750-22-01	FIG B-3

WATER ADDED AT 2.0 KSF



SAMPLE ID	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-2 @ 5'	SM	105.8	4.4	16.5

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CONSOLIDATION TEST RESULTS

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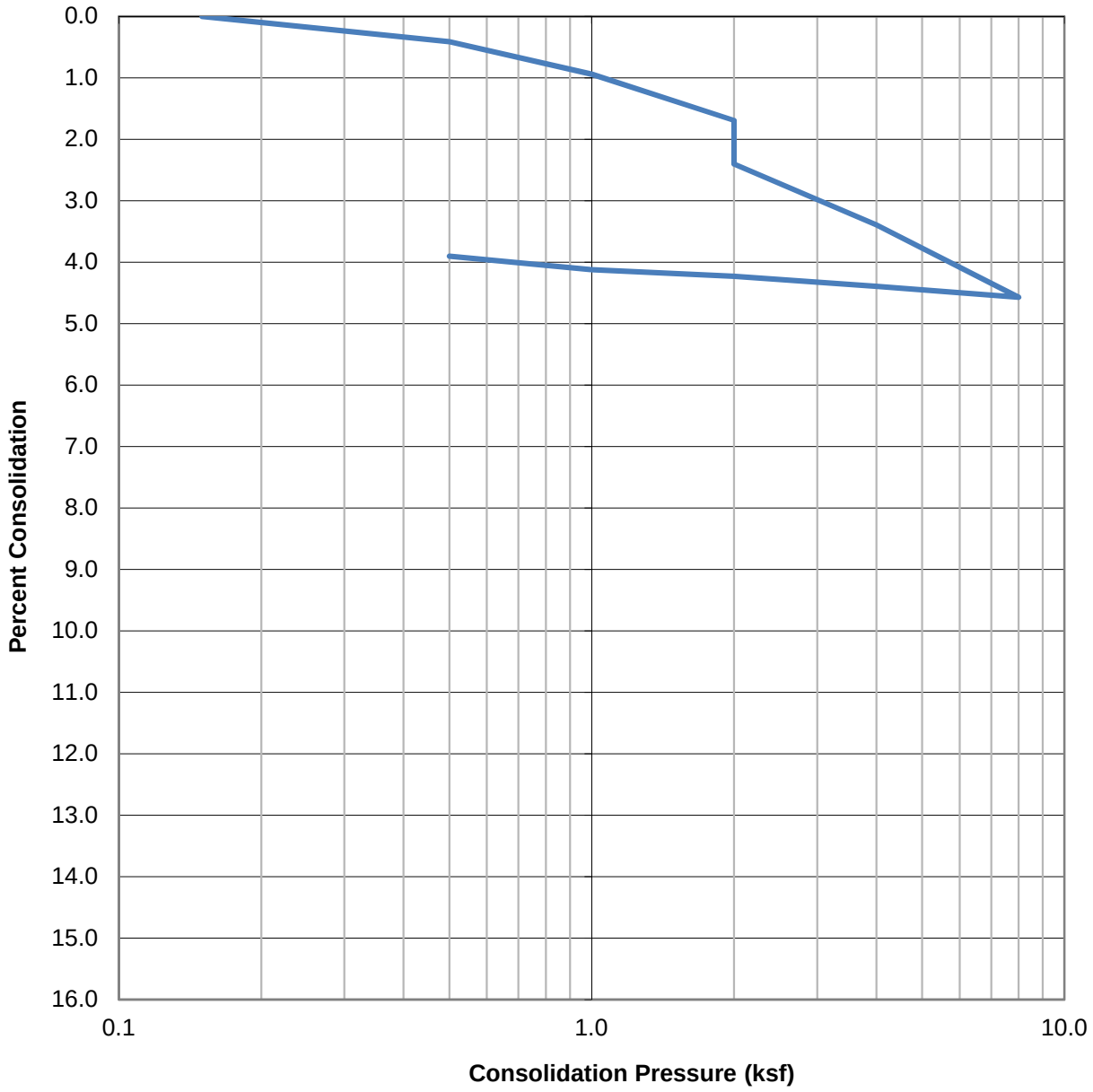
JANUARY, 2017 | PROJECT NO. T2750-22-01 | FIG B-4

WATER ADDED AT 2.0 KSF



SAMPLE ID	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-2 @ 7.5'	SM	105.3	2.2	15.8

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CONSOLIDATION TEST RESULTS

UCR BARN EXPANSION PROJECT
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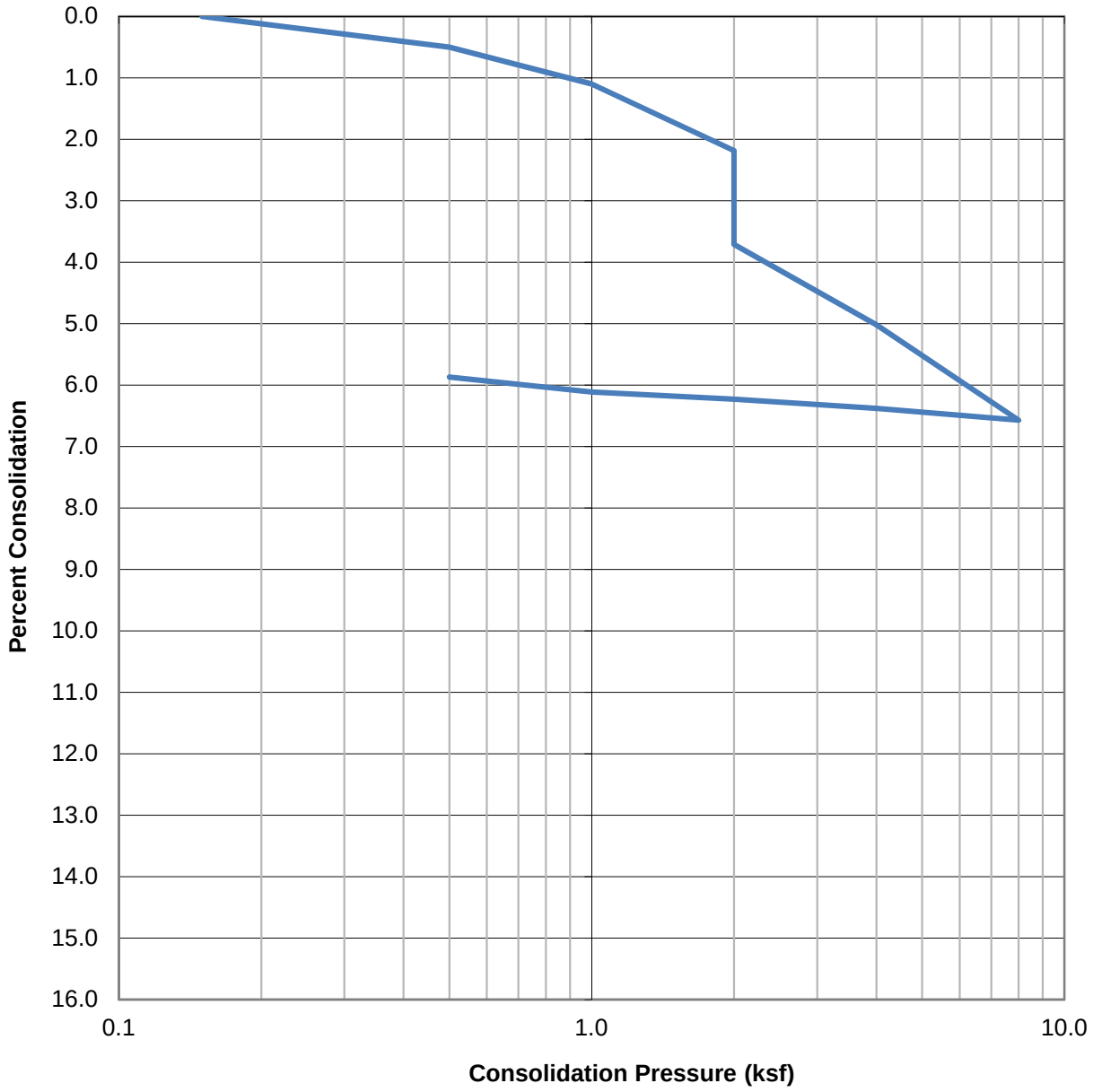
JANUARY, 2017 | PROJECT NO. T2750-22-01 | FIG B-5

WATER ADDED AT 2.0 KSF



SAMPLE ID	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-2 @ 10'	SM	107.9	3.4	14.2

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CONSOLIDATION TEST RESULTS

UCR BARN EXPANSION PROJECT
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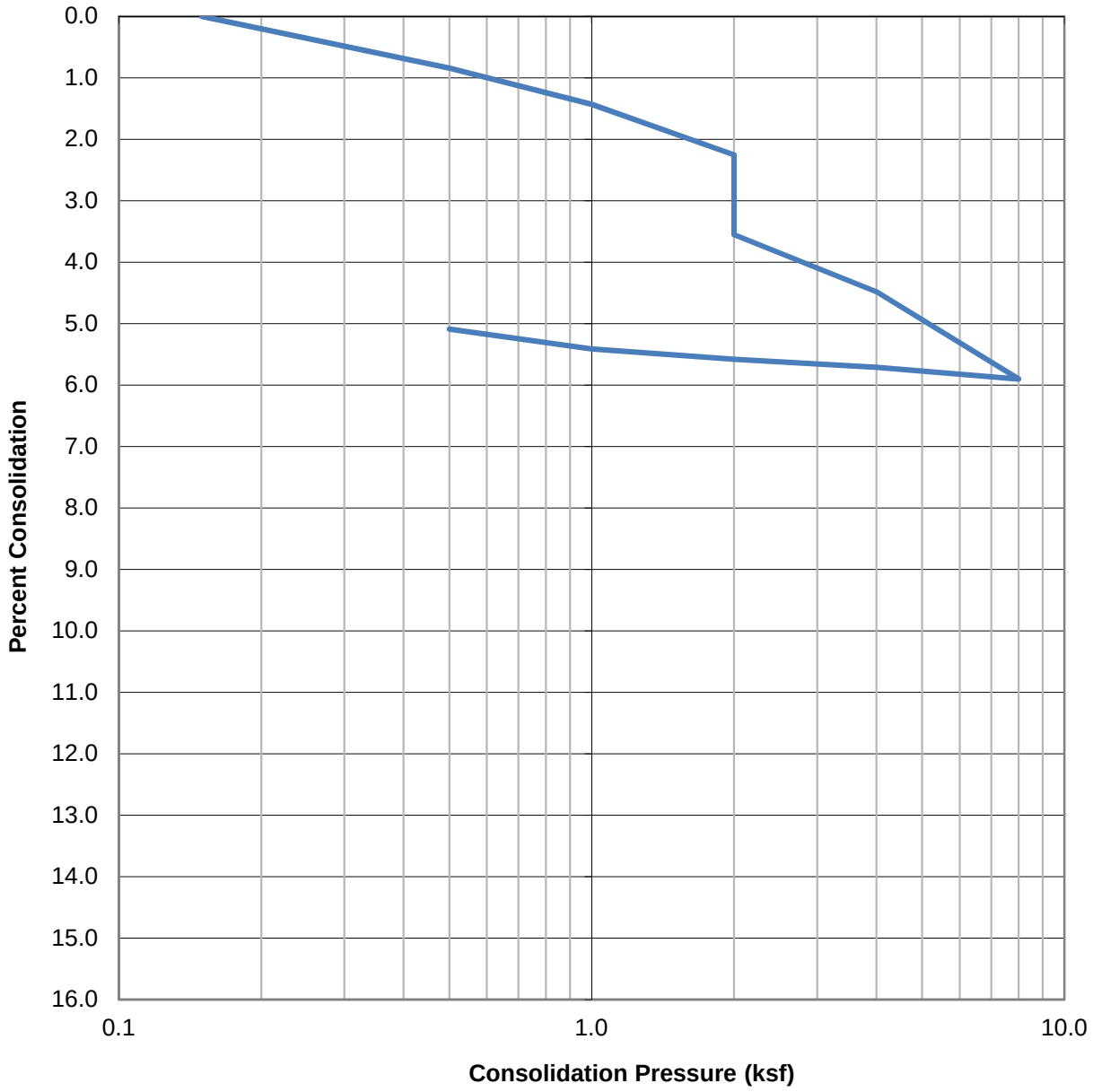
JANUARY, 2017	PROJECT NO. T2750-22-01	FIG B-6

WATER ADDED AT 2.0 KSF



SAMPLE ID	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-2 @ 15'	SM	105.3	3.3	15.7

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CONSOLIDATION TEST RESULTS

UCR BARN EXPANSION PROJECT
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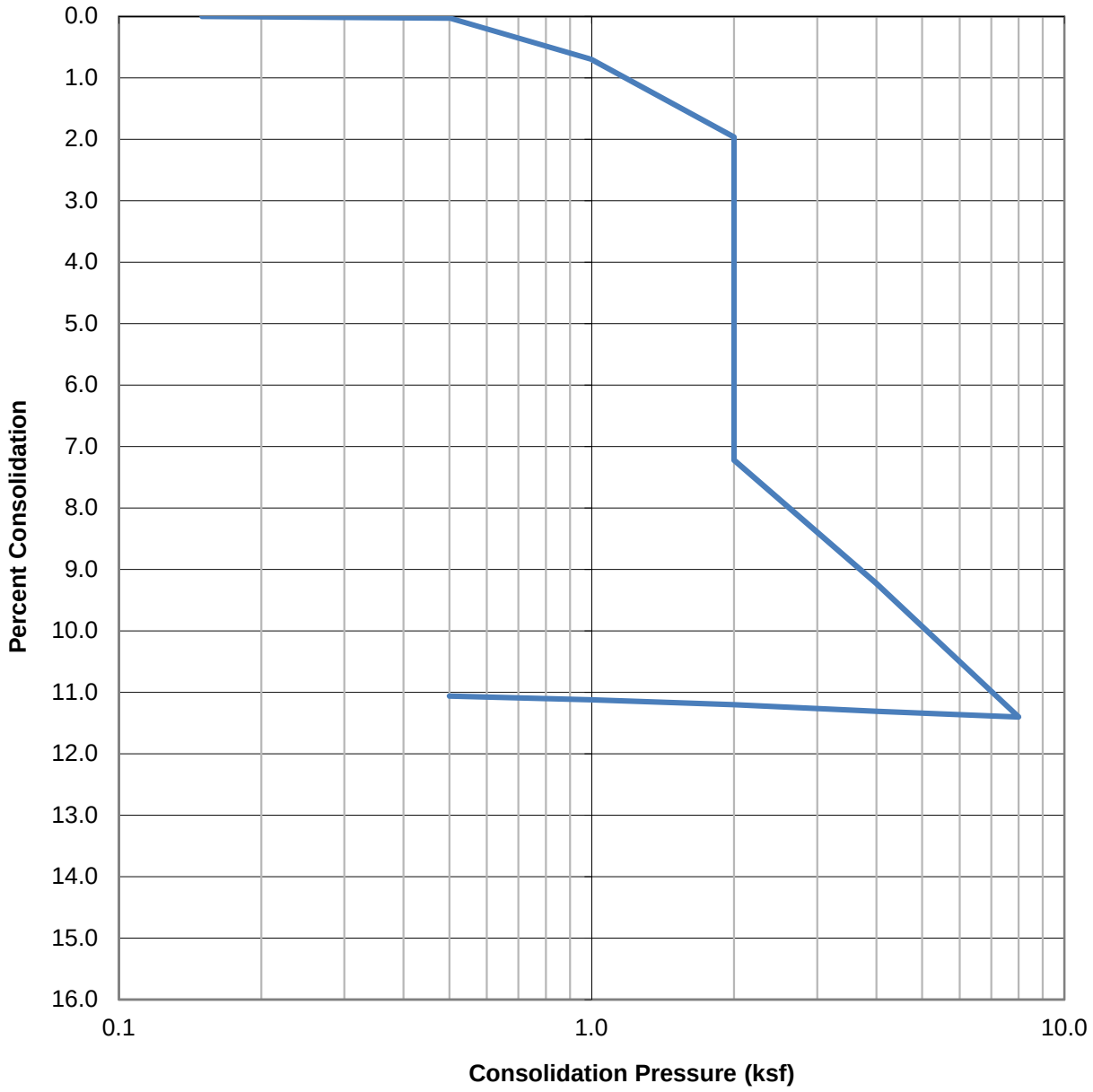
JANUARY, 2017 | PROJECT NO. T2750-22-01 | FIG B-7

