UC MERCED 2020 LONG-RANGE DEVELOPMENT PLAN
Recirculated Draft Subsequent Environmental Impact Report

SCH No. 2018041010

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University of California

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1.0 INTRODUCTION

1.1 SCOPE OF THE RECIRCULATED DRAFT SEIR

This Recirculated Draft Subsequent Environmental Impact Report (EIR) evaluates the potentially significant environmental effects of the proposed University of California (UC or the University) Merced (UC Merced or Campus) 2020 Long Range Development Plan (2020 LRDP).

In March 2009, the Board of Regents of the University of California (The Regents) certified a joint EIS/EIR (2009 UC Merced and University Community Project EIS/EIR; State Clearinghouse No. 2008041009) that analyzed and disclosed the impacts from the implementation of a Long Range Development Plan (LRDP) for the UC Merced campus and an adjoining community, and approved the UC Merced 2009 LRDP as a guide for physical development of the campus to accommodate growth projected through 2030 and beyond. For ease of reference, the 2009 UC Merced and University Community Project EIS/EIR is referred to in this Recirculated Draft SEIR as the 2009 LRDP EIS/EIR. The 2009 LRDP addressed the development of the campus to support an enrollment level of 25,000 students by the year 2030 on an 815-acre site. Since then, the University has revised its enrollment projections through 2030 down substantially and has also acquired more land to the south of the campus as part of the dissolution of a prior joint development venture with the Virginia Smith Trust. Furthermore, UC Merced plans to accommodate the projected enrollment growth on a smaller development footprint than previously identified in the 2009 LRDP. As a result of these changes, UC Merced has developed a revised land use plan for the campus site, which is included in the proposed 2020 LRDP.

Before The Regents can approve the proposed LRDP, The Regents must evaluate and disclose the environmental impacts of approving and implementing the 2020 LRDP. According to California Environmental Quality Act Guidelines (*State CEQA Guidelines*) Section 15162, a Subsequent EIR is required when a substantial change is proposed to a project for which an EIR has been previously certified. UC Merced has determined that the changes to the campus land use plan and anticipated development footprint are substantial changes and therefore, a Subsequent EIR (SEIR) is the appropriate CEQA document for the 2020 LRDP.

In September 2019, the University, acting as the lead agency under CEQA, published the 2020 LRDP Draft SEIR, which analyzed and disclosed the potentially significant environmental impacts of the proposed 2020 LRDP. The Draft SEIR was circulated for agency and public comment for a period of 45 days that ended on November 4, 2019. The University also conducted two public hearings on October 17 and 28, 2019 during the Draft SEIR circulation period.

The University has elected to recirculate the entire Draft SEIR to disclose new potentially significant biological resource impacts and to provide other clarifications, such as explaining the relationship between this SEIR and the 2009 LRDP EIS/EIR and to identify where the prior 2009 LRDP EIS/EIR was available and could be reviewed pursuant to *State CEQA Guidelines* Section 15162(d). The two new impacts to biological resources would be reduced to a less than significant level with the proposed mitigation. The corrections and additional information that has been added to the SEIR do not change any of the impact conclusions of the previously circulated Draft SEIR, and do not represent significant new information. The University has voluntarily included them in this Recirculated Draft SEIR for the benefit of reviewers. **Section 1.8 below** presents a list of those sections of the previously circulated Draft SEIR that have been revised, and summarizes the revisions that have been made to those sections.

For ease of reference, the Recirculated Draft SEIR is referred to as the "SEIR" throughout this document. As required by CEQA, this SEIR (1) assesses the potentially significant environmental effects of the proposed project, including cumulative impacts of the proposed project in conjunction with other reasonably foreseeable development; (2) identifies feasible means of avoiding or substantially lessening significant adverse impacts; and (3) evaluates a range of reasonable alternatives to the proposed project, including the No Project Alternative. The University is the "lead agency" for the project evaluated in this SEIR. The Regents has the principal responsibility for approving this project.

When certified, this SEIR, in conjunction with the 2009 LRDP EIS/EIR, will serve as the base environmental document for tiering purposes when implementing the 2020 LRDP. The 2020 LRDP will replace the 2009 LRDP as the planning document for decisions related to campus development.

1.2 PURPOSE OF THIS SEIR

The University has commissioned this SEIR evaluating the environmental effects of the 2020 LRDP for the following purposes:

- To satisfy the requirements of CEQA (Public Resources Code, Sections 21000–21178), the *State CEQA Guidelines* (California Code of Regulations, Title 4, Chapter 14, Sections 15000–15387), and the University of California Guidelines for the Implementation of CEQA;

- To inform the general public, the local community, responsible and interested public agencies, and The Regents of the nature of the proposed project, its potential significant environmental effects, measures to mitigate those effects, and alternatives to the proposed project;

- To enable The Regents to consider the environmental consequences of approving the 2020 LRDP;

- To provide a basis for tiering subsequent environmental documents from the 2020 LRDP EIR pursuant to the *State CEQA Guidelines* Sections 15152, 15168(c) and 15183.5; and
- For consideration by responsible agencies in issuing permits and approvals for projects under the 2020 LRDP and other actions.

As described in CEQA and the *State CEQA Guidelines*, public agencies are charged with the duty to avoid or substantially lessen significant environmental effects, where feasible. In satisfying this duty, a public agency has an obligation to balance the project's significant effects on the environment with its benefits, including economic, social, technological, legal, and other benefits. This SEIR is an informational document, the purpose of which is to identify the potentially significant effects of the proposed project on the environment and to indicate the manner in which those significant effects can be avoided or lessened; to identify any significant and unavoidable adverse impacts that cannot be mitigated; and to identify reasonable and feasible alternatives to the proposed project that would eliminate or reduce any significant adverse environmental effects to a less than significant level.

The University, as the lead agency, is required to consider the information in the SEIR, along with any other relevant information, in making its decisions on the proposed project. Although the SEIR does not determine the ultimate decision that will be made regarding implementation of the 2020 LRDP, CEQA requires the University to consider the information in the SEIR and make findings regarding each significant and unavoidable effect identified in the SEIR. The Regents will review and consider certification of the Final SEIR prior to any decision on whether to approve the 2020 LRDP.

1.3 PROJECT BACKGROUND AND NEED

In 2002, The Regents approved the first LRDP for the development of the UC Merced campus on a 910-acre site near Lake Yosemite about 2 miles north of the City of Merced, with the purpose of providing a UC campus to the previously underserved Central Valley. The campus site was located in an area that contained a high concentration of vernal pools and other seasonal wetlands, and habitat for several special-status species. Therefore, the University submitted an application to the U.S. Army Corps of Engineers for a Section 404 permit under the Clean Water Act that would allow the University to fill the wetlands for the development of the campus. Following the approval of the 2002 LRDP, the construction of the first phase of the campus was commenced on a portion of the campus site that did not contain any wetlands.

At the time of campus establishment, land to the south of the campus site was owned by Virginia Smith Trust (VST). In 2002, the University and VST formed a limited liability corporation (LLC) called University Community Land Company (UCLC) for the development of the land to the south of the campus.

Upon completion of the first phase of facilities, UC Merced was opened in 2005. Following the opening of the campus, the University continued to work with the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and other state and federal agencies to adjust and refine the location of the proposed campus. In 2007, agreement on the size and location of the campus was achieved, which included an approximately 815-acre campus site that was shifted to the south of the original campus site. The 815-acre campus site excluded the canal rights-of-way and comprised about 549 acres owned by the University and about 266 acres owned by UCLC.

The University then commenced the preparation of a revised LRDP (2009 LRDP) and a joint Environmental Impact Statement (EIS) and an EIR to evaluate and disclose the environmental impacts from the development of the revised campus site pursuant to the 2009 LRDP, along with the development of a community to the south of the campus. In March 2009, The Regents certified the EIR for the University of California, Merced and University Community Project, and in April 2009, the U.S. Corps of Engineers approved the 2009 EIS. As noted earlier, for ease of reference, the 2009 UC Merced and University Community Project EIS/EIR is referred to in this SEIR as the 2009 LRDP EIS/EIR.

The 2009 LRDP EIS/EIR evaluated at a program level the potential environmental effects from the implementation of the 2009 LRDP and identified means to eliminate or reduce potential adverse impacts. The 2009 LRDP EIS/EIR also included a project-level evaluation of Phase 2 of campus development, later named the UC Merced 2020 Project. In addition to analyzing the impacts of campus development, the 2009 LRDP EIS/EIR analyzed the environmental impacts from the development of the approximately 833-acre UCLC property to the south of the campus site. The planned land development on the UCLC property was called University Community North in the 2009 LRDP EIS/EIR.