WATER ADDED AT 2.0 KSF



SAMPLE ID	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-3 @ 2.5'	SM	103.7	4.1	14.0

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CONSOLIDATION TEST RESULTS

UCR BARN EXPANSION PROJECT
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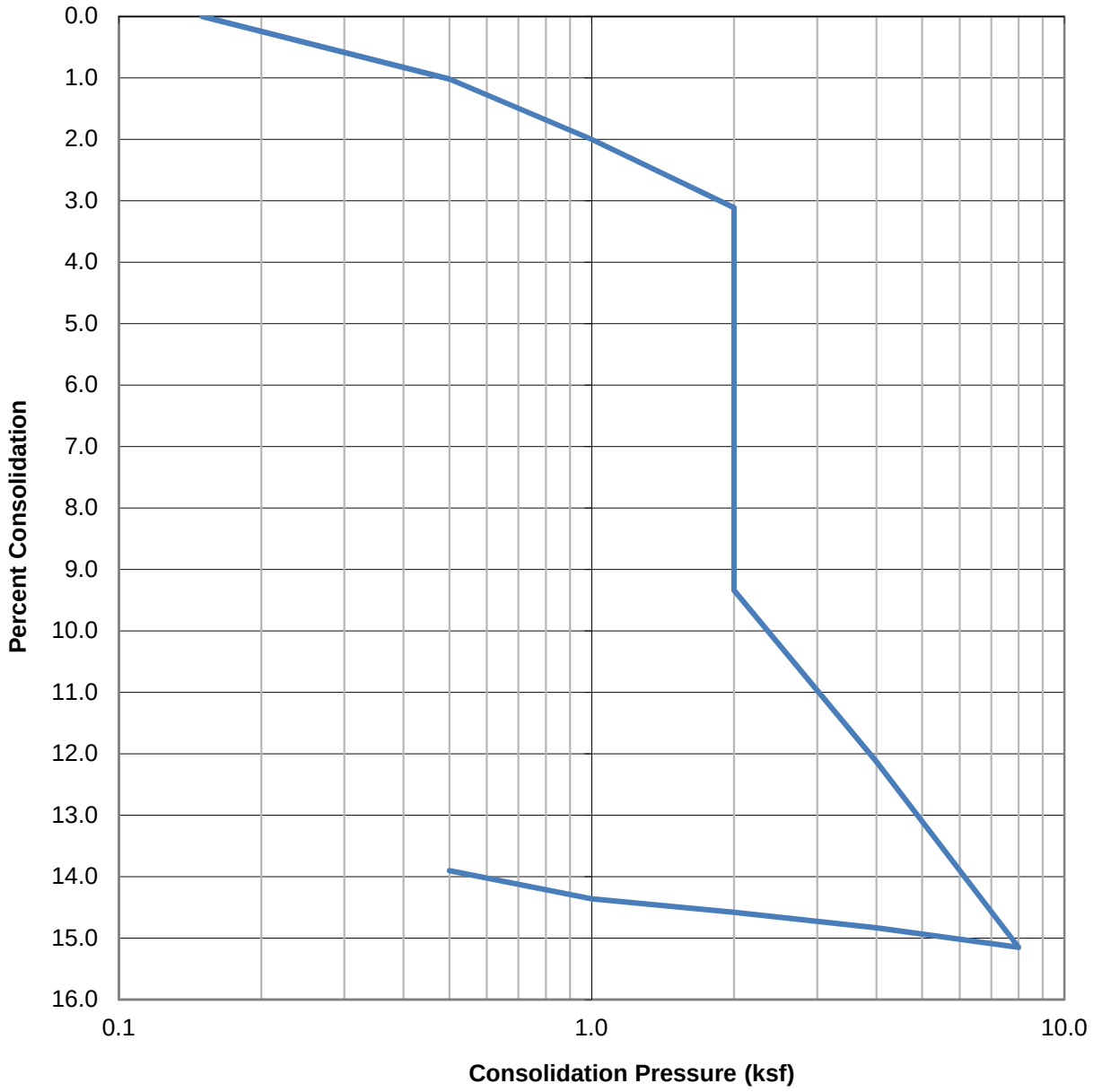
JANUARY, 2017	PROJECT NO. T2750-22-01	FIG B-8

WATER ADDED AT 2.0 KSF



SAMPLE ID	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-3 @ 5'	SM	95.0	6.8	17.7

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CONSOLIDATION TEST RESULTS

UCR BARN EXPANSION PROJECT
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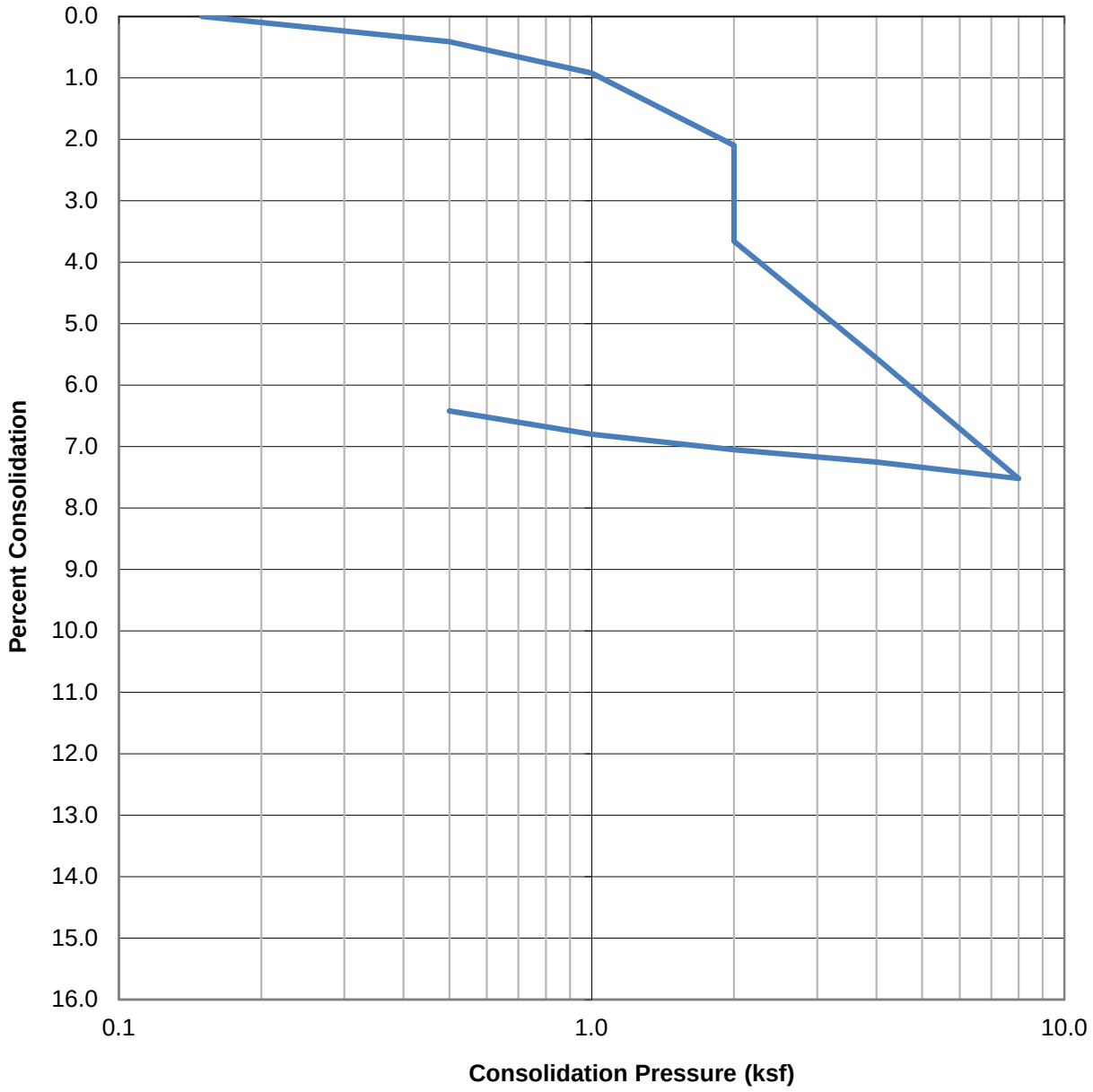
JANUARY, 2017	PROJECT NO. T2750-22-01	FIG B-9

WATER ADDED AT 2.0 KSF



SAMPLE ID	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-3 @ 7.5'	SM	102.2	4.2	18.6

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CONSOLIDATION TEST RESULTS

UCR BARN EXPANSION PROJECT
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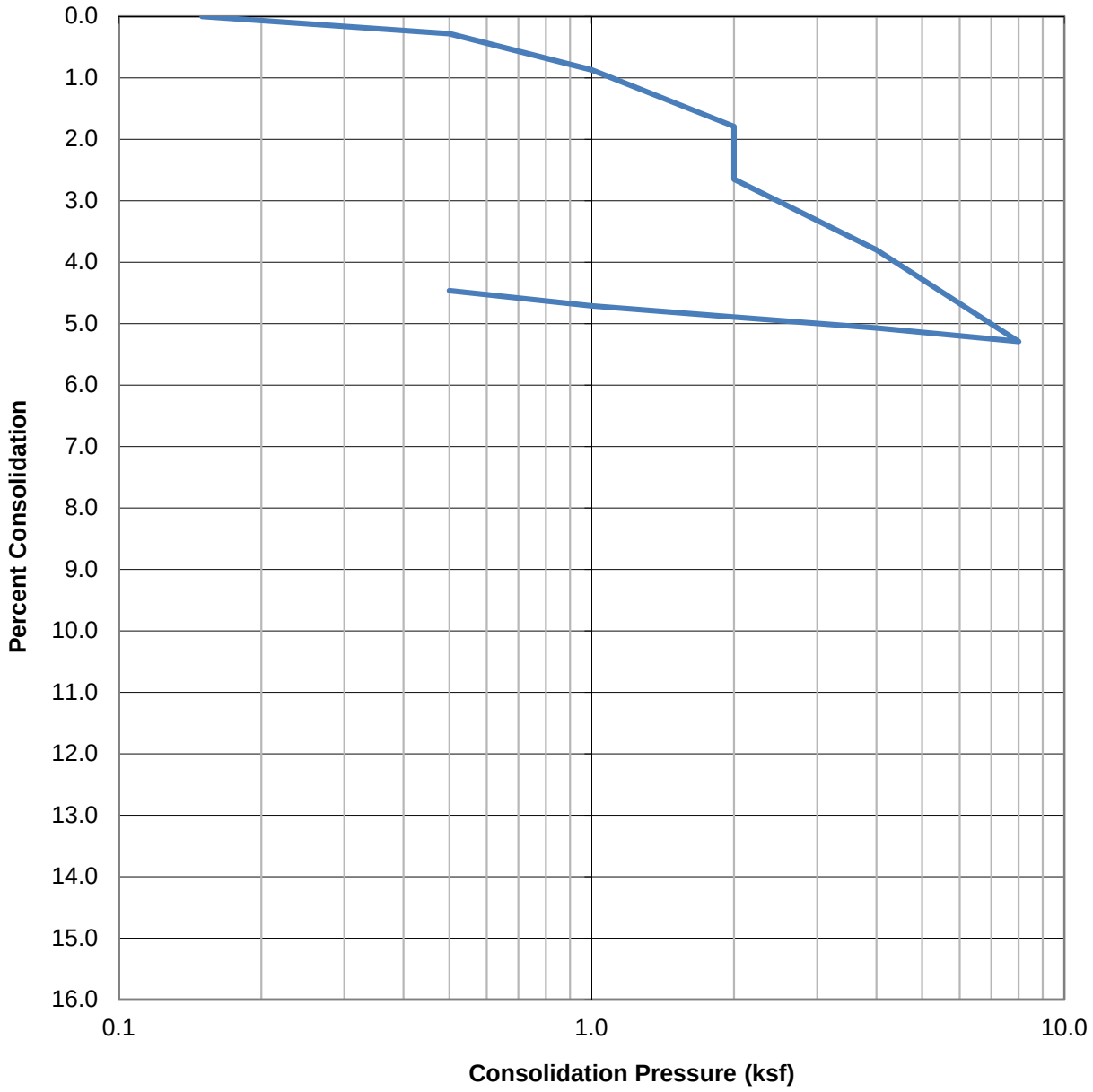
JANUARY, 2017 | PROJECT NO. T2750-22-01 | FIG B-10

WATER ADDED AT 2.0 KSF



SAMPLE ID	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B-3 @ 10'	SM	104.3	2.5	15.2