Although 549 acres of the 815-acre campus site were owned by the University, about 266 acres in the southern portion of the campus site still remained in the ownership of UCLC. In addition, UCLC owned the University Community North lands to the south of the campus site, for a total of approximately 1,111 acres. In 2017, the UCLC lands were subdivided, with approximately 477 acres in the northern portion of the UCLC property transferred to the University and approximately 634 acres transferred to VST. With this subdivision, the acreage of the campus site increased to approximately 1,026 acres. **Table 1.0-1, Approved and Revised Campus Acreage,** below provides the ownership information and shows the changes to the campus site following the subdivision of the UCLC lands.

Table 1.0-1
Approved and Revised Campus Acreage

	Regents	UCLC	UCLC Land Added/Subtracted	Total Area
Approved Campus (2009)	549	266	–	815
University Community North (2009)	0	833	–	833
			Total	**1,648**
Revised Campus (2016)	549.3	476.5	476.5	1,025.8
University Community North (2016)	-	1,110.1	- 476.5	633.6
			Total	**1,659.6** [1]

Source: University of California, Merced 2019
Notes: All acreages in this table exclude the canal rights-of-way acreage.
[1] *The southeastern boundary of the University Community North lands was redefined between 2009 and 2016, resulting in an increased total area.*

Figure 1.0-1, Revised Campus Land Area, presents the areas added to the 815-acre campus. As a result of this and other changes in the University's plan for developing the campus that are described below, the University has decided to prepare an updated LRDP. The updated 2020 LRDP is proposed for the following reasons.

First, because about 211 acres have been added to the previously approved campus site, UC Merced determined that the LRDP should be revised to encompass this land.

Second, enrollment at UC Merced is projected to grow at a slower pace than originally anticipated, adding no more than about 5,000 to 5,600 additional students between 2020 and 2030. The University has not projected enrollment growth beyond 2030 as it will be largely dependent on future student demand and funding for additional facilities.

Third, the 2009 LRDP was largely based on specific and restrictive land use designations for areas targeted for future growth on the campus. Subsequent to implementation of the plan, UC Merced determined that the newly approved land use designations were too restrictive to allow for flexible growth as future demands on campus land are difficult to anticipate.

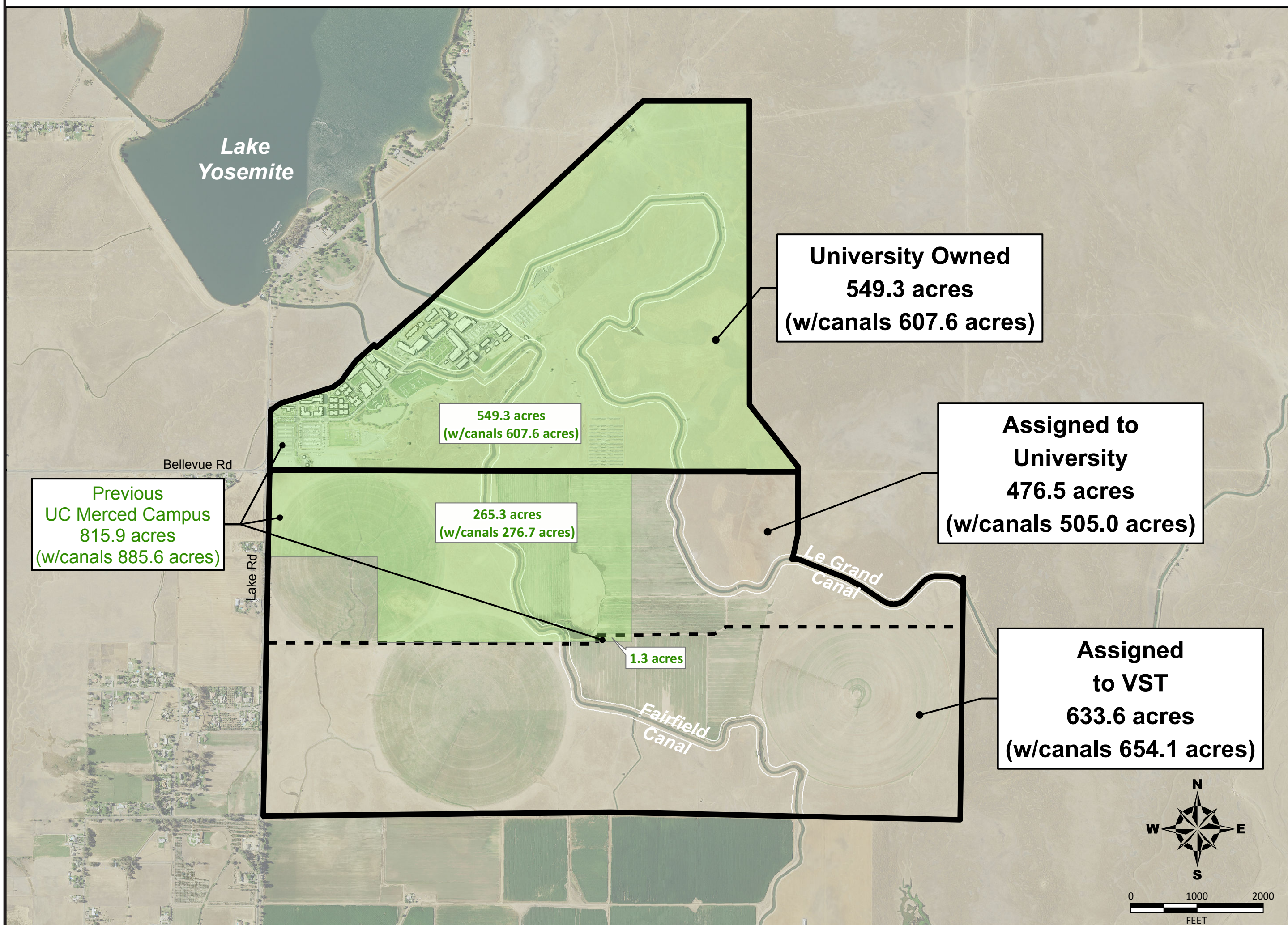
Lastly, it was determined that infrastructure delivery costs would be a major impediment to accommodate future growth as UC Merced continued to expand its footprint. It was determined that efforts should be made to ensure that the campus remained relatively compact, and that this could be achieved by increasing the density of development within the central portions of the campus and eliminating the need for infrastructure improvements such as roads, bridges across the canals that traverse through the campus, and pipeline extensions. Because this constitutes a change to the 2009

LRDP, UC Merced determined that an updated LRDP should be prepared with a compact footprint and sustainable growth focus as the primary goal.

1.4 SUMMARY OF THE PROPOSED 2020 LRDP

The proposed 2020 LRDP has been designed to guide the physical development of the campus to accommodate a projected enrollment level of 15,000 students by 2030. The 2020 LRDP plans for the addition of up to 1.83 million square feet of building space to the campus to serve this projected enrollment growth. The 2020 LRDP includes a revised land use diagram for the 1,026-acre campus. The Draft 2020 LRDP is described in detail in **Section 3.0, Project Description,** and is available online at https://planning.ucmerced.edu/2020LRDP.

The University is not asserting that the Merced Campus will not grow beyond an enrollment level of 15,000 students after 2030. However, enrollment growth beyond 2030 cannot be predicted accurately at this time, and the University does not want to engage in speculation regarding enrollment projections beyond 2030 and the associated physical growth that creates environmental effects. As an example, when the 2009 LRDP EIS/EIR was prepared, the Campus was projected to reach an enrollment level of 25,000 students by 2030. The Campus currently has an enrollment of about 8,000 students. Given the current enrollment, it is clear that the 2030 forecast in the 2009 LRDP EIS/EIR was not realistic. Courts have ruled that where future development is unspecified and uncertain, no purpose can be served by requiring an EIR to engage in sheer speculation as to future environmental consequences. As enrollment at UC Merced approaches 15,000 students, the University will prepare an updated LRDP that addresses the next phase of foreseeable physical development/growth and evaluate and disclose the effects of that growth in an EIR.



SOURCE: UC Merced, 2019

FIGURE **1.0-1**

Revised Campus Land Area

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1.5 ENVIRONMENTAL REVIEW PROCESS

1.5.1 Notice of Preparation and Scoping

On April 2, 2018, a Notice of Preparation (NOP) and Initial Study were published for the 2020 LRDP SEIR. In accordance with the *State CEQA Guidelines*, the NOP/IS was circulated for 30 days until May 1, 2018. Copies of the NOP, Initial Study, and comment letters are included in **Appendix 1.0**.

An EIR scoping meeting was held on April 25, 2018, in the UC Merced Downtown Campus Center (Conference Rooms 105 & 106), 655 W 18th Street, Merced, CA 95340. This meeting was intended to inform the public and interested agencies of the proposed 2020 LRDP, solicit comments, and identify areas of concern. No comments were received at the scoping meeting.