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CONSOLIDATION TEST RESULTS

UCR BARN EXPANSION PROJECT
UNIVERSITY OF CALIFORNIA, RIVERSIDE
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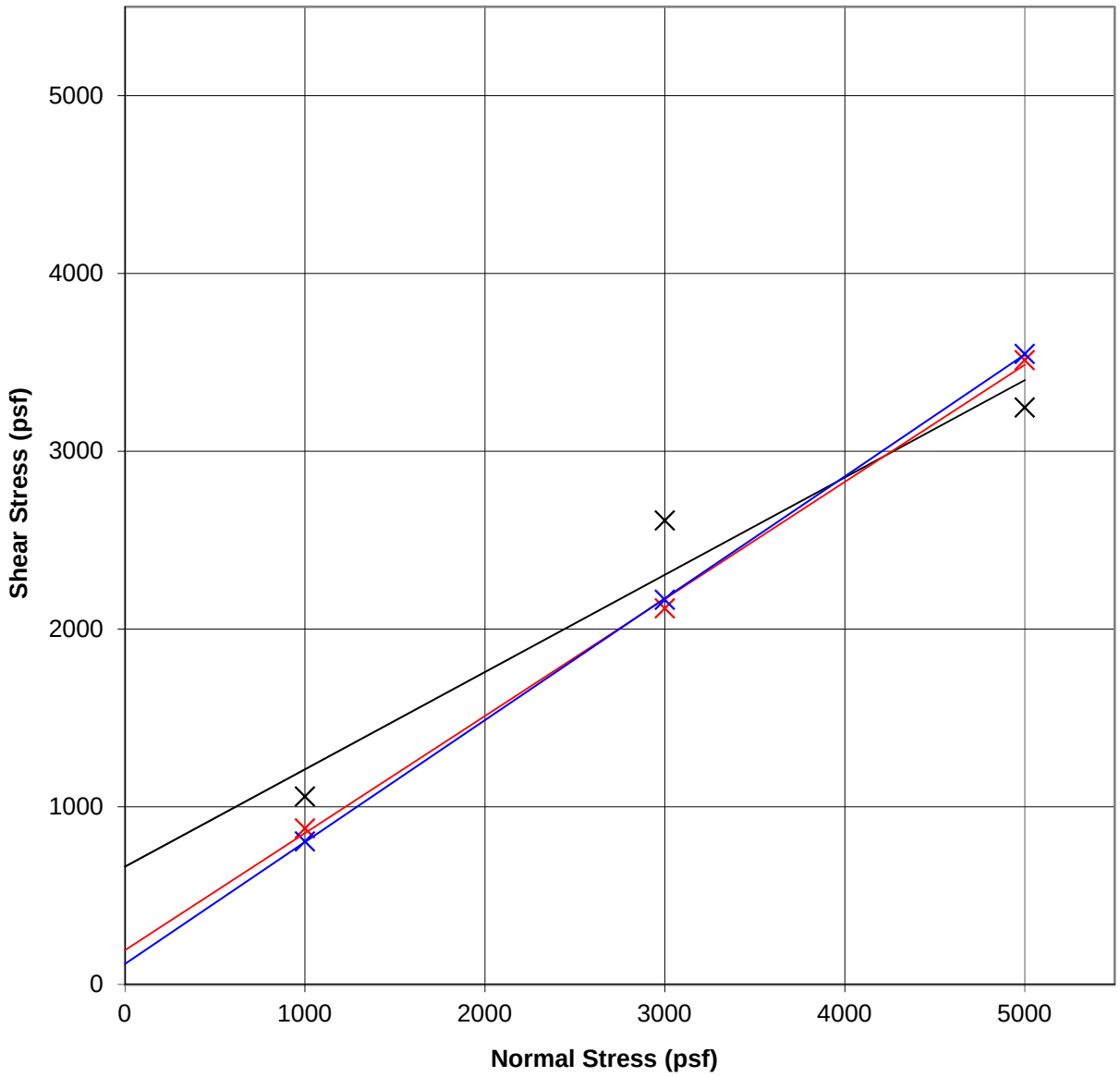
JANUARY, 2017	PROJECT NO. T2750-22-01	FIG B-11



SAMPLE ID	SOIL TYPE	INITIAL DRY DENSITY (pcf)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)	C (psf)	ϕ (deg)
B-1 @ 2.5'	SM	111.2	6.8	13.6	660	29
*B-2 @ 1-5'	SM	122.0	7.1	11.1	190	33
B-2 @ 2.5'	SM	105.2	8.1	14.5	120	34

*Sample remolded to approximately 90% of the test maximum dry density at optimum moisture content.

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DIRECT SHEAR TEST RESULTS

UCR BARN EXPANSION PROJECT
UNIVERSITY OF CALIFORNIA, RIVERSIDE
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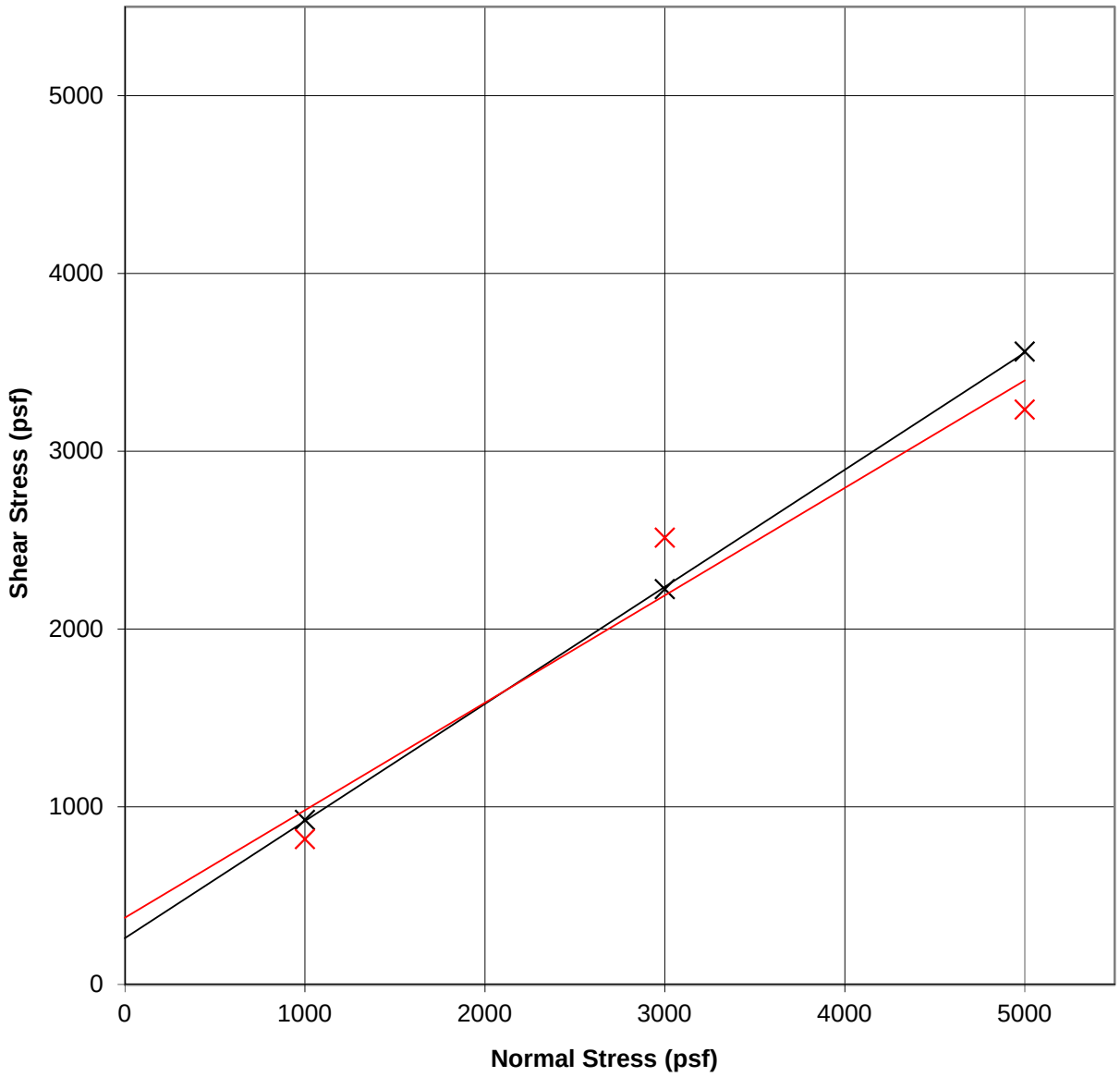
JANUARY, 2017 | PROJECT NO. T2750-22-01 | FIG B-12



SAMPLE ID	SOIL TYPE	INITIAL DRY DENSITY (pcf)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)	C (psf)	ϕ (deg)
*B-3 @ 0-5'	SM	122.0	7.3	12.4	260	33
B-3 @ 5'	SM	95.0	6.8	20.5	380	31

*Sample remolded to approximately 90% of the test maximum dry density at optimum moisture content.

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DIRECT SHEAR TEST RESULTS

UCR BARN EXPANSION PROJECT
UNIVERSITY OF CALIFORNIA, RIVERSIDE
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JANUARY, 2017 | PROJECT NO. T2750-22-01 | FIG B-13

APPENDIX C

APPENDIX C

RECOMMENDED GRADING SPECIFICATIONS

FOR

UCR BARN EXPANSION PROJECT
UNIVERSITY OF CALIFORNIA, RIVERSIDE
RIVERSIDE, CALIFORNIA

PROJECT NO. T2750-22-01

RECOMMENDED GRADING SPECIFICATIONS

1. GENERAL

1.1 These Recommended Grading Specifications shall be used in conjunction with the Geotechnical Report for the project prepared by Geocon. The recommendations contained in the text of the Geotechnical Report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict.

1.2 Prior to the commencement of grading, a geotechnical consultant (Consultant) shall be employed for the purpose of observing earthwork procedures and testing the fills for substantial conformance with the recommendations of the Geotechnical Report and these specifications. The Consultant should provide adequate testing and observation services so that they may assess whether, in their opinion, the work was performed in substantial conformance with these specifications. It shall be the responsibility of the Contractor to assist the Consultant and keep them apprised of work schedules and changes so that personnel may be scheduled accordingly.

1.3 It shall be the sole responsibility of the Contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the Consultant, unsatisfactory conditions such as questionable soil materials, poor moisture condition, inadequate compaction, and/or adverse weather result in a quality of work not in conformance with these specifications, the Consultant will be empowered to reject the work and recommend to the Owner that grading be stopped until the unacceptable conditions are corrected.

2. DEFINITIONS

2.1 **Owner** shall refer to the owner of the property or the entity on whose behalf the grading work is being performed and who has contracted with the Contractor to have grading performed.

2.2 **Contractor** shall refer to the Contractor performing the site grading work.

2.3 **Civil Engineer** or **Engineer of Work** shall refer to the California licensed Civil Engineer or consulting firm responsible for preparation of the grading plans, surveying and verifying as-graded topography.

2.4 **Consultant** shall refer to the soil engineering and engineering geology consulting firm retained to provide geotechnical services for the project.

2.5 **Soil Engineer** shall refer to a California licensed Civil Engineer retained by the Owner, who is experienced in the practice of geotechnical engineering. The Soil Engineer shall be responsible for having qualified representatives on-site to observe and test the Contractor's work for conformance with these specifications.

2.6 **Engineering Geologist** shall refer to a California licensed Engineering Geologist retained by the Owner to provide geologic observations and recommendations during the site grading.

2.7 **Geotechnical Report** shall refer to a soil report (including all addenda) which may include a geologic reconnaissance or geologic investigation that was prepared specifically for the development of the project for which these Recommended Grading Specifications are intended to apply.

3. MATERIALS

3.1 Materials for compacted fill shall consist of any soil excavated from the cut areas or imported to the site that, in the opinion of the Consultant, is suitable for use in construction of fills. In general, fill materials can be classified as *soil* fills, *soil-rock* fills or *rock* fills, as defined below.

3.1.1 **Soil fills** are defined as fills containing no rocks or hard lumps greater than 12 inches in maximum dimension and containing at least 40 percent by weight of material smaller than ¾ inch in size.

3.1.2 **Soil-rock fills** are defined as fills containing no rocks or hard lumps larger than 4 feet in maximum dimension and containing a sufficient matrix of soil fill to allow for proper compaction of soil fill around the rock fragments or hard lumps as specified in Paragraph 6.2. **Oversize rock** is defined as material greater than 12 inches.

3.1.3 **Rock fills** are defined as fills containing no rocks or hard lumps larger than 3 feet in maximum dimension and containing little or no fines. Fines are defined as material smaller than ¾ inch in maximum dimension. The quantity of fines shall be less than approximately 20 percent of the rock fill quantity.

3.2 Material of a perishable, spongy, or otherwise unsuitable nature as determined by the Consultant shall not be used in fills.

3.3 Materials used for fill, either imported or on-site, shall not contain hazardous materials as defined by the California Code of Regulations, Title 22, Division 4, Chapter 30, Articles 9

and 10; 40CFR; and any other applicable local, state or federal laws. The Consultant shall not be responsible for the identification or analysis of the potential presence of hazardous materials. However, if observations, odors or soil discoloration cause Consultant to suspect the presence of hazardous materials, the Consultant may request from the Owner the termination of grading operations within the affected area. Prior to resuming grading operations, the Owner shall provide a written report to the Consultant indicating that the suspected materials are not hazardous as defined by applicable laws and regulations.

3.4 The outer 15 feet of *soil-rock* fill slopes, measured horizontally, should be composed of properly compacted *soil* fill materials approved by the Consultant. *Rock* fill may extend to the slope face, provided that the slope is not steeper than 2:1 (horizontal:vertical) and a soil layer no thicker than 12 inches is track-walked onto the face for landscaping purposes. This procedure may be utilized provided it is acceptable to the governing agency, Owner and Consultant.

3.5 Samples of soil materials to be used for fill should be tested in the laboratory by the Consultant to determine the maximum density, optimum moisture content, and, where appropriate, shear strength, expansion, and gradation characteristics of the soil.

3.6 During grading, soil or groundwater conditions other than those identified in the Geotechnical Report may be encountered by the Contractor. The Consultant shall be notified immediately to evaluate the significance of the unanticipated condition

4. CLEARING AND PREPARING AREAS TO BE FILLED

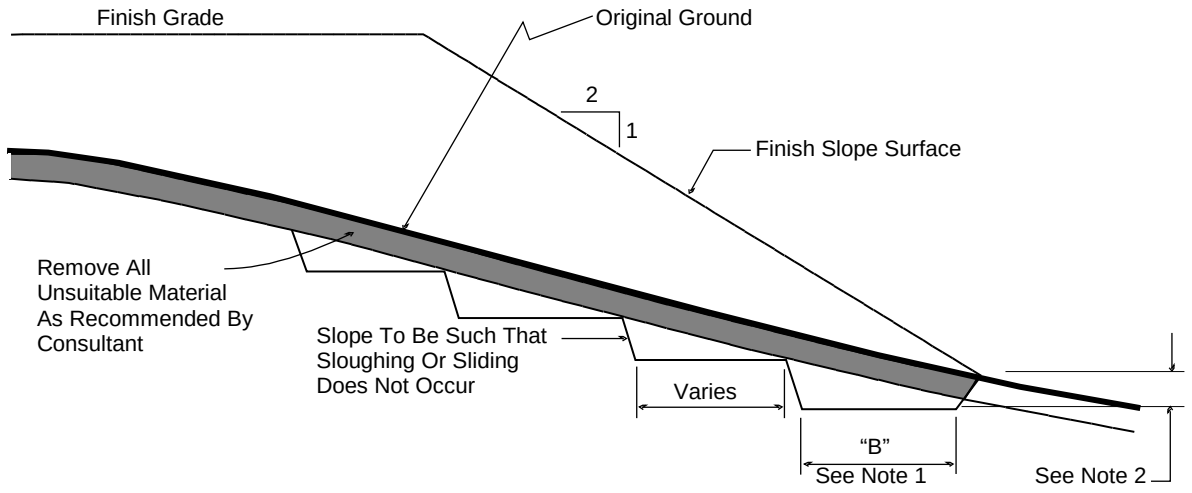
4.1 Areas to be excavated and filled shall be cleared and grubbed. Clearing shall consist of complete removal above the ground surface of trees, stumps, brush, vegetation, man-made structures, and similar debris. Grubbing shall consist of removal of stumps, roots, buried logs and other unsuitable material and shall be performed in areas to be graded. Roots and other projections exceeding 1½ inches in diameter shall be removed to a depth of 3 feet below the surface of the ground. Borrow areas shall be grubbed to the extent necessary to provide suitable fill materials.

4.2 Asphalt pavement material removed during clearing operations should be properly disposed at an approved off-site facility or in an acceptable area of the project evaluated by Geocon and the property owner. Concrete fragments that are free of reinforcing steel may be placed in fills, provided they are placed in accordance with Section 6.2 or 6.3 of this document.