1.5.2 Type of CEQA Document

An LRDP is a guide to campus development. It identifies development objectives, delineates campus land uses, and estimates the new building space needed to support program expansion through the planning horizon year. The 2020 LRDP provides a guide to land and infrastructure development that could be built on the campus site to support a projected level of enrollment and employment growth through 2030. It is not an implementation plan, and its approval does not constitute a commitment to any specific project, construction schedule, or funding priority nor does it constitute a commitment by the University to enrollment growth or a certain amount of development. Further, the LRDP does not sunset, and there is no set timeframe when a new LRDP would be needed. However, for purposes of impact analysis, this SEIR assumes that the development of related facilities and housing to accommodate the projected student and faculty/staff growth would occur by 2030.

Section 15168 of the *State CEQA Guidelines* provides for the preparation of a Program EIR for a series of actions that can be characterized as one large project and are related either geographically, or as logical parts in a chain or contemplated actions, or as individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects that can be mitigated in similar ways. This 2020 LRDP SEIR is a First Tier/Program SEIR that evaluates the effects of LRDP implementation at a program level.

According to the *State CEQA Guidelines Section 15162(a),* a Subsequent EIR is required when a substantial change is proposed to a project for which an EIR has been certified. As discussed earlier in this section, the 2009 LRDP EIS/EIR evaluated full buildout of the campus to accommodate 25,000 students by 2030 at a program level under the 2009 LRDP; however, the proposed 2020 LRDP would substantially change the land use plan previously approved as part of the 2009 LRDP to reflect slower enrollment growth and a more compact development footprint. Accordingly, preparation of a SEIR is appropriate for the 2020 LRDP.

Because the proposed LRDP updates the 2009 LRDP, provides for a lower enrollment increase through 2030, and includes a land use plan that is based on a compact footprint with a simplified and streamlined land use diagram, some of the impact analyses in the 2009 LRDP EIS/EIR still hold for the proposed 2020 LRDP. As indicated in **Section 1.7** below, the Initial Study prepared for the 2020 LRDP (and included in this SEIR in **Appendix 1.0**) shows that for environmental topics that include aesthetics, agricultural and forest resources, cultural resources, geology and soils, hazardous materials, land use and planning, and minerals, the 2020 LRDP would not result in new or more severe impacts than previously disclosed in the 2009 LRDP EIS/EIR and related addenda. For those topics, the previous analysis is incorporated by reference and UC Merced will continue to rely on that analysis for LRDP approval and tiered review of subsequent projects. For all other environmental topics, the SEIR updates the previous analyses as necessary in light of the revised LRDP and/or due to new information of substantial importance that has become available since the certification of the previous EIR. The updated analysis in the SEIR supersedes and replaces the 2009 LRDP EIS/EIR analyses of impacts and mitigation measures in full.

With respect to specific development projects that may be proposed during the planning horizon of the 2020 LRDP, CEQA and the *State CEQA Guidelines* state that subsequent projects should be examined in light of the Program EIR to determine whether additional environmental documentation must be prepared. If no new significant effects would occur, all significant effects have been adequately addressed, and no new mitigation measures would be required, the subsequent projects within the scope of the approved LRDP could rely on the environmental analysis provided in the Program EIR, and no additional environmental documentation would be required. On the other hand, if it is determined that subsequent environmental documentation must be prepared, UC Merced will prepare additional CEQA documentation. Both the SEIR and the 2009 LRDP EIS/EIR (specific sections only along with related addenda) will be used as First Tier/Program EIRs under the tiering provision of CEQA to approve the implementation of subsequent projects on the campus. These additional documents would tier from the Program EIRs, as appropriate, for general discussions and for the analysis of cumulative impacts while focusing on more project- and site-specific impacts.

This SEIR also serves as the CEQA document for small-scale development projects proposed on the campus under the 2020 LRDP. This project type would include, but not be limited to, small solar and alternative energy projects, educational and research projects, and small ancillary buildings and structures and their associated infrastructure (i.e., utilities and roads). The projects would be small, involving less than 10,000 square feet of building space or less than 2 acres of ground disturbance and proposed on the campus lands within three specific land use designations (Campus Mixed Use [CMU], Campus Building Reserve and Support Land [CBRSL], or Research Open Space [ROS]). This project type is analyzed generically in this SEIR for its environmental impacts. As and when a small project is proposed, UC Merced will confirm that it meets the criteria for a small project and is located within these land use designations. If so, no further CEQA documentation would be prepared.

1.5.3 Publication of Draft SEIR

The University has filed a Notice of Completion (NOC) with the Governor's Office of Planning and Research, State Clearinghouse indicating that this Recirculated Draft SEIR has been completed and is available for review and comment by the public, interested parties, agencies, and organizations. As required under *State CEQA Guidelines* Sections 15087 and 15088.5(d), the University has also sent a Notice of Availability to all those who submitted comments on the Draft SEIR (for whom contact information was submitted to UC Merced), to all organizations and members of the public who were on the University's distribution list for the Draft SEIR, and to any additional persons or organizations that have requested information about the EIR since the publication of the Draft SEIR. Copies of this Recirculated Draft SEIR, the Draft 2020 LRDP, the technical studies used in the preparation of this Recirculated Draft SEIR, and the 2009 LRDP EIS/EIR and addenda, are available for review during normal operating hours at the Physical and Environmental Planning office in the Downtown Center at 655 West 18th Street, Merced, CA 95340. All of these documents are also available online at https://planning.ucmerced.edu/2020LRDP. (Note that these documents are not kept in the Mondo Building or at the UC Merced building at Castle.)

Consistent with *State CEQA Guidelines* Section 15087, this Recirculated Draft SEIR is being made available for public review for a period of 45 days. During this period, the general public, agencies, and organizations may submit written comments on the Recirculated Draft SEIR to UC Merced. Please note that comments on the previously circulated Draft SEIR are part of the administrative record for this project, and those comments were taken into consideration in the preparation of the Recirculated Draft SEIR. Further, those comments will be responded to in the Final SEIR. Therefore, the commenters are advised not be resubmit their previous comment letters as comments on the Recirculated Draft SEIR and any new comments should focus on only those portions of the Draft SEIR that are revised in this Recirculated Draft SEIR. In reviewing the Recirculated Draft SEIR, reviewers should focus on the document's adequacy in identifying and analyzing significant effects on the environment and ways in which the significant effects of the project might be avoided or mitigated. To ensure inclusion in the Final SEIR and full consideration by the lead agency, comments on the Recirculated Draft SEIR must be received during the public review period, which ends at 5:00 PM on February 3, 2020. They may be e-mailed to 2020LRDP@ucmerced.edu or sent to:

Phillip Woods, AICP
Director of Physical & Environmental Planning
Physical & Environmental Planning
University of California, Merced
5200 North Lake Road
Merced, California 95343

1.5.4 Publication of Final SEIR

Following the close of the Recirculated Draft SEIR review period, the University will review the written and oral comments received and prepare responses to the comments that pertain to the environmental analysis and effects of the proposed LRDP. The Final EIR will consist of the Recirculated Draft SEIR, comments on the Draft SEIR, comments on the Recirculated Draft SEIR, responses to comments on both Draft SEIR and Recirculated Draft EIR, and any text changes. The Final SEIR will be considered by The Regents in a public meeting and certified if the Final SEIR is determined to be in compliance with CEQA.

If the SEIR is certified by The Regents and the 2020 LRDP is approved, a new Mitigation Monitoring and Reporting Plan will be adopted. The MMRP will contain the mitigation measures set forth in the SEIR for those environmental topics that were reevaluated in the SEIR as well as the mitigation measures in the 2009 LRDP EIS/EIS that apply to environmental topics that were not reevaluated in the SEIR.

Upon certification of the SEIR, The Regents will consider the 2020 LRDP for approval.

1.6 INTENDED USES OF THIS SEIR

There are three purposes that are envisioned for this document. The Regents will use this SEIR to review and consider the environmental implications of approving the 2020 LRDP. Secondly, if the 2020 LRDP is approved, this SEIR, along with specific sections of the 2009 LRDP EIS/EIR and related addenda, will be used to focus and/or complete the environmental review of subsequent campus development projects and will serve as the CEQA documentation for small projects. Lastly, this document may be used as a source of information by responsible agencies with permitting or approval authority over specific development projects proposed on the campus under this LRDP.

1.7 REPORT ORGANIZATION

This SEIR is organized in two volumes (Volumes I and II). Volume I presents the program-level environmental impacts of implementing the 2020 LRDP, while Volume II provides technical appendices. The contents of Volume I include the following:

Section 1.0, Introduction, provides an overview of the purpose of the EIR, the type of EIR, the EIR review process, the intended uses of the EIR, and an overview of the format and contents of the Draft SEIR.

Section 2.0, Executive Summary, summarizes environmental consequences that would result from the proposed project, provides a summary table that denotes anticipated environmental impacts, describes identified mitigation measures, indicates the level of significance of impacts before and after mitigation; and presents alternatives evaluated in this Draft SEIR for their ability to reduce or avoid the significant impacts of the proposed project. The summary also lists areas of controversy known to the lead agency.

Section 3.0, Project Description, provides a detailed description of the proposed 2020 LRDP, including LRDP objectives, background information, the land use diagram, and description of designated land use categories.

Section 4.0, Environmental Setting, Impacts, and Mitigation Measures, contains the individual and cumulative environmental effects of the proposed 2020 LRDP by environmental topic. This section evaluates the following environmental topics in detail:

- 4.1 Air Quality
- 4.2 Biological Resources
- 4.3 Greenhouse Gas Emissions
- 4.4 Hydrology and Water Quality
- 4.5 Noise
- 4.6 Population and Housing
- 4.7 Public Services and Recreation
- 4.8 Transportation
- 4.9 Tribal Cultural Resources
- 4.10 Utilities and Service Systems
- 4.11 Energy

As the analysis in the Initial Study shows, the proposed project would clearly not result in new or more severe impacts on aesthetics, agricultural and forestry, cultural resources, geology and soils, hazards and hazardous materials, land use and planning, or mineral resources than previously analyzed and disclosed in the 2009 LRDP EIS/EIR, and no new mitigation measures would be required. Therefore, these environmental topics are not evaluated in further detail in this SEIR. For these environmental topics, UC Merced will continue to depend on the 2009 LRDP EIS/EIR for analysis.

Section 5.0, Alternatives, describes alternatives to the project and presents the comparative environmental consequences and benefits of each alternative. This section includes an analysis of the No Project Alternative, among others, as required by CEQA.

Section 6.0, Other CEQA Considerations, summarizes impacts that would result from LRDP implementation, including significant environmental effects, significant and unavoidable environmental effects, irreversible changes to the environment, and growth-inducing impacts.

Section 7.0, Report Preparation, identifies lead agency staff and consultants who prepared the Draft SEIR under contract to the University. It also identifies all federal, state, or local agencies, and individuals consulted during the preparation of the Draft SEIR.

Volume II, which is provided on a flash drive attached to the back cover of Volume I, includes all the appendices.

1.8 CHANGES TO THE DRAFT SEIR

Table 1.0-2 below lists the sections of the previously published Draft SEIR that have been revised and summarizes the revisions made to the text of these sections in the Draft Recirculated SEIR.

Table 1.0-2
Summary of Revisions to the Previously Circulated Draft SEIR

Section No.	Section Title	Nature of Revision
1.0	Introduction	New Section 1.1 has been added to explain why the Draft SEIR is being recirculated. Text has been added under Section 1.4 to explain why campus growth beyond 15,000 student enrollment level cannot be evaluated at this time. Section 1.5.2 has been expanded to explain the relationship between the SEIR and the 2009 LRDP EIS/EIR and the manner in which both documents will be used for tiering. Section 1.5.3 has been clarified to state where the Recirculated Draft SEIR, the 2009 LRDP EIS/EIR and the related addenda are available for review. Section 1.5.4 has been expanded to present the contents of the Final EIR and the MMRP.
2.0	Executive Summary	Section 2.1 has been revised to clarify the relationship between the SEIR and the 2009 LRDP EIS/EIR and the manner in which both documents will be used for tiering. Tables 2.0-2 and 2.0-3 have been revised to include a new potentially significant biological resource impact and mitigation measure, and a revised biological resource impact and related mitigation measure.
3.0	Project Description	Text in Section 3.3 has been revised to add more information about the VST property to the south of the campus site.
4.0	Environmental Setting, Impacts, and Mitigation Measures	A footnote has been added to indicate the current status of VST's land development proposal for the property to the south of the campus.
4.2	Biological Resources	Text and table in Section 4.2.2 have been revised to include a description of the Crotch bumble bee. A new potentially significant impact (LRDP Impact BIO-4) has been added to address the project's impact on the Crotch bumble bee. The impact will be reduced to less than significant with mitigation. LRDP Impact BIO-9 has been updated to include project impacts on bird movement due to building strikes, which would be reduced to less than significant with mitigation. The text of all other impacts in the previously circulated Draft SEIR, including impact conclusions, remains unchanged. No new mitigation has been added.

Table 1.0-2
Summary of Revisions to the Previously Circulated Draft SEIR

Section No.	Section Title	Nature of Revision
4.4	Hydrology and Water Quality	Text in Section 4.4.2 has been updated to reflect that a Groundwater Sustainability Plan (GSP) has been completed and adopted for the Merced Subbasin. LRDP Impact HYD-1 has been revised to include an evaluation of the proposed project relative to the findings and recommendations of the GSP. The impact conclusion remains unchanged. The text of all other impacts in the previously circulated Draft SEIR, including impact conclusions, remains unchanged. No new mitigation has been added.
4.6	Population and Housing	Text in Section 4.6.2 has been revised to correct typographic errors and inconsistency between text and data in tables; text related to housing projections has been expanded to provide clarification and more information. LRDP Impact PH-1 has been revised to highlight the key assumptions used in the analysis, and text has been added to explain the scope of population and housing impact analysis under CEQA. The impact conclusion remains unchanged. The text of all other impacts in the previously circulated Draft SEIR, including impact conclusions, remains unchanged. No new mitigation has been added.
4.7	Public Services and Recreation	Text in Section 4.7.2 has been expanded to present more information regarding the County fire department. LRDP Impact PUB-2 has been revised to explain the nature of the proposed project and the manner in which it would result in the need for expanded fire service. The impact conclusion remains unchanged. The text of all other impacts in the previously circulated Draft SEIR, including impact conclusions, remains unchanged. No new mitigation has been added.
4.8	Transportation	Text in Sections 4.8.1, 4.8.2, and 4.8.3 has been expanded to address a number of comments received on the Draft SEIR regarding the scope of the transportation impact analysis, as well as the relationship between the previously conducted 2009 transportation impact analysis and the current transportation impact analysis. The text of all impacts in the previously circulated Draft SEIR, including impact conclusions, remains unchanged. No new mitigation has been added.
4.10	Utilities and Service Systems	LRDP Impact UTL-1 and Cumulative Impact C-UTL-1 have been revised to include an evaluation of the proposed project relative to the findings and recommendations of the GSP. The impact conclusions of both impacts remain unchanged. The text of all other impacts in the previously circulated Draft SEIR, including impact conclusions, remains unchanged. No new mitigation has been added.
5.0	Alternatives	The text and table have been updated to include the new potentially significant impact on the Crotch bumble bee and the revised potentially significant impact on avian species. All other impacts and alternatives analyses remain unchanged. The conclusions of the section also remain unchanged.

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2.0 EXECUTIVE SUMMARY

2.1 PURPOSE

This Recirculated Draft Subsequent Environmental Impact Report (SEIR) evaluates the potentially significant environmental effects of the proposed University of California (UC or the University) Merced campus (UC Merced or Campus) 2020 Long Range Development Plan (hereinafter 2020 LRDP).

In March 2009, the Board of Regents of the University of California (The Regents) certified a joint EIS/EIR (State Clearinghouse No. 2008041009) that analyzed and disclosed the significant environmental impacts from the implementation of a Long Range Development Plan (LRDP) for the UC Merced campus, and approved the UC Merced 2009 LRDP as a guide for physical development to accommodate growth projected through 2030 and beyond. The 2009 LRDP addressed the development of the campus to support an enrollment level of 25,000 students by the year 2030 on an 815-acre site. Since then, the University has revised its enrollment projections through 2030 down substantially and has also acquired more land for campus development as a result of the transfer of a portion of the adjoining University Community Land Company (UCLC) property to its former partner, the Virginia Smith Trust. Furthermore, UC Merced plans to accommodate the projected enrollment growth on a smaller developed footprint within the larger campus site. As a result of these changes, UC Merced has developed an updated LRDP which includes a revised land use plan for the campus site.

Before The Regents can approve the proposed LRDP, The Regents must evaluate and disclose the environmental impacts of approving and implementing the proposed 2020 LRDP. According to *State CEQA Guidelines*, a Subsequent EIR is required when a substantial change is proposed to a project for which an EIR has been certified. UC Merced has determined that the changes to the previously approved LRDP are substantial changes and therefore, preparation of a Subsequent EIR is appropriate for the 2020 LRDP. As required by CEQA, this SEIR (1) assesses the potentially significant environmental effects of the proposed 2020 LRDP, including cumulative impacts of the campus development under the 2020 LRDP in conjunction with other reasonably foreseeable development; (2) identifies feasible means of avoiding or substantially lessening significant adverse impacts; and (3) evaluates a range of reasonable alternatives to the proposed 2020 LRDP, including the No Project Alternative.