4.3 After clearing and grubbing of organic matter and other unsuitable material, loose or porous soils shall be removed to the depth recommended in the Geotechnical Report. The depth of removal and compaction should be observed and approved by a representative of the Consultant. The exposed surface shall then be plowed or scarified to a minimum depth of 6 inches and until the surface is free from uneven features that would tend to prevent uniform compaction by the equipment to be used.

4.4 Where the slope ratio of the original ground is steeper than 5:1 (horizontal:vertical), or where recommended by the Consultant, the original ground should be benched in accordance with the following illustration.

TYPICAL BENCHING DETAIL



No Scale

DETAIL NOTES: (1) Key width "B" should be a minimum of 10 feet, or sufficiently wide to permit complete coverage with the compaction equipment used. The base of the key should be graded horizontal, or inclined slightly into the natural slope.

(2) The outside of the key should be below the topsoil or unsuitable surficial material and at least 2 feet into dense formational material. Where hard rock is exposed in the bottom of the key, the depth and configuration of the key may be modified as approved by the Consultant.

4.5 After areas to receive fill have been cleared and scarified, the surface should be moisture conditioned to achieve the proper moisture content, and compacted as recommended in Section 6 of these specifications.

5. COMPACTION EQUIPMENT

5.1 Compaction of *soil* or *soil-rock* fill shall be accomplished by sheepsfoot or segmented-steel wheeled rollers, vibratory rollers, multiple-wheel pneumatic-tired rollers, or other types of acceptable compaction equipment. Equipment shall be of such a design that it will be capable of compacting the *soil* or *soil-rock* fill to the specified relative compaction at the specified moisture content.

5.2 Compaction of *rock* fills shall be performed in accordance with Section 6.3.

6. PLACING, SPREADING AND COMPACTION OF FILL MATERIAL

6.1 *Soil* fill, as defined in Paragraph 3.1.1, shall be placed by the Contractor in accordance with the following recommendations:

6.1.1 *Soil* fill shall be placed by the Contractor in layers that, when compacted, should generally not exceed 8 inches. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to obtain uniformity of material and moisture in each layer. The entire fill shall be constructed as a unit in nearly level lifts. Rock materials greater than 12 inches in maximum dimension shall be placed in accordance with Section 6.2 or 6.3 of these specifications.

6.1.2 In general, the *soil* fill shall be compacted at a moisture content at or above the optimum moisture content as determined by ASTM D 1557.

6.1.3 When the moisture content of *soil* fill is below that specified by the Consultant, water shall be added by the Contractor until the moisture content is in the range specified.

6.1.4 When the moisture content of the *soil* fill is above the range specified by the Consultant or too wet to achieve proper compaction, the *soil* fill shall be aerated by the Contractor by blading/mixing, or other satisfactory methods until the moisture content is within the range specified.

6.1.5 After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted by the Contractor to a relative compaction of at least 90 percent. Relative compaction is defined as the ratio (expressed in percent) of the in-place dry density of the compacted fill to the maximum laboratory dry density as determined in accordance with ASTM D 1557. Compaction shall be continuous over the entire area, and compaction equipment shall make sufficient passes so that the specified minimum relative compaction has been achieved throughout the entire fill.

6.1.6 Where practical, soils having an Expansion Index greater than 50 should be placed at least 3 feet below finish pad grade and should be compacted at a moisture content generally 2 to 4 percent greater than the optimum moisture content for the material.

6.1.7 Properly compacted *soil* fill shall extend to the design surface of fill slopes. To achieve proper compaction, it is recommended that fill slopes be over-built by at least 3 feet and then cut to the design grade. This procedure is considered preferable to track-walking of slopes, as described in the following paragraph.

6.1.8 As an alternative to over-building of slopes, slope faces may be back-rolled with a heavy-duty loaded sheepsfoot or vibratory roller at maximum 4-foot fill height intervals. Upon completion, slopes should then be track-walked with a D-8 dozer or similar equipment, such that a dozer track covers all slope surfaces at least twice.

6.2 *Soil-rock* fill, as defined in Paragraph 3.1.2, shall be placed by the Contractor in accordance with the following recommendations:

6.2.1 Rocks larger than 12 inches but less than 4 feet in maximum dimension may be incorporated into the compacted *soil* fill, but shall be limited to the area measured 15 feet minimum horizontally from the slope face and 5 feet below finish grade or 3 feet below the deepest utility, whichever is deeper.

6.2.2 Rocks or rock fragments up to 4 feet in maximum dimension may either be individually placed or placed in windrows. Under certain conditions, rocks or rock fragments up to 10 feet in maximum dimension may be placed using similar methods. The acceptability of placing rock materials greater than 4 feet in maximum dimension shall be evaluated during grading as specific cases arise and shall be approved by the Consultant prior to placement.

6.2.3 For individual placement, sufficient space shall be provided between rocks to allow for passage of compaction equipment.

6.2.4 For windrow placement, the rocks should be placed in trenches excavated in properly compacted *soil* fill. Trenches should be approximately 5 feet wide and 4 feet deep in maximum dimension. The voids around and beneath rocks should be filled with approved granular soil having a Sand Equivalent of 30 or greater and should be compacted by flooding. Windrows may also be placed utilizing an "open-face" method in lieu of the trench procedure, however, this method should first be approved by the Consultant.

6.2.5 Windrows should generally be parallel to each other and may be placed either parallel to or perpendicular to the face of the slope depending on the site geometry. The minimum horizontal spacing for windrows shall be 12 feet center-to-center with a 5-foot stagger or offset from lower courses to next overlying course. The minimum vertical spacing between windrow courses shall be 2 feet from the top of a lower windrow to the bottom of the next higher windrow.

6.2.6 Rock placement, fill placement and flooding of approved granular soil in the windrows should be continuously observed by the Consultant.

6.3 *Rock* fills, as defined in Section 3.1.3, shall be placed by the Contractor in accordance with the following recommendations:

6.3.1 The base of the *rock* fill shall be placed on a sloping surface (minimum slope of 2 percent). The surface shall slope toward suitable subdrainage outlet facilities. The *rock* fills shall be provided with subdrains during construction so that a hydrostatic pressure buildup does not develop. The subdrains shall be permanently connected to controlled drainage facilities to control post-construction infiltration of water.

6.3.2 *Rock* fills shall be placed in lifts not exceeding 3 feet. Placement shall be by rock trucks traversing previously placed lifts and dumping at the edge of the currently placed lift. Spreading of the *rock* fill shall be by dozer to facilitate *seating* of the rock. The *rock* fill shall be watered heavily during placement. Watering shall consist of water trucks traversing in front of the current rock lift face and spraying water continuously during rock placement. Compaction equipment with compactive energy comparable to or greater than that of a 20-ton steel vibratory roller or other compaction equipment providing suitable energy to achieve the required compaction or deflection as recommended in Paragraph 6.3.3 shall be utilized. The number of passes to be made should be determined as described in Paragraph 6.3.3. Once a *rock* fill lift has been covered with *soil* fill, no additional *rock* fill lifts will be permitted over the *soil* fill.

6.3.3 Plate bearing tests, in accordance with ASTM D 1196, may be performed in both the compacted *soil* fill and in the *rock* fill to aid in determining the required minimum number of passes of the compaction equipment. If performed, a minimum of three plate bearing tests should be performed in the properly compacted *soil* fill (minimum relative compaction of 90 percent). Plate bearing tests shall then be performed on areas of *rock* fill having two passes, four passes and six passes of the compaction equipment, respectively. The number of passes required for the *rock* fill shall be determined by comparing the results of the plate bearing tests for the *soil* fill and the *rock* fill and by evaluating the deflection

variation with number of passes. The required number of passes of the compaction equipment will be performed as necessary until the plate bearing deflections are equal to or less than that determined for the properly compacted *soil* fill. In no case will the required number of passes be less than two.

6.3.4 A representative of the Consultant should be present during *rock* fill operations to observe that the minimum number of "passes" have been obtained, that water is being properly applied and that specified procedures are being followed. The actual number of plate bearing tests will be determined by the Consultant during grading.

6.3.5 Test pits shall be excavated by the Contractor so that the Consultant can state that, in their opinion, sufficient water is present and that voids between large rocks are properly filled with smaller rock material. In-place density testing will not be required in the *rock* fills.

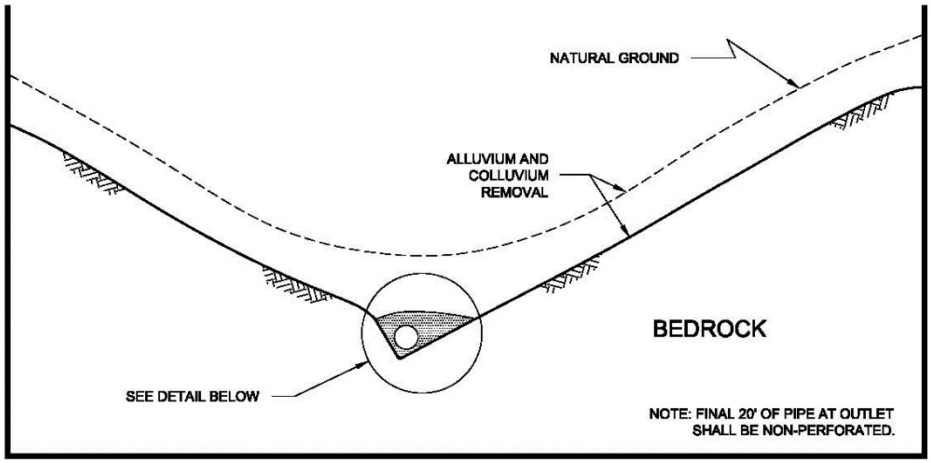
6.3.6 To reduce the potential for "piping" of fines into the *rock* fill from overlying *soil* fill material, a 2-foot layer of graded filter material shall be placed above the uppermost lift of *rock* fill. The need to place graded filter material below the *rock* should be determined by the Consultant prior to commencing grading. The gradation of the graded filter material will be determined at the time the *rock* fill is being excavated. Materials typical of the *rock* fill should be submitted to the Consultant in a timely manner, to allow design of the graded filter prior to the commencement of *rock* fill placement.

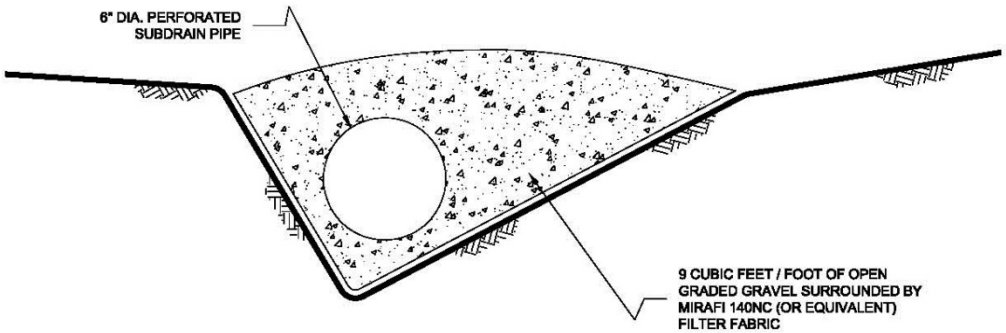
6.3.7 *Rock* fill placement should be continuously observed during placement by the Consultant.

7. SUBDRAINS

7.1 The geologic units on the site may have permeability characteristics and/or fracture systems that could be susceptible under certain conditions to seepage. The use of canyon subdrains may be necessary to mitigate the potential for adverse impacts associated with seepage conditions. Canyon subdrains with lengths in excess of 500 feet or extensions of existing offsite subdrains should use 8-inch-diameter pipes. Canyon subdrains less than 500 feet in length should use 6-inch-diameter pipes.

TYPICAL CANYON DRAIN DETAIL





NOTES:

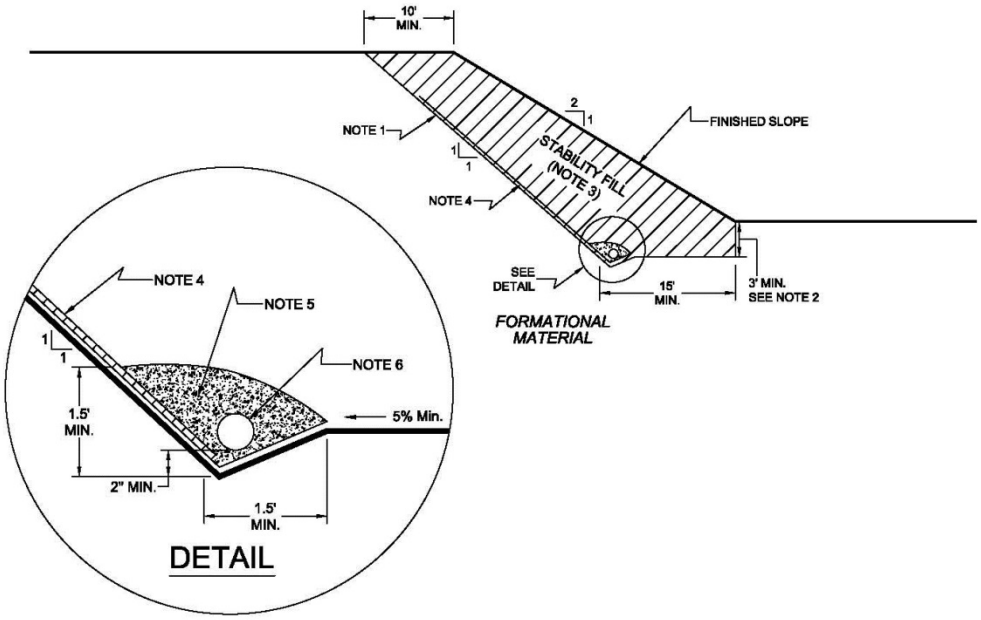
1.....6-INCH DIAMETER, SCHEDULE 80 PVC PERFORATED PIPE FOR FILLS
IN EXCESS OF 100-FEET IN DEPTH OR A PIPE LENGTH OF LONGER THAN 500 FEET.

2.....6-INCH DIAMETER, SCHEDULE 40 PVC PERFORATED PIPE FOR FILLS
LESS THAN 100-FEET IN DEPTH OR A PIPE LENGTH SHORTER THAN 500 FEET.

NO SCALE

7.2 Slope drains within stability fill keyways should use 4-inch-diameter (or larger) pipes.

TYPICAL STABILITY FILL DETAIL



NOTES:

1.....EXCAVATE BACKCUT AT 1:1 INCLINATION (UNLESS OTHERWISE NOTED).

2.....BASE OF STABILITY FILL TO BE 3 FEET INTO FORMATIONAL MATERIAL, SLOPING A MINIMUM 5% INTO SLOPE.

3.....STABILITY FILL TO BE COMPOSED OF PROPERLY COMPACTED GRANULAR SOIL.

4.....CHIMNEY DRAINS TO BE APPROVED PREFABRICATED CHIMNEY DRAIN PANELS (MIRADRAIN G200N OR EQUIVALENT) SPACED APPROXIMATELY 20 FEET CENTER TO CENTER AND 4 FEET WIDE. CLOSER SPACING MAY BE REQUIRED IF SEEPAGE IS ENCOUNTERED.

5.....FILTER MATERIAL TO BE 3/4-INCH, OPEN-GRADED CRUSHED ROCK ENCLOSED IN APPROVED FILTER FABRIC (MIRAFI 140NC).