The *State CEQA Guidelines (*Section 15123) requires that a summary be included in an EIR that identifies all major conclusions, identifies each significant effect, recommended mitigation measure(s), and alternatives that would minimize or avoid potential significant impacts. The summary is also required to identify areas of controversy known to the lead agency, including issues raised by agencies and the public and issues to be resolved. These issues include the choice among alternatives and whether or how to mitigate significant effects. This Executive Summary is intended to address these CEQA requirements and provide the decision makers, responsible agencies, and the public with a clear, simple, and concise description of the proposed project and its potential significant environmental impacts.

The University of California (the University) is the CEQA lead agency for the proposed project. The Regents has the principal responsibility for approving the proposed 2020 LRDP.

This 2020 LRDP SEIR is a First Tier/Program SEIR that evaluates the effects of LRDP implementation at a program level for all environmental topics except aesthetics, agricultural and forest resources, cultural resources, geology and soils, hazardous materials, land use and planning, and minerals which are adequately addressed in the 2009 LRDP EIS/EIR. The 2009 LRDP EIS/EIR, and all addenda that modify the 2009 LRDP, will continue to serve as a First Tier/Program EIR for those topics. With respect to specific development projects that may be proposed during the planning horizon of the 2020 LRDP, CEQA and the *State CEQA Guidelines* state that subsequent projects should be examined in light of the Program EIR to determine whether additional environmental documentation must be prepared. If no new significant effects would occur, all significant effects have been adequately addressed, and no new mitigation measures would be required, the subsequent projects within the scope of the approved LRDP could rely on the environmental analysis provided in the Program EIR, and no additional environmental documentation would be required. On the other hand, if it is determined that subsequent environmental documentation must be prepared, UC Merced will prepare additional CEQA documentation. These additional documents would tier from the 2009 LRDP EIS/EIR or the 2020 LRDP SEIR, as appropriate, for general discussions and for the analysis of cumulative impacts while focusing on more project- and site-specific impacts.

This SEIR also serves as the CEQA document for small-scale development projects proposed on the campus under the 2020 LRDP. This project type would include, but not be limited to, small solar and alternative energy projects, educational and research projects, and small ancillary buildings and structures and their associated infrastructure (i.e., utilities and roads). The projects would be small, involving less than 10,000 square feet of building space or less than 2 acres of ground disturbance, and would be proposed on the campus lands within three specific land use designations: (Campus Mixed Use [CMU], Campus Building Reserve and Support Land [CBRSL], or Research Open Space [ROS]). This project type is analyzed generically in this SEIR for its environmental impacts. As and when a small project is proposed, UC Merced will confirm that it meets the criteria for a small project and is located within these land use designations. If so, no further CEQA documentation would be prepared.

2.2 PROJECT LOCATION

The approximately 1,026-acre project site is the Merced campus of the University of California. The campus is located in eastern Merced County, within the sphere of influence (SOI) of the City of Merced, approximately 2 miles northeast of the city limits. The campus occupies portions of Sections 26, 27, 34, and 35, Township 6 South, Range 14 East; and Sections 3 and 2, Township 7 South, Range 14 East. The site is south southeast of Lake Yosemite Regional Park and east of Lake Road. State Route 99 provides regional access to the project site.

2.3 PROJECT DESCRIPTION

Each campus in the UC system is required to periodically examine its academic goals, and to support those goals, formulate a land use plan in an LRDP. An LRDP is defined by statute (Public Resources Code [PRC] 21080.09) as a "physical development and land use plan to meet the academic and institutional objectives for a particular campus or medical center of public higher education." As noted above, The Regents approved the 2009 LRDP for the UC Merced campus as a guide for physical development to accommodate enrollment growth projected through 2030. For reasons stated above and described in detail in **Section 1.0, Introduction**, the University determined that an updated LRDP must be prepared to better reflect the revised campus site and changed conditions in the area.

The proposed 2020 LRDP substantially revises the 2009 LRDP with the objective of accommodating projected increases in programs and providing appropriate space and infrastructure for existing and new initiatives on the campus, while allowing for more flexibility in the manner in which facilities are added to the campus to serve the projected enrollment growth. The salient features of the 2020 LRDP are described in **Sections 2.3.1** through **2.3.3** below.

2.3.1 Enrollment Projections

The 2009 LRDP was designed to accommodate an on-campus population of 25,000 students and an associated faculty and staff of 6,560 employees, for a total of 31,560 persons by 2030. UC Merced has revised its enrollment projection for 2030 to 15,000 students (headcount)[1]. The 2020 LRDP has been designed to accommodate this level of enrollment and associated smaller increases in faculty and staff

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1 Enrollment at UC campuses is calculated using two metrics. The first metric is headcount which is the actual number of students enrolled at the campus in a given semester or quarter and includes all students that are enrolled whether they are a full-time or a part-time student. The second metric is full-time equivalent (FTE). For this metric, all part-time students are converted into full-time equivalent students using a formula and that number is added to the number of full-time students enrolled at the campus, to get a total FTE count. For most UC campuses including UC Merced, because the majority of the students are full-time students, the headcount is only slightly higher than the FTE number. All analysis in this SEIR is based on headcount.

compared to the previous projections used in the design of the 2009 LRDP for 2030. Campus growth and development through 2020 will be addressed by the ongoing UC Merced 2020 Project which will add an adequate amount of facilities to the campus to accommodate up to 10,000 students by 2020, although when the analysis for this SEIR was commenced, the 2020 enrollment was projected to be 9,700 students. The 2020 LRDP is designed to address campus growth between 2020 and 2030. Between these years, based on an enrollment of 9,700 students in 2020, enrollment is projected to increase by about 5,300 students, and employment at the campus is projected to increase by 1,131 faculty and staff.[2]

2.3.2 Building Space

Given the lower total enrollment by 2030, UC Merced now projects that it will need to add about 1.83 million gross square feet (gsf) of building space to the campus between 2020 and 2030 to accommodate the projected enrollment increase and expanding academic programs. The 2020 LRDP identifies land area for the development of this amount of additional building space.

2.3.3 Land Use Designations and Map

The proposed 2020 LRDP sets forth a revised land use map to inform the pattern of development on the campus. This land use map replaces the prior 2009 LRDP land use map in full and establishes new land use designations. **Table 2.0-1** below presents a summary of campus land use designations and acres of land under each designation per the proposed 2020 LRDP land use map.

Table 2.0-1
Land Use Summaries and Acreages

Land Use Category	Acres
Campus Mixed Use (CMU)	274
Campus Building Reserve and Support Land (CBRSL)	306
Research Open Space (ROS)	135
Active Open Space (AOS)	9
Passive Open Space (POS)	283
Campus Parkway Open Space (CPOS)	19
Total	**1,026**

2 At the time that the analysis in this SEIR was commenced, UC Merced was projecting an enrollment level of 9,700 students by 2020. However, based on Fall 2019 enrollment, the Campus is now expected to have an enrollment of 9,400 students in 2020. This does not affect the 2030 enrollment projection which UC Merced still projects will be 15,000 students. That number is used in the SEIR for all impact analysis.

2.4 PROJECT NEED AND OBJECTIVES

The overall goal of the project is to continue the growth of UC Merced as a premier research university, consistent with the University of California's mission of teaching, research, and service excellence. The overarching objective of the 2020 LRDP is to provide an up-to-date land use plan to guide the physical planning and development of the next phase of campus growth from about 10,000 to 15,000 students, as well as to establish a paradigm for the campus' character.

The following are the specific project objectives that will facilitate accomplishment of the overarching project objective:

- Provide the physical planning framework to guide development that would be needed to accommodate anticipated increases in enrollment demand for the University of California system, both short-term and long-term.
- Reduce the costs of the next phase of campus development.
- Plan for a compact, pedestrian-oriented campus that reduces the need for new infrastructure.
- Plan and develop the campus to facilitate faculty-student interaction, ease and enjoyment of use of academic facilities, and an environment conducive to learning.
- Offer attractive and centrally located on-campus housing, consistent with UC-wide student housing policies.
- Provide opportunities for on-campus academic field research.
- Provide sufficient athletic facilities to offer high-quality NCAA, recreational, and club athletic programs commensurate with other premier universities.
- To the extent practicable, plan and develop the campus with sustainable design by incorporating energy efficiency, water conservation, protection of biological resources, waste reduction and minimization, on-site stormwater management and reduced dependence on automobiles.
- Promote community integration and reflect the landscape, history, resources, and diverse cultures of the San Joaquin Valley in terms of physical development.