6.....COLLECTOR PIPE TO BE 4-INCH MINIMUM DIAMETER, PERFORATED, THICK-WALLED PVC SCHEDULE 40 OR EQUIVALENT, AND SLOPED TO DRAIN AT 1 PERCENT MINIMUM TO APPROVED OUTLET.

NO SCALE

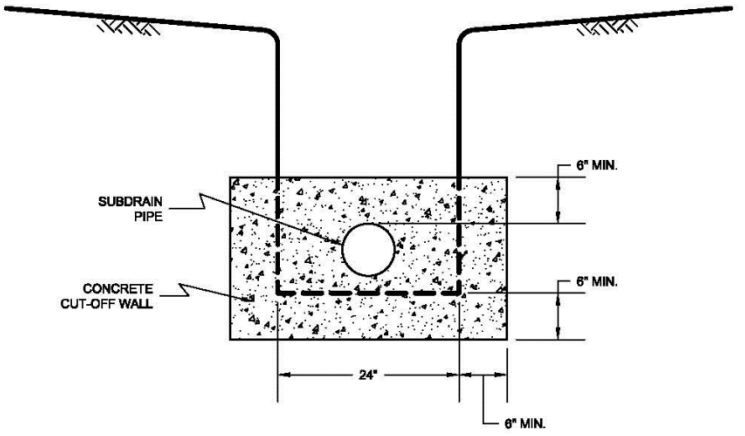
7.3 The actual subdrain locations will be evaluated in the field during the remedial grading operations. Additional drains may be necessary depending on the conditions observed and the requirements of the local regulatory agencies. Appropriate subdrain outlets should be evaluated prior to finalizing 40-scale grading plans.

7.4 *Rock* fill or *soil-rock* fill areas may require subdrains along their down-slope perimeters to mitigate the potential for buildup of water from construction or landscape irrigation. The subdrains should be at least 6-inch-diameter pipes encapsulated in gravel and filter fabric. *Rock* fill drains should be constructed using the same requirements as canyon subdrains.

7.5 Prior to outletting, the final 20-foot segment of a subdrain that will not be extended during future development should consist of non-perforated drainpipe. At the non-perforated/ perforated interface, a seepage cutoff wall should be constructed on the downslope side of the pipe.

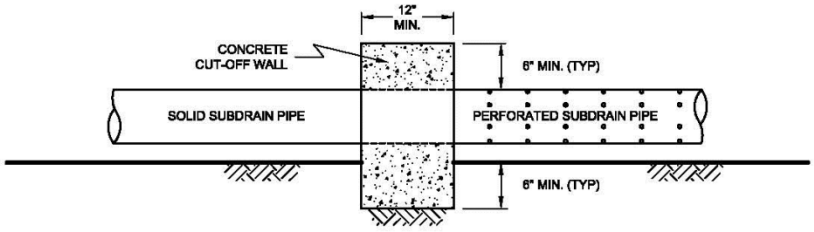
TYPICAL CUT OFF WALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW

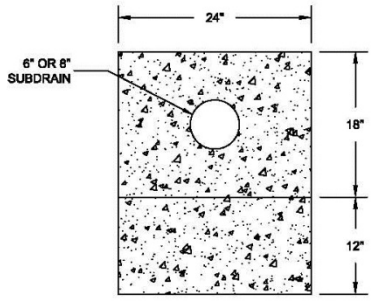


NO SCALE

7.6 Subdrains that discharge into a natural drainage course or open space area should be provided with a permanent headwall structure.

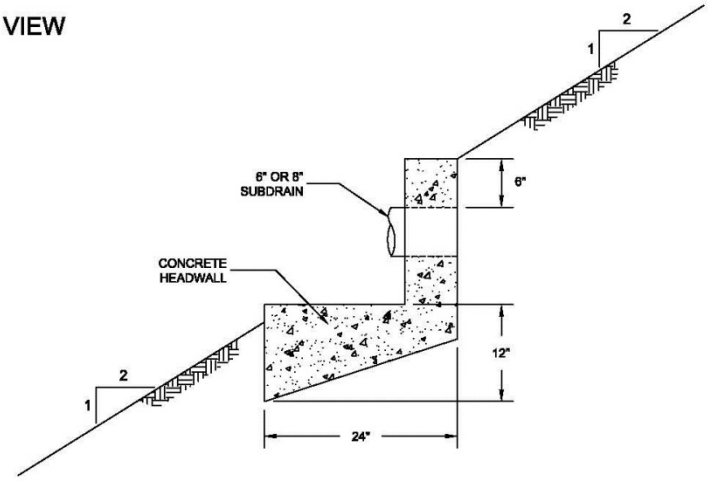
TYPICAL HEADWALL DETAIL

FRONT VIEW



NO SCALE

SIDE VIEW



NOTE: HEADWALL SHOULD OUTLET AT TOE OF FILL SLOPE OR INTO CONTROLLED SURFACE DRAINAGE

NO SCALE

7.7 The final grading plans should show the location of the proposed subdrains. After completion of remedial excavations and subdrain installation, the project civil engineer should survey the drain locations and prepare an “as-built” map showing the drain locations. The final outlet and connection locations should be determined during grading operations. Subdrains that will be extended on adjacent projects after grading can be placed on formational material and a vertical riser should be placed at the end of the subdrain. The grading contractor should consider videoing the subdrains shortly after burial to check proper installation and functionality. The contractor is responsible for the performance of the drains.

8. OBSERVATION AND TESTING

8.1 The Consultant shall be the Owner's representative to observe and perform tests during clearing, grubbing, filling, and compaction operations. In general, no more than 2 feet in vertical elevation of *soil* or *soil-rock* fill should be placed without at least one field density test being performed within that interval. In addition, a minimum of one field density test should be performed for every 2,000 cubic yards of *soil* or *soil-rock* fill placed and compacted.

8.2 The Consultant should perform a sufficient distribution of field density tests of the compacted *soil* or *soil-rock* fill to provide a basis for expressing an opinion whether the fill material is compacted as specified. Density tests shall be performed in the compacted materials below any disturbed surface. When these tests indicate that the density of any layer of fill or portion thereof is below that specified, the particular layer or areas represented by the test shall be reworked until the specified density has been achieved.

8.3 During placement of *rock* fill, the Consultant should observe that the minimum number of passes have been obtained per the criteria discussed in Section 6.3.3. The Consultant should request the excavation of observation pits and may perform plate bearing tests on the placed *rock* fills. The observation pits will be excavated to provide a basis for expressing an opinion as to whether the *rock* fill is properly seated and sufficient moisture has been applied to the material. When observations indicate that a layer of *rock* fill or any portion thereof is below that specified, the affected layer or area shall be reworked until the *rock* fill has been adequately seated and sufficient moisture applied.

8.4 A settlement monitoring program designed by the Consultant may be conducted in areas of *rock* fill placement. The specific design of the monitoring program shall be as recommended in the Conclusions and Recommendations section of the project Geotechnical Report or in the final report of testing and observation services performed during grading.

8.5 We should observe the placement of subdrains, to check that the drainage devices have been placed and constructed in substantial conformance with project specifications.

8.6 Testing procedures shall conform to the following Standards as appropriate:

8.6.1 Soil and Soil-Rock Fills:

8.6.1.1 Field Density Test, ASTM D 1556, *Density of Soil In-Place By the Sand-Cone Method.*

8.6.1.2 Field Density Test, Nuclear Method, ASTM D 6938, *Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).*

8.6.1.3 Laboratory Compaction Test, ASTM D 1557, *Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-Pound Hammer and 18-Inch Drop.*

8.6.1.4. Expansion Index Test, ASTM D 4829, *Expansion Index Test*.

9. PROTECTION OF WORK

9.1 During construction, the Contractor shall properly grade all excavated surfaces to provide positive drainage and prevent ponding of water. Drainage of surface water shall be controlled to avoid damage to adjoining properties or to finished work on the site. The Contractor shall take remedial measures to prevent erosion of freshly graded areas until such time as permanent drainage and erosion control features have been installed. Areas subjected to erosion or sedimentation shall be properly prepared in accordance with the Specifications prior to placing additional fill or structures.

9.2 After completion of grading as observed and tested by the Consultant, no further excavation or filling shall be conducted except in conjunction with the services of the Consultant.

10. CERTIFICATIONS AND FINAL REPORTS

10.1 Upon completion of the work, Contractor shall furnish Owner a certification by the Civil Engineer stating that the lots and/or building pads are graded to within 0.1 foot vertically of elevations shown on the grading plan and that all tops and toes of slopes are within 0.5 foot horizontally of the positions shown on the grading plans. After installation of a section of subdrain, the project Civil Engineer should survey its location and prepare an *as-built* plan of the subdrain location. The project Civil Engineer should verify the proper outlet for the subdrains and the Contractor should ensure that the drain system is free of obstructions.

10.2 The Owner is responsible for furnishing a final as-graded soil and geologic report satisfactory to the appropriate governing or accepting agencies. The as-graded report should be prepared and signed by a California licensed Civil Engineer experienced in geotechnical engineering and by a California Certified Engineering Geologist, indicating that the geotechnical aspects of the grading were performed in substantial conformance with the Specifications or approved changes to the Specifications.

Appendix D

Hydrology and Water Quality Reports

FUSCOE
ENGINEERING

PRELIMINARY DRAINAGE STUDY

UCR BARN

December 22, 2016
Riverside, CA

prepared for:

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University Village
1223 University Ave., Suite 240
Riverside, CA 92507

Fuscoe Engineering, Inc.
6390 Greenwich Drive, Suite 170
San Diego, California 92122
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Bryan Smith
Job # 00307-014-01

full circle thinking®

PRELIMINARY DRAINAGE STUDY

UCR BARN

UC Riverside, California

Prepared Under the Responsible Charge of:

DRAFT

Bryan D. Smith, P.E. RCE 75822 EXP: 06-30-18

Fuscoe Engineering, San Diego, Inc.
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For

UC Riverside
University Village
1223 University Ave Suite 240
Riverside, CA 92507

December 2016

TABLE OF CONTENTS

1. INTRODUCTION

The purpose of this drainage study is to compare the existing and proposed stormwater runoff discharge rates for the UCR Barn Project (Project) based on the preliminary Schematic Design documents. The analysis was performed in accordance with the Riverside County Flood Control District Hydrology Manual, 1978, (Hydrology Manual).

1.1 Project Description

The project site is located within the UC Riverside Campus, in Riverside County, California. The existing site consists of the existing Barn Dining and Barn Theatre Buildings which are to remain, and a Barn Stable building on the west side of the project will be demolished. The existing site includes landscaping and paving for parking, drive access, and pedestrian access which will be removed and replaced. The project proposes to construct several new buildings including a Campus Meeting Room, Faculty/Staff Dining building, and a Kitchen Addition to the Barn Dining. The project will also include pedestrian paving and landscaping improvements, and a loading dock / service yard. The project site is approximately 1.7 acres and is bounded by Chass building to the North, Sproul Hall to the east, and West Campus Drive along the South and West sides. Refer to the Proposed Hydrology Exhibit in the Appendix for the proposed site plan.

1.2 Existing Conditions

The existing project site consists of the existing Barn Dining and Barn Theatre Buildings, and a Barn Stable building on the west side of the building. The site generally slopes from east to west. Runoff from the site discharges at two locations along West Campus Drive. The easterly portion of the site (Basin A) drains south and is collected by an existing Curb Inlet along the north side of West Campus Drive. The westerly portion of the site (Basin B) will drain west and sheet flows to the curb and gutter in West Campus Drive. The site is approximately 54% impervious. Refer to Appendix 1 for Existing Conditions Drainage Map.

1.3 Proposed Conditions

The project proposes to construct several new buildings including a Campus Meeting Room, Faculty/Staff Dining building, and a Kitchen Addition to the Barn Dining. The project will also include pedestrian paving and landscaping improvements, and a loading dock / service yard. Runoff from the site will continue to discharge at two locations along West Campus Drive, however, the basin areas will be altered slightly as shown in Table 3.0 to include the loading dock within Basin A. Runoff from the easterly and southerly portion of the site (Basin A) will be conveyed via a combination of storm drain piping and vegetated swale to the existing curb inlet on the north side of West Campus Drive. The westerly portion of the site (Basin B) will drain west via storm drain piping and vegetated swales and discharge through a curb outlet on West Campus Drive. The proposed site is approximately 74% impervious. Refer to Appendix 2 for Proposed Conditions.

1.4 Project Site Soils

According to the Hydrology Manual, the soils are predominately Hydrologic Soil type C, with a lesser amount of Soil type A. For the purposes of this report, soil type C was assumed for the site.

2. METHODOLOGY

The Rational Method was utilized to calculate the runoff rate as indicated in the Riverside County Flood Control District Hydrology Manual.

2.1 Rational Method

Runoff was calculated using the Modified Rational Method which is given by the following equation:

$Q = C \times I \times A$

Where:
Q = Flow rate in cubic feet per second (cfs)
C = Runoff coefficient
I = Rainfall Intensity in inches per hour (in/hr)
A = Drainage basin area in acres, (ac)

Modified Rational Method calculations were performed in accordance with the Hydrology Manual and the AES Hydrologic Software, 2014. To perform the hydrology routing, the total watershed area is divided into sub-areas which discharge at designated nodes. The procedure for the sub-area summation model is as follows:

(1) Subdivide the watershed into an initial sub-area (generally 1 lot) and subsequent sub-areas, which are generally less than 10 acres in size. Assign upstream and downstream node numbers to each sub-area.

(2) Estimate an initial T_c by using the appropriate nomograph or overland flow velocity estimation. The minimum T_c considered is 5.0 minutes.

(3) Using the initial T_c, determine the corresponding values of I. Then Q = CIA.

(4) Using Q, estimate the travel time between this node and the next by Manning's equation as applied to particular channel or conduit linking the two nodes. Then, repeat the calculation for Q based on the revised intensity (which is a function of the revised time of concentration)

The nodes are joined together by links, which may be street gutter flows, drainage swales, drainage ditches, pipe flow, or various channel flows.

SUBAREA HYDROLOGIC PROCESS

1. Confluence analysis at node.
2. Initial sub-area analysis (including time of concentration calculation).
3. Pipe flow travel time (computer estimated).
4. Pipe flow travel time (user specified).
5. Trapezoidal channel travel time.
6. Street flow analysis through sub-area.
7. User-specified information at node.
8. Addition of sub-area runoff to main line.
9. V-gutter flow through area.
10. Copy main stream data to memory bank
11. Confluence main stream data with a memory bank
12. Clear a memory bank

At the confluence point of two or more basins, the following procedure is used to combine peak flow rates to account for differences in the basin's times of concentration. This adjustment is based on the assumption that each basin's hydrographs are triangular in shape.

(1). If the collection streams have the same times of concentration, then the Q values are directly summed,

$$Q_p = Q_a + Q_b;\ T_p = T_a = T_b$$

(2). If the collection streams have different times of concentration, the smaller of the tributary Q values may be adjusted as follows:

(i). The most frequent case is where the collection stream with the longer time of concentration has the larger Q. The smaller Q value is adjusted by a ratio of rainfall intensities.

$$Q_p = Q_b + Q_a\,(I_b/I_a);\ T_p = T_a$$

(ii). In some cases, the collection stream with the shorter time of concentration has the larger Q. Then the smaller Q is adjusted by a ratio of the T values.

$$Q_p = Q_b + Q_a\,(T_b/T_a);\ T_p = T_b$$

2.2 Runoff Coefficient

Runoff Coefficients were calculated in accordance with the Hydrology Manual plate D-5.3 for Soil Group -C, AMC II in correspondence with the following tabulated impervious percentages. See Appendix 4 for Hydrology Calculations.

Table 2.2: Impervious Percentage Tabulations

	Impervious (ac)	Pervious (ac)	% Impervious - Actual	% Impervious - Tabulated
Existing	0.91	0.76	54%	55%
Proposed	1.23	0.4	74%	80%

2.2 Rainfall Intensity

Rainfall intensity was calculated in accordance with Section D of the Hydrology Manual and plate D-4.3, D-4.5, and D-4.6 included in the Appendix. The slope of Intensity Curve was selected to be 0.52 as shown on Plate D-4.6.

2.3 Tributary Areas

Drainage basins are delineated and graphically portrayed on the enclosed Existing and Proposed Condition Maps in Appendix 1 and Appendix 2. Offsite drainage areas were not analyzed as part of this report.

3. CALCULATIONS/RESULTS

The calculations / results for the hydrology analysis can be found in Appendix 4. The table below presents the comparison between existing and proposed peak discharge and Basin Areas. The calculations were based on the 10-year, 1- Hour storm and the 100-year, 1-Hour storm events.

Table 3.0: Hydrology Summary

Basin	Existing Conditions			Proposed Conditions		
	Area (ac)	Q10 (cfs)	Q100 (cfs)	Area (ac)	Q10 (cfs)	Q100 (cfs)
A	0.53	0.9	1.4	0.69	1.4	2.0
B	1.14	2.1	3.1	0.98	1.9	2.9
Total	**1.67**	**3.0**	**4.5**	**1.67**	**3.3**	**4.9**

The project will result in a net increase in the 100-year storm discharge of 0.4 cfs, and 10-year storm discharge of 0.3 cfs due to the increase in impervious percentage. The increase in discharge represents an 9% increase in runoff from site in proposed conditions for the 100-year storm event.

Information for the existing storm drain piping system was unavailable at the time of this report. Therefore, a hydraulic analysis of the existing storm drain system was not be performed with this analysis.

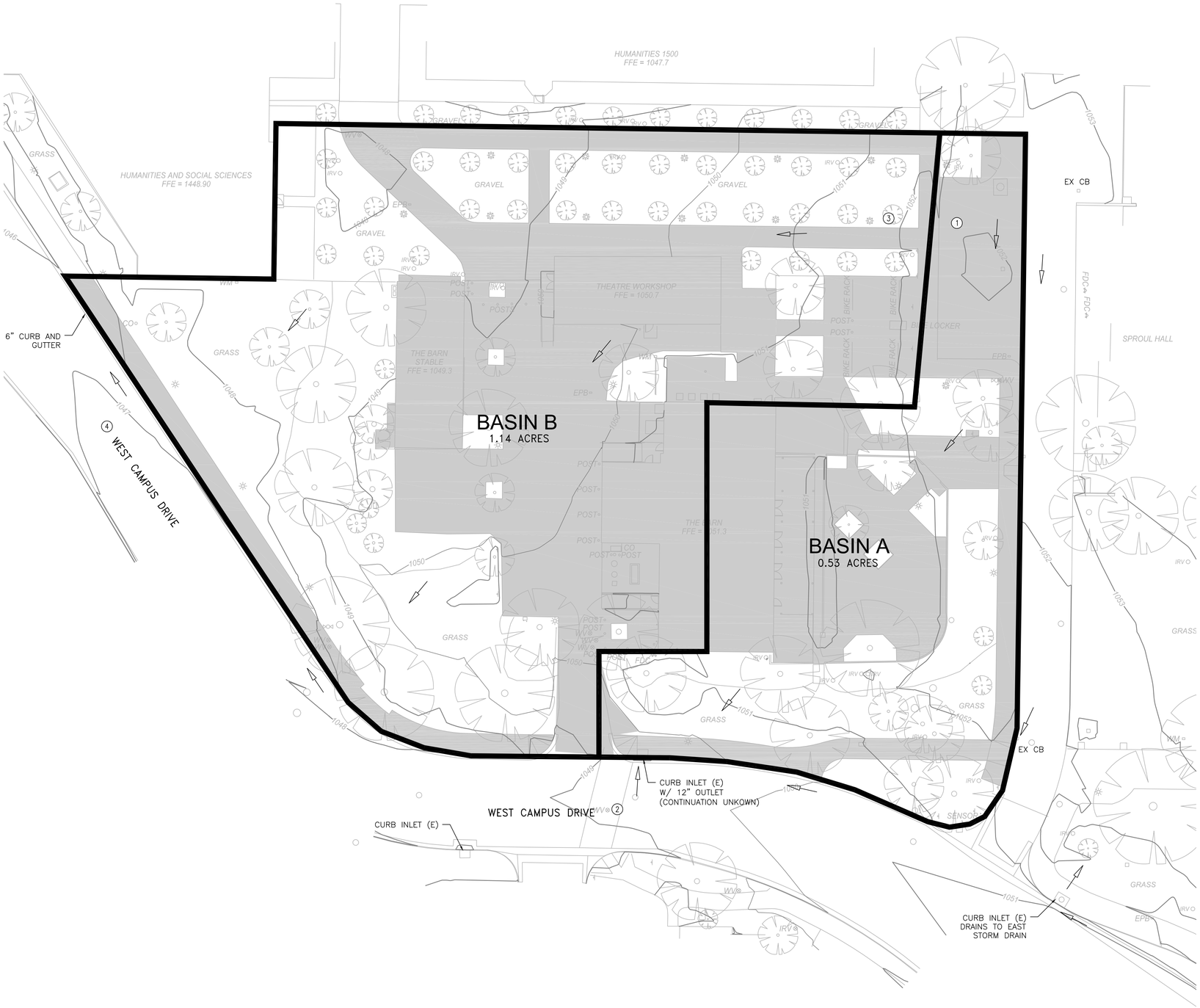
4. CONCLUSION

The UCR Barn project will result in a 9% increase in the total 100-year storm peak runoff rate discharging from the site due to an increase in impervious percentage. The impervious percentage will increase from 54% in existing conditions to 74% in proposed conditions. The project will install a local drainage system consisting area drains, catch basins, underground storm drain, and vegetated swales to convey the proposed flows toward the discharge points along West Campus Drive.

Information for the existing storm drain piping system was unavailable at the time of this report. Therefore, a hydraulic analysis of the existing storm drain system was not be performed with this analysis.

Appendix 1

Existing Conditions Map



LEGEND

- BASIN BOUNDARY
- IMPERVIOUS SURFACE
- FLOW DIRECTION ARROW
- STORM DRAIN
- SWALE
- HYDROLOGY NODE (#)

20' 0' 10' 20'

SCALE: 1" = 20'

EXISTING HYDROLOGY

UCR BARN - PRELIMINARY HYDROLOGY

12/22/2016

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Appendix 2

Proposed Conditions Map

LEGEND

BASIN BOUNDARY

IMPERVIOUS SURFACE

FLOW DIRECTION ARROW

STORM DRAIN

SWALE

HYDROLOGY NODE (#)

PROPOSED HYDROLOGY

UCR BARN - PRELIMINARY HYDROLOGY

12/22/2016

20' 0' 10' 20'

SCALE: 1" = 20'

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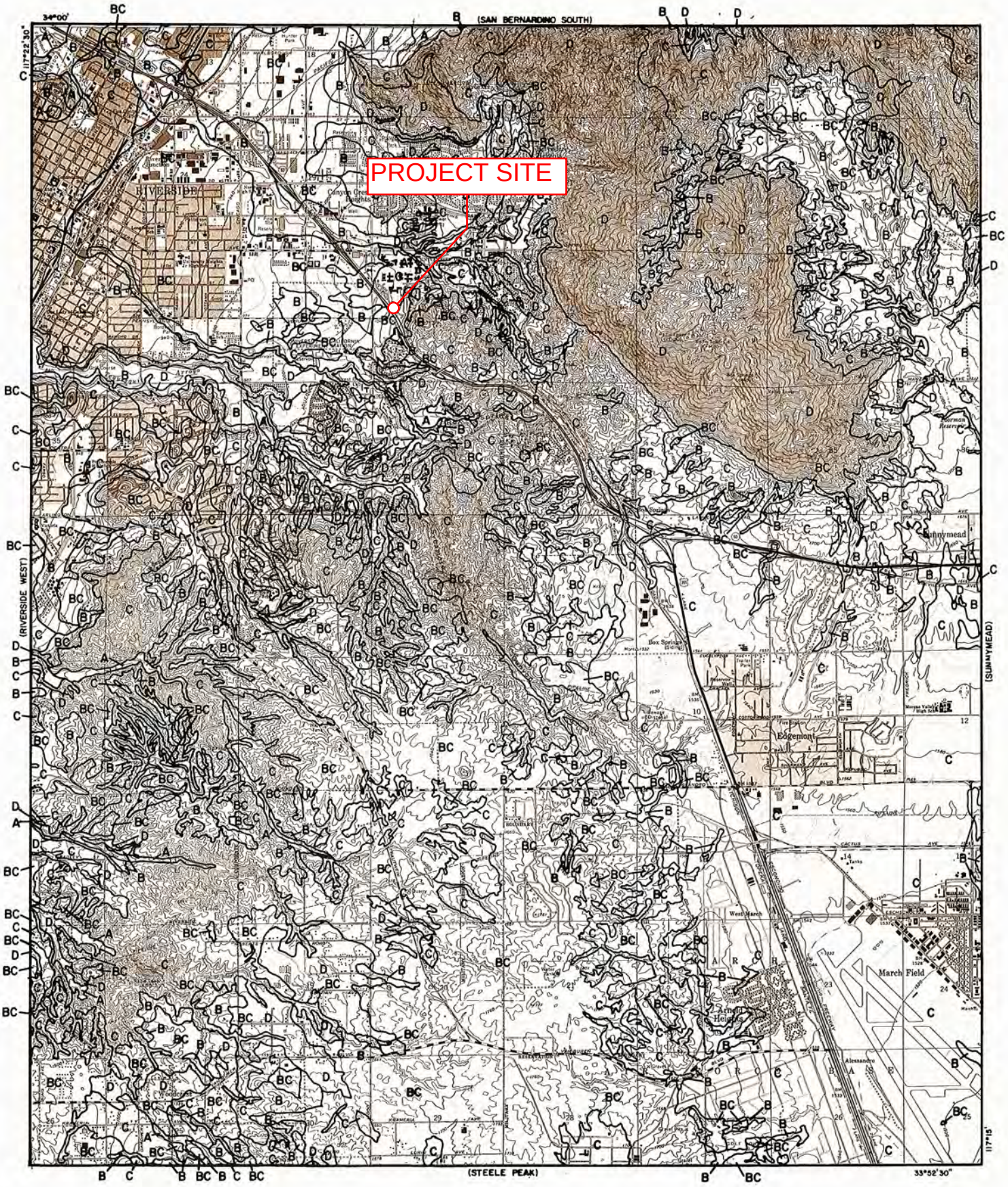
Appendix 3

Hydrology Manual References



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC&WCD

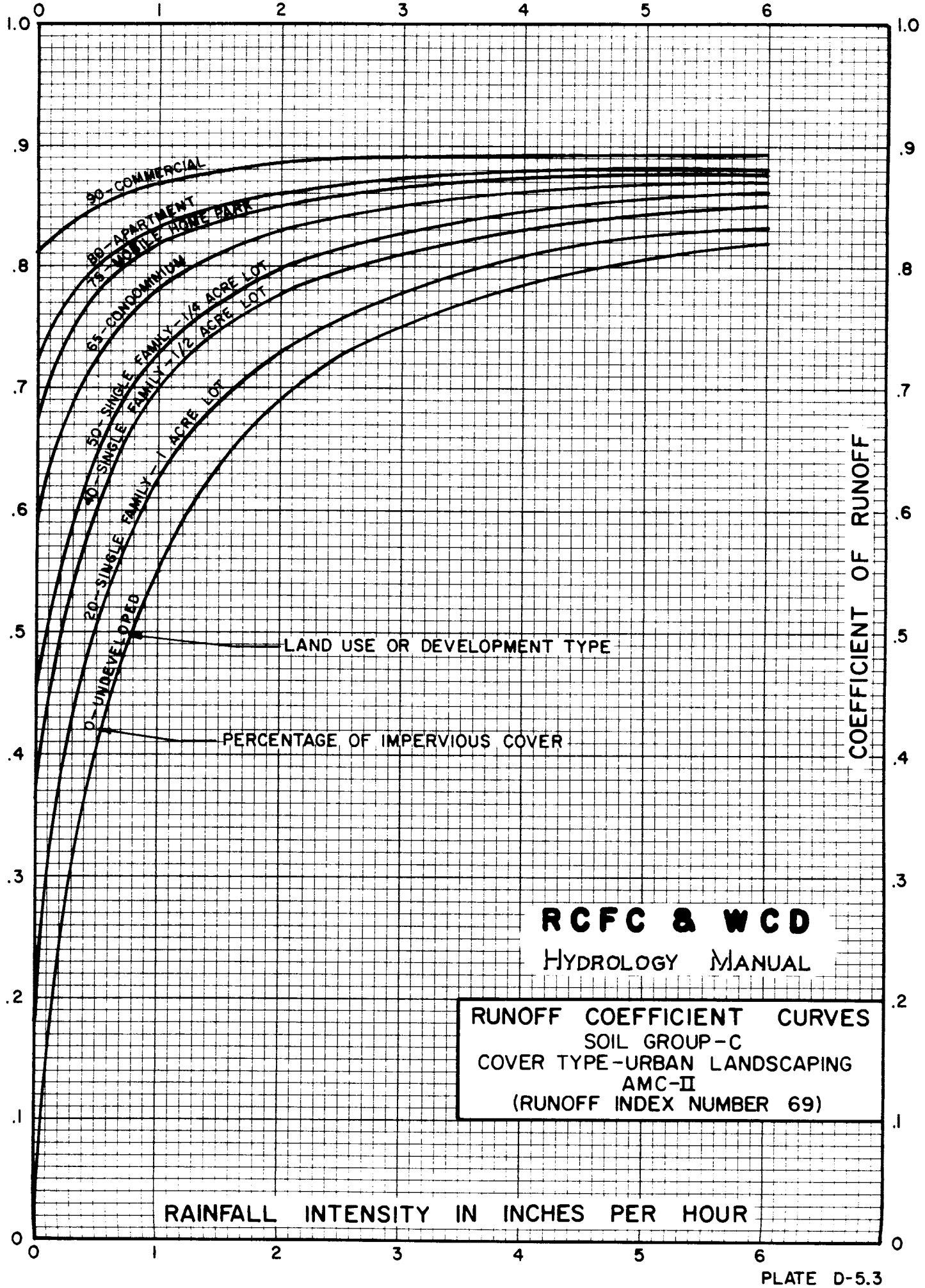
HYDROLOGY MANUAL

N

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR RIVERSIDE–EAST

PLATE C–1.16



RCFC & WCD

HYDROLOGY MANUAL

RUNOFF COEFFICIENT CURVES
SOIL GROUP-C
COVER TYPE-URBAN LANDSCAPING
AMC-II
(RUNOFF INDEX NUMBER 69)