2.5 TOPICS OF KNOWN CONCERN

To determine which environmental topics should be addressed in this SEIR, UC Merced circulated a Notice of Preparation (NOP) in order to receive input from interested public agencies and private parties. A copy of the NOP is presented in **Appendix 1.0** of this SEIR. Based on the NOP comments and the analysis in the Initial Study that accompanied the NOP, this SEIR addresses the following environmental topics in depth:

- Air Quality
- Biological Resources
- Greenhouse Gas Emissions
- Hydrology and Water Quality
- Noise
- Population and Housing
- Public Services and Recreation
- Transportation
- Tribal Cultural Resources
- Utilities
- Energy

2.6 ISSUES TO BE RESOLVED/AREAS OF CONTROVERSY

Specific issues that were raised in scoping comments include the following:

- Impacts of campus demand on water supply, especially in light of the Sustainable Groundwater Management Act;
- Impact of the higher density, high-rise campus development under the 2020 LRDP on aesthetics, including light and glare.
- Impacts on study area housing resources given the increase in student population and the fact that a University Community is unlikely to be developed adjacent to the campus within the timeframe of the LRDP;
- Impacts on public services, especially fire service provided by both the City and the County;
- Impacts on water and wastewater infrastructure from the growth of the campus under the 2020 LRDP;
- Impacts of increased campus-related traffic on the transportation system, including traffic impacts that would result if the portion of Campus Parkway north of Yosemite Avenue is not built;
- Consideration of mitigation measures put forth by Merced Irrigation District (MID) for potential effects on MID facilities on the campus;
- Recommendation by the Native American Heritage Commission (NAHC) that UC Merced conduct consultation with California Native American Tribes that are traditionally and culturally affiliated with the geographic area of the proposed project as early as possible to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources; and
- Recommendation by the California Department of Toxic Substances Control (DTSC) to confirm the absence of prior releases of hazardous materials on development sites on the campus.

All applicable scoping comments are addressed in the impact analysis. The visual effects from increasing building density and building heights on the campus were analyzed by the University in an addendum to the 2009 LRDP EIR at the time that the 2020 Project was planned. The proposed heights and densities under the 2020 LRDP are consistent with those approved and developed by the University in conjunction with the 2020 Project. Further evaluation is not required. Regarding the recommendation from the DTSC, there have been no releases of hazardous substances on the campus. Other than the barn, which has been demolished, there are no older structures on the campus site that could contain asbestos and/or lead based paint. Further, historical agricultural uses of the campus lands have included grazing and irrigated pasture and have not involved the use of fertilizers or pesticides.

2.7 ALTERNATIVES

Consistent with CEQA requirements, a reasonable range of alternatives were considered and evaluated in this SEIR. Two alternatives that were considered were found to be infeasible and were not carried forth for detailed evaluation. Two alternatives that were considered feasible were evaluated in detail along with the mandated No Project Alternative. The alternatives evaluated in detail are presented below.

2.7.1 Alternative 1: No Project

State CEQA Guidelines require the analysis of a No Project Alternative (Section 15126.6(e)). The analysis must discuss existing conditions, as well as what would be reasonably expected to occur in the foreseeable future if the proposed project were not to be approved, based on current plans, site zoning, and consistent with available infrastructure and community services. If a project is a development project on an identifiable site, *State CEQA Guidelines* Section 15126.6(e)(3)(B) provides that the discussion of the No Project Alternative should compare the environmental effects of the site remaining in its existing state against environmental effects which would occur if the project is approved.

The proposed 2020 LRDP is a land use plan and policy document to guide campus development. An LRDP does not limit or induce enrollment growth. Instead, using the enrollment and employment growth projections, UC Merced has estimated the amount of additional building space (academic, administrative, housing, student services, athletics, and support) that would be needed to accommodate the projected growth. Using the estimated building space and program needs, UC Merced has prepared the LRDP land use diagram that identifies areas within the campus site where the new building space or facilities could or should be built. Given that the LRDP is only a planning document that plans for but does not cause enrollment growth, if the proposed 2020 LRDP is not approved, enrollment and employment at UC Merced would continue to grow as currently projected to 15,000 students by 2030, and campus development would be guided by the previously approved 2009 LRDP, as amended in 2013 and 2017.

Building Program

Under the No Project Alternative, UC Merced would continue to grow at a rate similar to the rate of enrollment and employment growth analyzed for the proposed 2020 LRDP and the same amount of building space (about 1.83 million gsf) would be constructed on the campus site to accommodate the projected growth.

Campus Population

For reasons presented above, under the No Project Alternative, campus enrollment would grow to 15,000 students by 2030, and the faculty and staff would increase to about 2,411 employees.

Land Use Diagram

Development of the new facilities within the campus site under this alternative would be guided by the land use plan included in the 2009 LRDP as amended. That LRDP includes a land use plan for the 815-acre site but does not include 211 acres that are now a part of the campus. As there is no land use plan to guide the development of new facilities on the newly added 211 acres, projects within the newly added area would be developed without the benefit of a land use plan as the University Community Plan is for the development of a mixed-use community on the University Community North site and is not applicable or relevant to campus development. Compared to the proposed 2020 LRDP which limits the siting of new campus buildings to an approximately 274-acre area designated CMU, this alternative would allow campus buildings to be located on all lands except those designated Passive Open Space, and a dispersed and less dense development would likely result under this alternative.

2.7.2 Alternative 2: Reduced Development

The Reduced Development Alternative was developed in order to reduce the increase in vehicle trips to the campus and traffic-related impacts of the proposed project. Under this alternative, future campus development would be planned to accommodate a lower enrollment level by 2030.

Building Program

The proposed 2020 LRDP plans building space to accommodate the projected growth in enrollment between 2020 and 2030, after the completion of the 2020 Project. Similarly, this alternative also plans for the growth in enrollment between 2020 and 2030 but at a lower annual rate such that by 2030, there would be 12,500 students. To accommodate this lower enrollment level, the building program for academic and housing space under the Reduced Development Alternative would be about 45 percent less than analyzed for the 2020 LRDP. Therefore, instead of the addition of about 1.83 million gsf of new building space, UC Merced would add approximately 1.01 million gsf of new building space between 2020 and 2030.

Campus Population

Under this alternative, the enrollment would increase from about 9,700 students in 2020 to 12,500 students in 2030, an increase of about 2,800 new students. Similar to the proposed project, it is assumed that slightly more than half of the new students would be housed on the campus and the rest of the new students would live off-campus.

Assuming that the same student to faculty/staff ratio is maintained under this alternative as is represented by the proposed project, approximately 734 new on-campus employees would be added under this alternative. Therefore, under this alternative a total of 3,534 new students and employees would be added to the campus between 2020 and 2030.

The campus population increase would be about 45 percent less than the increase of 6,431 new students and employees analyzed for the 2020 LRDP. The total on-campus population by 2030 under this alternative (that is, existing population plus projected growth) would be approximately 14,514 persons, which is about 17 percent lower than the 2030 population of about 17,411 persons analyzed for the 2020 LRDP.

Land Use Diagram

With regard to the land use diagram, it is assumed that the diagram under this alternative would be the same as the land use diagram under the proposed 2020 LRDP. As with the proposed 2020 LRDP, the new facilities would be built within the 274-acre area designated CMU. With the building program reduced by about 45 percent under this alternative compared to the proposed project, less acreage within the CMU area would be developed with new facilities under this alternative.

2.7.3 Alternative 3: Distributed Employment Location Alternative

The Distributed Employment Location Alternative was developed to reduce the increase in the number of daily and peak hour vehicle trips to the campus and traffic-related impacts. Under this alternative, about 35 percent of the new staff employees would be located off campus.

Building Program

As a result of locating some of the new staff off campus under this alternative, the building program would be slightly reduced compared to that analyzed for the 2020 LRDP. Therefore, instead of the addition of about 1.83 million gsf of new building space to the campus, UC Merced would add approximately 1.78 million gsf of new building space to the campus and would lease or construct about 45,000[3] square feet of building space in Merced to house the 267 new employees who would be located off campus.

Campus Population

Under this alternative, enrollment at the campus would increase at the same rate as analyzed for the 2020 LRDP such that there would be 15,000 students by 2030, an increment of 5,300 students between 2020 and 2030. On-campus resident students would be the same as analyzed for the 2020 LRDP. The increase in faculty and staff would also be the same, with 346 new faculty and 785 new staff added between 2020 and 2030. However, while all of the additional faculty would be located on the campus, 65 percent of the new staff (518 new staff) would be located on the campus and about 267 of the new staff would be located off campus.

Land Use Diagram

With regard to the land use diagram, it is assumed that the diagram under this alternative would be the same as the land use diagram under the proposed 2020 LRDP. With the building program reduced by about 2 percent under this alternative compared to the proposed project, slightly less area within the 274-acre CMU area would be developed with new facilities under this alternative.