PLATE D-5.3

UC RIVERSIDE BARN PROJECT

PROJECT LOCATION

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

UC RIVERSIDE BARN PROJECT

PROJECT LOCATION

NOTES
1. Isohyetals based on NOAA Atlas 2, Volume XI – California, 1973

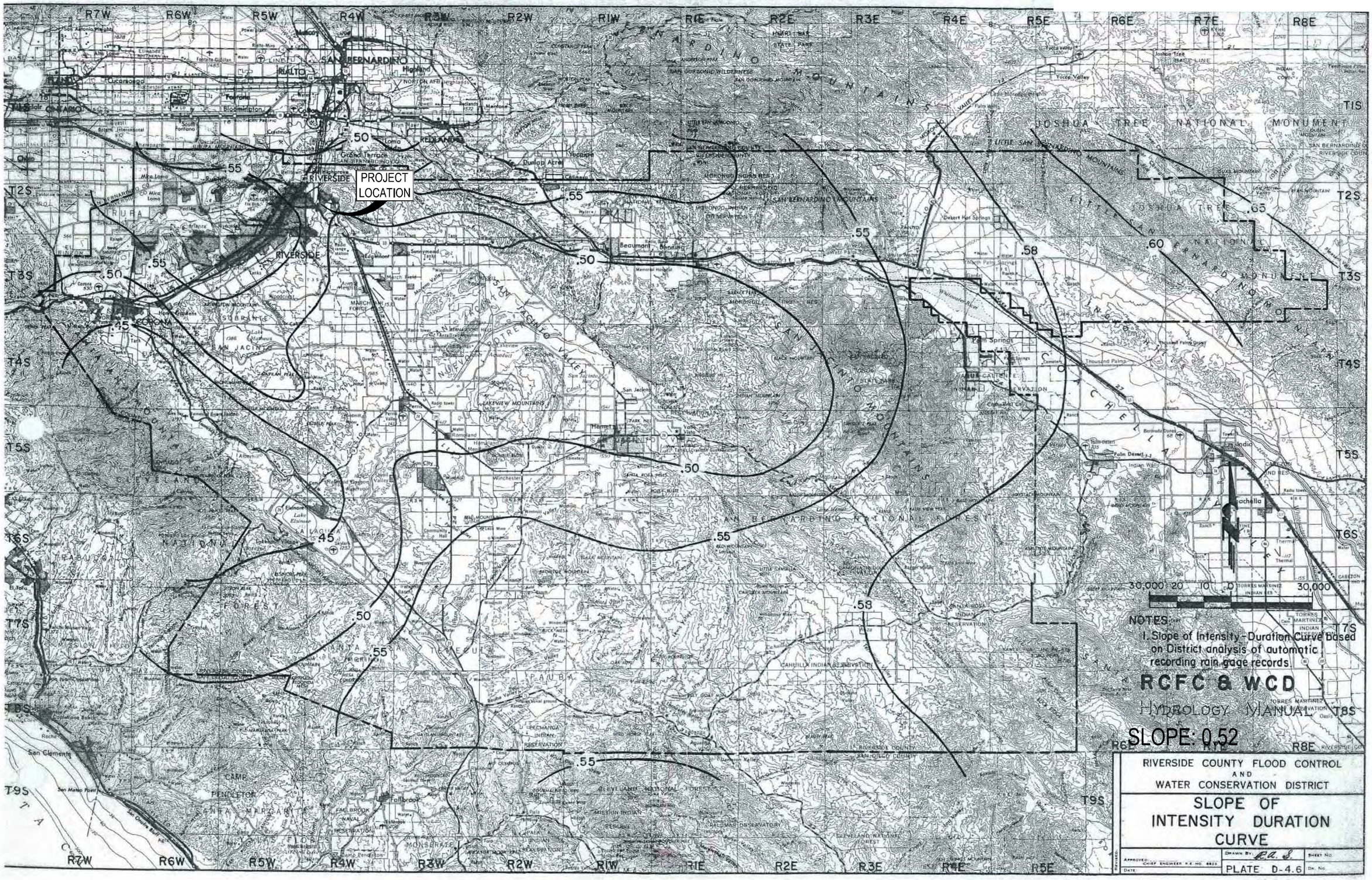
RCFC & WCD
HYDROLOGY MANUAL

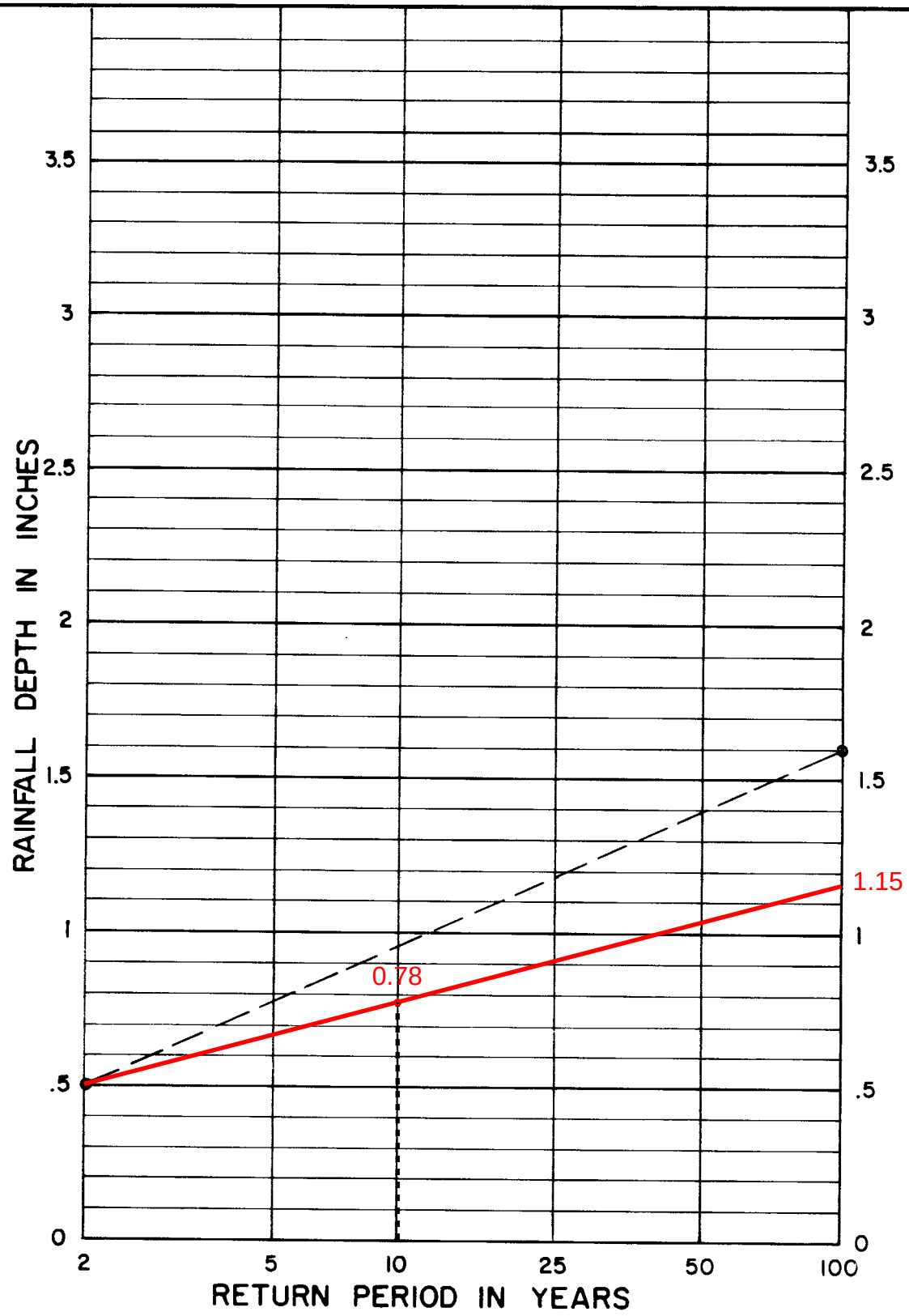
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

100-YEAR — 1-HOUR PRECIPITATION

DRAWN BY: A.A.S. | SHEET NO.
APPROVED CHIEF ENGINEER R.E. NO. 6822 | PLATE D-4.4 | DR. NO.
DATE

UC RIVERSIDE BARN PROJECT





NOTE:

1. For intermediate return periods plot 2-year and 100-year one hour values from maps, then connect points and read value for desired return period. For example given 2-year one hour = .50" and 100-year one hour = 1.60", 25-year one hour = 1.18"

Reference: NOAA Atlas 2, Volume XI - California, 1973.

RCFC & WCD

HYDROLOGY MANUAL

RAINFALL DEPTH VERSUS RETURN PERIOD FOR PARTIAL DURATION SERIES

PLATE D-4.5

Appendix 4

Rational Method Calculations

```
**************************************************************************
        RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
      (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
     (c) Copyright 1983-2014 Advanced Engineering Software (aes)
        Ver. 21.0  Release Date: 06/01/2014  License ID 1355

                  Analysis prepared by:

                    Fuscoe Engineering
                     16795 Von Karman
                        Suite 100
                    Irvine, California 92606

 ************************* DESCRIPTION OF STUDY *************************
* UCR BARN                                                *
* EXISTING CONDITIONS                                          *
* 10 YEAR STORM                                             *
 ************************************************************************

  FILE NAME: BARNE10.DAT
  TIME/DATE OF STUDY: 13:41 12/22/2016
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
              --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.50
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.780
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) = 0.7878
  SLOPE OF INTENSITY DURATION CURVE = 0.5200

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
    HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
    WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.  (FT)    (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   18.0      1.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  1.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *PIPE MAY BE SIZED TO HAVE A FLOW CAPACITY LESS THAN
   UPSTREAM TRIBUTARY PIPE.*
```

```
 *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
 FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
 ELEVATION DATA: UPSTREAM(FEET) =   1053.00  DOWNSTREAM(FEET) =   1050.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.495
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.177
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS   Tc
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 CONDOMINIUMS             C       0.53      0.57     0.350    69    8.50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA RUNOFF(CFS) =      0.94
 TOTAL AREA(ACRES) =      0.53   PEAK FLOW RATE(CFS) =      0.94

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =   1052.00  DOWNSTREAM(FEET) =   1048.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.359
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.195
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS   Tc
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 CONDOMINIUMS             C       1.14      0.57     0.350    69    8.36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA RUNOFF(CFS) =      2.05
 TOTAL AREA(ACRES) =      1.14   PEAK FLOW RATE(CFS) =      2.05

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1046.50  DOWNSTREAM ELEVATION(FEET) = 1046.00
 STREET LENGTH(FEET) =    40.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00
```

```
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.00
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.32
  HALFSTREET FLOOD WIDTH(FEET) =    9.64
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.86
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.91
 STREET FLOW TRAVEL TIME(MIN.) =   0.23   Tc(MIN.) =    8.59
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.164
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                C        1.00      0.57     0.100    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    1.90
 EFFECTIVE AREA(ACRES) =      2.14    AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.57  AREA-AVERAGED Ap =  0.23
 TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       3.91

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.85
 FLOW VELOCITY(FEET/SEC.) =  3.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
 LONGEST FLOWPATH FROM NODE      3.00 TO NODE      5.00 =     340.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       2.1  TC(MIN.) =      8.59
 EFFECTIVE AREA(ACRES) =      2.14  AREA-AVERAGED Fm(INCH/HR)=  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.57  AREA-AVERAGED Ap = 0.233
 PEAK FLOW RATE(CFS)   =       3.91
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
        RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
      (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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        Ver. 21.0  Release Date: 06/01/2014  License ID 1355

                  Analysis prepared by:

                    Fuscoe Engineering
                     16795 Von Karman
                        Suite 100
                    Irvine, California 92606

 ************************* DESCRIPTION OF STUDY *************************
* UCR BARN                                                *
* EXISTING CONDITIONS                                             *
* 100 YEAR                                              *
 ************************************************************************

  FILE NAME: BARNE100.DAT
  TIME/DATE OF STUDY: 13:25 12/22/2016
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
              --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.50
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.780
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) = 1.1500
  SLOPE OF INTENSITY DURATION CURVE = 0.5200

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
    HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
    WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.  (FT)    (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   18.0      1.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  1.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *PIPE MAY BE SIZED TO HAVE A FLOW CAPACITY LESS THAN
   UPSTREAM TRIBUTARY PIPE.*
```

```
 *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
 FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
 ELEVATION DATA: UPSTREAM(FEET) =   1053.00  DOWNSTREAM(FEET) =   1050.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.495
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.178
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS   Tc
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 CONDOMINIUMS             C       0.53      0.57     0.350    69    8.50
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA RUNOFF(CFS) =      1.42
 TOTAL AREA(ACRES) =      0.53   PEAK FLOW RATE(CFS) =      1.42

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =   1052.00  DOWNSTREAM(FEET) =   1048.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.359
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.205
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS   Tc
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 CONDOMINIUMS             C       1.14      0.57     0.350    69    8.36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA RUNOFF(CFS) =      3.08
 TOTAL AREA(ACRES) =      1.14   PEAK FLOW RATE(CFS) =      3.08

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1046.50  DOWNSTREAM ELEVATION(FEET) = 1046.00
 STREET LENGTH(FEET) =    40.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00
```

```
 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.48
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.36
  HALFSTREET FLOOD WIDTH(FEET) =   11.46
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.13
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
 STREET FLOW TRAVEL TIME(MIN.) =   0.21   Tc(MIN.) =    8.57
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.163
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                C        1.00      0.57     0.100    69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    2.80
 EFFECTIVE AREA(ACRES) =      2.14    AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.57  AREA-AVERAGED Ap =  0.23
 TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       5.84

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.79
 FLOW VELOCITY(FEET/SEC.) =  3.33   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
 LONGEST FLOWPATH FROM NODE      3.00 TO NODE      5.00 =     340.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       2.1  TC(MIN.) =      8.57
 EFFECTIVE AREA(ACRES) =      2.14  AREA-AVERAGED Fm(INCH/HR)=  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.57  AREA-AVERAGED Ap = 0.233
 PEAK FLOW RATE(CFS)   =       5.84
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
        RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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        Ver. 21.0  Release Date: 06/01/2014  License ID 1355

                  Analysis prepared by:

                    Fuscoe Engineering
                     16795 Von Karman
                       Suite 100
                    Irvine, California 92606

 ************************* DESCRIPTION OF STUDY *************************
* UCR BARN                                                *
* PROPOSED CONDITIONS                                          *
* 10 YEAR STORM                                             *
 ************************************************************************

  FILE NAME: BARNP10.DAT
  TIME/DATE OF STUDY: 13:37 12/22/2016
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
              --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.50
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.780
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =   10.00   1-HOUR INTENSITY(INCH/HOUR) = 0.7878
  SLOPE OF INTENSITY DURATION CURVE = 0.5200

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
    HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
    WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.  (FT)    (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00  0.0313  0.167  0.0150
  2   18.0      1.0    0.020/0.020/0.020   0.50    1.50  0.0313  0.125  0.0130

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  1.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *PIPE MAY BE SIZED TO HAVE A FLOW CAPACITY LESS THAN
   UPSTREAM TRIBUTARY PIPE.*
```

```
 *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
 FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
 ELEVATION DATA: UPSTREAM(FEET) =   1053.00  DOWNSTREAM(FEET) =   1050.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.646
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.300
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS   Tc
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 APARTMENTS               C       0.69      0.57     0.200    69    7.65
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.36
 TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      1.36

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   310.00
 ELEVATION DATA: UPSTREAM(FEET) =   1052.00  DOWNSTREAM(FEET) =   1048.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.673
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.296
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS   Tc
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 APARTMENTS               C       0.98      0.57     0.200    69    7.67
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.92
 TOTAL AREA(ACRES) =      0.98   PEAK FLOW RATE(CFS) =      1.92

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1046.50  DOWNSTREAM ELEVATION(FEET) = 1046.00
 STREET LENGTH(FEET) =    40.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00
```

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 1.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0130
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.93
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.29
HALFSTREET FLOOD WIDTH(FEET) = 7.95
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.58
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.74
STREET FLOW TRAVEL TIME(MIN.) = 0.26 Tc(MIN.) = 7.93
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.256
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.01	0.57	0.100	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.57
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.01 SUBAREA RUNOFF(CFS) = 0.02
EFFECTIVE AREA(ACRES) = 0.99 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 1.92
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.29 HALFSTREET FLOOD WIDTH(FEET) = 7.95
FLOW VELOCITY(FEET/SEC.) = 2.57 DEPTH*VELOCITY(FT*FT/SEC.) = 0.73
LONGEST FLOWPATH FROM NODE 3.00 TO NODE 5.00 = 350.00 FEET.