2.8 IMPACT SUMMARY

A detailed discussion regarding potential environmental impacts of the proposed project is provided in **Section 4.0 Environmental Setting, Impacts and Mitigation Measures.** A summary of the impacts of the proposed 2020 LRDP is provided in **Table 2.0-2, Summary of LRDP Impacts and Mitigation Measures**. Also provided in **Table 2.0-2** are mitigation measures that are proposed to avoid or reduce significant project impacts. The table indicates whether implementation of the recommended mitigation measures would reduce the impact to a less than significant level. **Table 2.0-3, Summary Comparison of Alternatives**, presents the environmental impacts of each alternative to allow the decision makers, agencies and the public to compare and contrast these alternatives and weigh their relative merits and demerits.

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3 Calculated based on a rate of 165 square feet per employee. The rate was derived from the Downtown Center, which is a 75,000 gsf building for 454 employees.

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Air Quality			
LRDP Impact AQ-1: Campus development under the 2020 LRDP would not result in construction emissions that would result in a cumulatively considerable net increase of criteria pollutants for which the air basin is in non-attainment.	*Less than Significant*	**LRDP MM AQ-1a:** The construction contractors shall be required via contract specifications to use construction equipment rated by the U.S. EPA as meeting Tier 4 (model year 2008 or newer) emission limits for engines between 50 and 750 horsepower. **LRDP MM AQ-1b:** UC Merced shall include in all construction contracts the measures specified in SJVAPCD Regulation VIII (as it may be amended for application to all construction projects generally) to reduce fugitive dust impacts, including but not limited to the following: • All disturbed areas, including storage piles, which are not being actively utilized for construction purpose, shall be effectively stabilized of dust emissions using water, chemical stabilizer/ suppressant, or vegetative ground cover. • All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/ suppressant. • All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions using application of water or by presoaking. • When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, or at least 6 inches of freeboard space from the top of the container shall be maintained. • All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit visible dust emissions. Use of blower devices is expressly forbidden.)	*N/A*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		• Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, storage piles shall be effectively stabilized of fugitive dust emissions by using sufficient water or chemical stabilizer/ suppressant.	
LRDP Impact AQ-2: Campus development under the 2020 LRDP would result in operational emissions that would involve a cumulatively considerable net increase of criteria pollutants for which the air basin is in non-attainment.	*Significant*	**LRDP MM AQ-2a**: UC Merced shall implement the following measures to reduce emissions from vehicles: • Provide pedestrian-enhancing infrastructure to encourage pedestrian activity and discourage vehicle use. • Provide bicycle facilities to encourage bicycle use instead of driving, such as bicycle parking, bicycle lanes, bicycle lockers; and showers and changing facilities for employees. • Provide preferential carpool and vanpool parking for non-residential uses. • Provide transit-enhancing infrastructure to promote the use of public transportation, such as covered bus stops and information kiosks. • Provide facilities, such as electric car charging stations and a CNG refueling station, to encourage the use of alternative-fuel vehicles. • Improve traffic flows and congestion by timing of traffic signals at intersections adjacent to the campus to facilitate uninterrupted travel. • Work with campus transit provider to replace CatTracks buses with either electric buses or buses operated on alternative fuels. • Work with the City of Merced to establish park and ride lots and provide enhanced transit service between the park and ride lots and the campus. • Replace campus fleet vehicles with electric vehicles or vehicles that operate on alternative fuels. • Reduce the number of daily vehicle trips by providing more housing on campus.	*Significant and Unavoidable*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		LRDP MM AQ-2b: UC Merced shall implement the following measures to reduce emissions from area and energy sources, as feasible: • Utilize low-VOC cleaning supplies and low-VOC paints (100 grams/liter or less) in building maintenance. • Utilize electric equipment for landscape maintenance. • Plant low maintenance landscaping. • Implement a public information program for resident students to minimize the use of personal consumer products that result in ROG emissions, including information on alternate products. • Instead of natural gas water heaters, install solar water heating systems.	
LRDP Impact AQ-3: Implementation of the 2020 LRDP would not expose sensitive receptors to substantial pollutant concentrations of carbon monoxide.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact AQ-4: Implementation of the 2020 LRDP would not conflict with or obstruct implementation of the applicable air quality plan.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact AQ-5: Implementation of the 2020 LRDP would not result in odors adversely affecting a substantial number of people.	*Less than Significant*	No mitigation is required.	*N/A*
Cumulative Impact C-AQ-1: The construction and operation of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, could hinder air quality attainment and maintenance efforts for criteria pollutants.	*Significant*	**Cumulative MM C-AQ-1:** Implement LRDP MM AQ-2a and AQ-2b. No additional mitigation is available.	*Significant and Unavoidable*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Biological Resources			
LRDP Impact BIO-1: Implementation of the 2020 LRDP would not have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact BIO-2: Implementation of the 2020 LRDP would not result in adverse impacts on special-status plant species.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact BIO-3: Implementation of the 2020 LRDP would not result in a substantial adverse impact on special-status invertebrate species due to the loss of vernal pool ecosystems or designated critical habitat for the species.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact BIO-4: Implementation of the 2020 LRDP would result in a potentially significant adverse impact on nesting and overwintering habitat for the Crotch bumble bee.	*Potentially Significant*	**LRDP MM BIO-4:** A qualified wildlife biologist shall conduct visual surveys of the development area during the flight season for the Crotch bumble bee (late February through late October). Between two and four evenly spaced surveys shall be conducted for the highest detection probability, including surveys in early spring (late March/early April) and early summer (late June/July). Surveys shall take place when temperatures are above 60°F, preferably on sunny days with low wind speeds (e.g., less than 8 miles per hour) and at least 2 hours after sunrise and 3 hours before sunset. On warm days (e.g., over 85°F), bumble bees will be more active in the mornings and evenings. Surveyors shall conduct transect surveys focusing on detection of foraging bumble bees and underground nests using visual aids such as butterfly binoculars. If no Crotch bumble bees or potential Crotch bumble bees are detected, no further mitigation is required. If Crotch bumble bees or potential Crotch bumble bees are observed within the development area, a plan to protect Crotch bumble bee nests and individuals shall be developed and implemented in consultation with	*Less than Significant*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		CDFW. The plan shall include, but not be limited to, the following measures: • Specifications for construction timing and sequencing requirements (e.g., avoidance of raking, mowing, tilling, or other ground disturbance until late March to protect overwintering queens); • Preconstruction surveys conducted within 30 days and consistent with any current available CDFW standards prior to the start of ground disturbing activities to identify active nests; • Establishment of appropriate no-disturbance buffers for nest sites and construction monitoring by a qualified biologist to ensure compliance; • Restrictions associated with construction practices, equipment, or materials that may harm bumble bees (e.g., avoidance of pesticides/herbicides, BMPs to minimize the spread of invasive plant species); • Provisions to avoid Crotch bumble bees or potential Crotch bumble bees if observed away from a nest during project activity (e.g., ceasing of project activities until the animal has left the work area on its own volition); and • Prescription of an appropriate restoration seed mix targeted for the Crotch bumble bee, including native plant species known to be visited by native bumble bee species and containing a mix of flowering plant species with continual floral availability through the entire active season of the Crotch bumble bee (March to October).	

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
LRDP Impact BIO-5: Implementation of the 2020 LRDP would not result in a substantial adverse impact on special-status amphibians (California tiger salamanders and western spadefoot) dependent on vernal pool ecosystems, annual grasslands, and stock ponds due to the loss of these habitats and would not result in mortality of individual amphibians during construction of campus facilities due to compliance with permits.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact BIO-6: Implementation of the 2020 LRDP would not result in a substantial adverse impact on western pond turtle from the loss or disturbance of ponds and seasonal freshwater marsh communities.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact BIO-7: Implementation of the 2020 LRDP would not result in a substantial adverse impact on Swainson's hawk from the loss of suitable foraging or nesting habitat.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact BIO-8: Implementation of the 2020 LRDP would not result in a substantial adverse impact on special-status avian species from the loss of foraging habitat.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact BIO-9: Implementation of the 2020 LRDP would result in potentially significant adverse impacts on special-status bird species and non-special-status migratory birds and raptors.	*Potentially Significant*	**LRDP MM BIO-9a:** Avoid and minimize impacts on native birds protected under the MBTA, including listed species, fully protected species, special-status species of concern, and raptors and passerines. (a) Limit ground disturbance activities to the non-breeding season and remove potential unoccupied breeding habitat during the non-breeding season if possible. If breeding season work is required, conduct take avoidance (tree, shrub, and ground) nest surveys to identify and avoid active nests. • If feasible, UC Merced shall conduct all project-related activities including (but not limited to) tree and shrub removal, other vegetation clearing, grading, or other ground disturbing activities during the non-breeding	*Less than Significant*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		season (typically between September 16 and February 14). • If activities are scheduled to occur during the breeding season (typically between February 15 through September 15), applicable CDFW and/or USFWS permit conditions in the permits issued to the University related to bird surveys must be followed. In addition, a UC Merced-approved qualified avian biologist, with knowledge of the species to be surveyed, shall conduct focused nesting surveys within 15 days prior to the start of project or ground-disturbing activities and within the appropriate habitat. The qualified avian biologist shall determine the exact survey duration and location (typically 500 feet around the work area) based on the work conditions and shall take into account existing applicable CDFW or USFWS permit conditions. • If an unoccupied nest (without birds or eggs) of a non-listed or fully protected species (as determined by the qualified avian biologist) is found, the nest shall be removed under the direction of the qualified avian biologist. • If an active nest is located, a qualified avian biologist shall establish an appropriate no-disturbance buffer around the nest making sure that any buffer width required by the University's permit obligations is followed. A 500-foot buffer is recommended for listed or fully protected nesting birds (or another buffer determined in consultation with CDFW and/or USFWS), a 250-foot buffer around raptors, and a 75-foot buffer around passerines. If work activities cause or contribute to a bird being flushed from a nest, the buffer width shall be adjusted to avoid and minimize impacts to nesting birds.	