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 1.0 TC(MIN.) = 7.93
EFFECTIVE AREA(ACRES) = 0.99 AREA-AVERAGED Fm(INCH/HR)= 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.199
PEAK FLOW RATE(CFS) = 1.92

==========

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END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
        RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
      (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
     (c) Copyright 1983-2014 Advanced Engineering Software (aes)
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                  Analysis prepared by:

                    Fuscoe Engineering
                     16795 Von Karman
                       Suite 100
                    Irvine, California 92606

 ************************* DESCRIPTION OF STUDY *************************
* UCR BARN                                                *
* PROPOSED CONDITIONS                                             *
* 100 YEAR                                              *
 ************************************************************************

  FILE NAME: BARNP100.DAT
  TIME/DATE OF STUDY: 13:28 12/22/2016
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
              --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.50
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.780
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.150
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) = 1.1500
  SLOPE OF INTENSITY DURATION CURVE = 0.5200

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
    HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
    WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.  (FT)    (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   18.0      1.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  1.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (FT*FT/S)
  *PIPE MAY BE SIZED TO HAVE A FLOW CAPACITY LESS THAN
   UPSTREAM TRIBUTARY PIPE.*
```

```
 *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
 FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
 ELEVATION DATA: UPSTREAM(FEET) =   1053.00  DOWNSTREAM(FEET) =   1050.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.646
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.357
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS   Tc
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 APARTMENTS               C       0.69      0.57     0.200    69    7.65
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      2.01
 TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      2.01

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   310.00
 ELEVATION DATA: UPSTREAM(FEET) =   1052.00  DOWNSTREAM(FEET) =   1048.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.673
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.351
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp        Ap     SCS   Tc
     LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 APARTMENTS               C       0.98      0.57     0.200    69    7.67
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.57
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      2.86
 TOTAL AREA(ACRES) =      0.98   PEAK FLOW RATE(CFS) =      2.86

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) = 1046.50  DOWNSTREAM ELEVATION(FEET) = 1046.00
 STREET LENGTH(FEET) =    40.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00
```

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 1.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.020
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.020

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0130
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.87
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.32
HALFSTREET FLOOD WIDTH(FEET) = 9.46
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.83
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.89
STREET FLOW TRAVEL TIME(MIN.) = 0.24 Tc(MIN.) = 7.91
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.299
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	C	0.01	0.57	0.100	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.57
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.01 SUBAREA RUNOFF(CFS) = 0.03
EFFECTIVE AREA(ACRES) = 0.99 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 1.0 PEAK FLOW RATE(CFS) = 2.86
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.32 HALFSTREET FLOOD WIDTH(FEET) = 9.46
FLOW VELOCITY(FEET/SEC.) = 2.82 DEPTH*VELOCITY(FT*FT/SEC.) = 0.89
LONGEST FLOWPATH FROM NODE 3.00 TO NODE 5.00 = 350.00 FEET.

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END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 1.0 TC(MIN.) = 7.91
EFFECTIVE AREA(ACRES) = 0.99 AREA-AVERAGED Fm(INCH/HR)= 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.57 AREA-AVERAGED Ap = 0.199
PEAK FLOW RATE(CFS) = 2.86

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END OF RATIONAL METHOD ANALYSIS

Phase II Small MS4 Post-Construction Stormwater Management Checklist

Projects That Create/Replace >2,500 sf of impervious surface

9/26/2016

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 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: UCR Barn	Project #:
Project Location: UCR Barn - West Campus Drive	
Description of Project: The project site is located within the UC Riverside Campus, in Riverside County, California. The existing site consists of the existing Barn Dining and Barn Theatre Buildings which are to remain, and a Barn Stable building on the west side of the project will be demolished. The existing site includes landscaping and paving for parking, drive access, and pedestrian access which will be removed and replaced. The project proposes to construct several new buildings including a Campus Meeting Room, Faculty/Staff Dining building, and a Kitchen Addition to the Barn Dining. The project will also include pedestrian paving and landscaping improvements, and a loading dock / service yard. The project site is approximately 1.7 acres and is bounded by Chass building to the North, Sproul Hall to the east, and West Campus Drive along the South and West sides. Refer to the Proposed Hydrology Exhibit in Drainage Study for the proposed site plan.	
Project Type: New Development ☒ Redevelopment[1] ☐ Retrofit ☐ Landscaping ☐ Road ☐ Utility ☐ Other ☐ _____	
Total Project Site Area (sq ft): 72,750 Disturbed (sq ft): 72,750 New Impervious (sq ft): 13,900 Replaced Impervious (sq ft):[1] 32,600 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: 39,610 Total Post-project Impervious: 53,520	

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 Calculator for Small Projects (or equivalent) may be used to quantify the runoff reduction resulting from implementation of site design measures, and the calculations may be attached to this checklist.

Describe the site design measures selected (attach additional sheets if necessary):

Size of area that will drain to each BMP (sq ft): See Part B

Volume of runoff that will be managed by each BMP (cu ft): See Part B

Pollutants that will be managed by each BMP (check each that apply):

☒ Trash ☒ Sediment ☐ Dry weather flow ☐ Other:_____

Pre-project runoff volume (cu ft): See Part B Project-related runoff volume increase (cu ft): See Part B

Project-related runoff volume increase with reduction credits (cu ft): See Part B

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 Stormwater BMP Handbook for New Development and Redevelopment: https://www.casqa.org/resources/bmp-handbooks/new-development-redevelopment-bmp-handbook.

Describe the source control BMPs that will be implemented for the project for all pollutant generating activities checked above (attached additional sheets if necessary):

-Drain or wash water from the service yard will be directed into the sewer system via an automatic switch / diversion control valve dowstream of the trench drain. Stormwater will enter the storm drain system, non-stormwater will enter the sewer.

-Interior floor drains will be directed to sewer

-loading dock drainage will be isolated to the maximum extent practical. Dry weather flows will be directed to the sanitary sewer system.

-outdoor storage of equipment or materials will be covered to the maximum extent practical to reduce the potential of stormwater contact.

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:	2) Flow-based 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 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.	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 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) may be used to quantify the runoff reduction, and the calculations may be attached to 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): Tree Planting, Impervious Disconnection, and Soil Quality Improvements will be implemented per the attached SMARTS Post-Construction Calculator to manage runoff from the 85th percentile storm event.

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): 1,499 Project-related runoff volume increase (cu ft): 3,082

Project-related runoff volume increase with reduction credits (cu ft): (-6,684)

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.

Post-Construction Water Balance Calculator

	User may make changes from any cell that is orange or brown in color (similar to the cells to the immediate right). Cells in green are calculated for you.			(Step 1a) If you know the 85th percentile storm event for your location enter it in the box below		(Step 1b) If you can not answer 1a then select the county where the project is located (click on the cell to the right for drop-down): This will determine the average 85th percentile 24 hr. storm event for your site, which will appear under precipitation to left.			***RIVERSIDE***			
				0.61		(Step 1c) If you would like a more percise value select the location closest to your site. If you do not recgonize any of these locations, leave this drop-down menu at location. The average value for the County will be used.			**RIVERSIDE CITRUS EXP ST**			
	Project Information					***Runoff Calculations***						
	Project Name:	***Optional***				(Step 2) Indicate the Soil Type (dropdown menu to right):	***Group C Soils***		**Low infiltration. Sandy clay loam. Infiltration rate 0.05 to 0.15 inch/hr when wet.**			
	Waste Discharge Identification (WDID):	***Optional***				(Step 3) Indicate the existing **dominant** non-built land Use Type (dropdown menu to right):	***Brush: 50% to 75% ground cover***					
	Date:	***Optional***				(Step 4) Indicate the proposed **dominant** non-built land Use Type (dropdown menu to right):	***A mix of lawn, grass, pasture and tress covering more than 75% of the open space***					
	Sub Drainage Area Name (from map):	***Optional***					**Complete Either**					
	Runoff Curve Numbers						**Sq Ft**	**Acres**	**Acres**			
	Existing Pervious Runoff Curve Number		**85**			*(Step 5) Total Project Site Area:*	**72750**		**1.67**			
	Proposed Development Pervious Runoff Curve Number		**91**			*(Step 6) Sub-watershed Area:*	**72750**		**1.67**			
	Design Storm					*Percent of total project :*	**100%**					
	Based on the County you indicated above, we have included the 85 percentile average 24 hr event - P85 (in)^ for your area.	**0.61**	**in**									
	The Amount of rainfall needed for runoff to occur (Existing runoff curve number -P from existing RCN (in)^)	**0.36**	**In**			*(Step 7) Sub-watershed Conditions*	**Complete Either**		**Calculated Acres**			
	P used for calculations (in) (the greater of the above two criteria)	**0.61**	**In**			Sub-watershed Area (acres)	**Sq Ft**	**Acres**	**1.67**			
	^Available at www.cabmphandbooks.com					Existing Rooftop Impervious Coverage	**8100**	**0**	**0.19**			
						Existing Non-Rooftop Impervious Coverage	**31600**	**0**	**0.73**			
						Proposed Rooftop Impervious Coverage	**21000**	**0**	**0.48**			
						Proposed Non-Rooftop Impervious Coverage	**32500**	**0**	**0.75**			
						Credits	**Acres**		**Square Feet**			
						Porous Pavement	**0.00**		**0**			
						Tree Planting	**0.28**		**12,197**			
	Pre-Project Runoff Volume (cu ft)	**1,499**	**Cu.Ft.**			Downspout Disconnection	**0.02**		**871**			
	Project-Related Runoff Volume Increase w/o credits (cu ft)	**3,082**	**Cu.Ft.**			Impervious Area Disconnection	**0.19**		**8,276**			
						Green Roof	**0.00**		**0**			
						Stream Buffer	**0.00**		**0**			
	Project-Related Volume Increase with Credits (cu ft)	**-6,684**	**Cu.Ft.**			Vegetated Swales	**0.00**		**0**			
						Subtotal	**0.49**		**21,344**			
						Subtotal Runoff Volume Reduction Credit	**1021 Cu. Ft.**					
	You have achieved your minimum requirements					***(Step 9) Impervious Volume Reduction Credits***	**Volume (cubic feet)**					
						Rain Barrels/Cisterns	**0 Cu. Ft.**					
						Soil Quality	**8,745 Cu. Ft.**					
						Subtotal Runoff Volume Reduction	**8,745 Cu. Ft.**					
						Total Runoff Volume Reduction Credit	**9,766 Cu. Ft.**					

Downspout Disconnection Credit Worksheet

Please fill out a downspout disconnection credit worksheet for each project subwatershed. If you answer yes to all questions, all rooftop area draining to each downspout will be subtracted from your proposed rooftop impervious coverage.

Downspout Disconnection Credit Criteria					
Do downspouts and any extensions extend at least six feet from a basement and two feet from a crawl space or concrete slab?				○ Yes	◉ No
Is the area of rooftop connecting to each disconnected downspout 600 square feet or less?				○ Yes	◉ No
Is the roof runoff from the design storm event fully contained in a raised bed or planter box or does it drain as sheet flow to a landscaped area large enough to contain the roof runoff from the design storm event?				○ Yes	◉ No
The Stream Buffer and/or Vegetated Swale credits **will not** be taken in this sub-watershed area?				○ Yes	◉ No
Percentage of existing	0.19	Acres	of rooftop surface has disconnected downspouts		
Percentage of the proposed	0.48	Acres	of rooftop surface has disconnected downspouts	10	
				Return to Calculator	

Impervious Area Disconnection Credit Worksheet

Please fill out an impervious area disconnection credit worksheet for each project sub-watershed. If you answer yes to all questions, all non-rooftop impervious surface area will be subtracted from your proposed non-rooftop impervious coverage.

Non-Rooftop Disconnection Credit Criteria	Response
Is the maximum contributing impervious flow path length less than 75 feet or, if equal or greater than 75 feet, is a storage device (e.g. French drain, bioretention area, gravel trench) implemented to achieve the required disconnection length?	(●) Yes ( ) No
Is the impervious area to any one discharge location less than 5,000 square feet?	(●) Yes ( ) No
The Stream Buffer credit **will not** be taken in this sub-watershed area?	(●) Yes ( ) No

Percentage of existing	0.73	Acres non-rooftop surface area disconnected	
Percentage of the proposed	0.75	Acres non-rooftop surface area disconnected	25

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Please fill out a soil quality worksheet for each project sub-watershed.

	Response
Will the landscaped area be lined with an impervious membrane?	
Will the soils used for landscaping meet the ideal bulk densities listed in Table 1 below?[1]	◉ Yes ○ No
If you answered yes to the question above, and you know the area-weighted bulk density within the top 12 inches for soils used for landscaping (in g/cm^3)* , fill in the cell to the right and skip to cell G11. If not select from the drop-down menu in G10.	
If you answered yes to the question above, but you do not know the exact bulk density, which of the soil types in the drop down menu to the right best describes the top 12 inches for soils used for landscaping (in g/cm^3).	Sandy clay loams, loams, clay loams
What is the average depth of your landscaped soil media meeting the above criteria (inches)?	12
What is the total area of the landscaped areas meeting the above criteria (in acres)?	0.38

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Table 1

Sands, loamy sands	<1.6
Sandy loams, loams	<1.4
Sandy clay loams, loams, clay loams	<1.4
Silts, silt loams	<1.3
Silt loams, silty clay loams	<1.1
Sandy clays, silty clays, some clay loams (35-45% clay)	<1.1
Clays (>45% clay)	<1.1

Porosity (%) 47.17%

Mineral grains in many soils are mainly quartz and feldspar, so 2.65 a good average for particle density. To determine percent porosity, use the formula: Porosity (%) = (1-Bulk Density/2.65) X 100

[1] USDA NRCS. "Soil Quality Urban Technical Note No.2-Urban Soil Compaction". March 2000. http://soils.usda.gov/sqi/management/files/sq_utn_2.pdf

* To determine how to calculate density see: http://www.globe.gov/tctg/bulkden.pdf?sectionID=94