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		• A qualified avian biologist shall monitor the nest site regularly during work activities to ensure that the nest site is not disturbed, the buffer is maintained and the success or failure of the nest is documented. • If UC Merced elects to remove a nest tree, nest trees may only be removed after the qualified avian biologist has determined that the nests are unoccupied. • If an active nest is causing a safety hazard, CDFW shall be contacted to determine if the nest can be removed. (b) Minimize impacts to burrowing owl and compensate for habitat loss. CDFW (2012) recommends that take-avoidance (preconstruction) surveys be conducted to locate active burrowing owl burrows in the construction work area and within an approximately 500-foot buffer zone around the construction area. a qualified avian biologist shall conduct take avoidance surveys for active burrows according to the CDFW's Staff Report on Burrowing Owl Mitigation (2012 Staff Report). Surveys shall be conducted no less than 14 days prior to initiating ground disturbance activities and surveillance surveys should be conducted as frequently as recommended in the 2012 Staff Report. If ground-disturbing activities are delayed or suspended for than 30 days after the take avoidance survey, the area shall be resurveyed. If no burrowing owls are detected, no further mitigation is required. If active burrowing owls are detected, the following additional measures are required: • Project implementation shall seasonally and spatially avoid negative impacts and disturbances that could result in the take of burrowing owls, nest or eggs.	

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		• If burrowing owls and their habitat can be protected in place or adjacent to a construction site, buffer zones, visual screens or other measures shall be used to minimize disturbance impacts while project activities are occurring. To use these minimization measures, a qualified avian biologist shall determine the exact measures following the guidance described in the 2012 Staff Report. • If owls must be moved away from the project site during the nonbreeding season, passive relocation techniques (e.g., installing one-way doors at burrow entrances) shall be used instead of trapping, as described in CDFW guidelines. At least 1 week will be necessary to complete passive relocation and allow owls to acclimate to alternate burrows. • When destruction of occupied burrows is unavoidable during the nonbreeding season (September 1 to January 31), unsuitable burrows shall be enhanced (enlarged or cleared of debris) or new burrows created (by installing artificial burrows) at a ratio of 2:1 on protected lands approved by the CDFW. Newly created burrows shall follow guidelines established by the CDFW. **LRDP MM BIO-9b**: New buildings and structures proposed under the 2020 LRDP shall incorporate bird-safe design practices (for example, American Bird Conservancy's *Bird-Friendly Building Design* [2015] or San Francisco Planning Department's *Standards for Bird-Safe Buildings* [2011]). The UC Merced Physical and Environmental Planning Department shall review the final designs of the buildings and structures to determine that appropriate bird safety designs have been effectively incorporated to reduce potential impacts to birds. The following design strategies shall be considered in the design of buildings and structures:	

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		• Create building facades with “visual noise” via cladding or other design features that make it easier for birds to identify buildings and not mistake windows for open sky or trees. • Incorporate windows that are not clear or reflective into the building or structure designs. • Use windows that incorporate glass types such as UV-A or fritted glass and windows that incorporate UV-absorbing and UV-reflecting stripe. • Use grid patterns on windows in locations with the highest potential for bird-window collisions (e.g., windows at the anticipated height of adjacent vegetation at maturity). • Reduce the proportion of glass to other building materials in new construction. • Avoid placement of bird-friendly attractants (i.e. vegetated roofs, water features, tall trees) near glass whenever possible. • Install motion-sensitive lighting in any area visible from the exterior that automatically turn lights off during after-work hours.	
LRDP Impact BIO-10: Implementation of the 2020 LRDP would not result in substantial adverse impacts to San Joaquin kit fox due to the loss of suitable residence and dispersal habitat.	*Less than Significant*	No mitigation is required.	*N/A*
Cumulative Impact C-BIO-1: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not result in the loss or adverse modification of vernal pool wetlands, clay slope wetlands, and other seasonal wetlands.	*Less than Significant*	No mitigation is required.	*N/A*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Cumulative Impact C-BIO-2: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not result in the loss or adverse modification of important special-status plant and wildlife habitat, including adverse effects to special-status plant and wildlife species that occupy or could potentially occupy these habitats.	*Less than Significant*	No mitigation is required.	*N/A*
Greenhouse Gas Emissions			
LRDP Impact GHG-1: Implementation of the 2020 LRDP would generate greenhouse gas emissions, either directly or indirectly, that would have a significant impact on the environment.	*Significant*	**LRDP MM GHG-1a:** UC Merced shall set a goal to reduce or control the increase in its GHG emissions such that the total emissions do not exceed 3,300 $MTCO_2e$/ year by the end of the year 2030. UC Merced shall monitor GHG emissions each year, monitor upcoming projects for their potential to increase the campus' GHG emissions, and implement project-specific and campus-wide GHG reduction measures to reduce the campus' GHG emissions in accordance with the 3,300 $MTCO_2e$/year goal for 2030. In the event that adequate reduction is not achieved by these measures, UC Merced shall purchase renewable energy credits, or other verifiable GHG offsets to keep the net emissions at or below 3,300 $MTCO_2e$/year. **LRDP MM GHG-1b**: UC Merced shall implement LRDP Mitigation Measures AQ-2a and -2b. **LRDP MM GHG-1c:** UC Merced shall periodically review new technologies that can be implemented to further reduce the campus' GHG emissions.	*Less than Significant*
LRDP Impact GHG-2: Implementation of the 2020 LRDP would conflict with state law, UC Sustainable Practices Policy, or the UC Merced Climate Action Plan, adopted for the purpose of reducing the emissions of greenhouse gases.	*Significant*	**LRDP MM GHG-2:** Implement LRDP Mitigation Measures GHG-1a, 1b, and 1c.	*Less than Significant*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Cumulative Impact C-GHG-1: Implementation of the 2020 LRDP would result in a significant cumulative GHG impact.	*Significant*	**Cumulative MM C-GHG-1:** Implement LRDP Mitigation Measures GHG-1a, 1b, and 1c.	*Less than Significant*
Hydrology and Water Quality			
LRDP Impact HYD-1: Campus development under the 2020 LRDP would not substantially interfere with groundwater recharge nor substantially decrease groundwater supplies.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact HYD-2: Campus development under the 2020 LRDP would not substantially alter the existing drainage pattern of the campus site through alteration of a water course or through the addition of impervious surfaces such that it would result in substantial erosion or siltation on or off site, result in flooding on or off site, contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems, or impede or redirect flood flows.	*Less than Significant*	No mitigation is required.	*N/A*
Cumulative Impact C-HYD-1: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, could cumulatively increase surface runoff but would not increase local and regional flooding.	*Less than Significant*	No mitigation is required.	*N/A*
Cumulative Impact C-HYD-2: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not substantially interfere with groundwater recharge but would deplete groundwater supplies and contribute to the overdraft of the regional groundwater aquifer.	*Significant*	**Cumulative MM C-HYD-2:** UC Merced shall work with the regional water agencies, including the City of Merced and MID, to develop programs to expand conjunctive use capabilities, increase recharge, and reduce groundwater demand.	*Significant and Unavoidable*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Noise			
LRDP Impact NOI-1: Implementation of the 2020 LRDP would not substantially increase ambient traffic noise levels at existing off-site noise-sensitive uses.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact NOI-2: Daily operations on the campus under the 2020 LRDP would not expose existing off-site and future on-site noise-sensitive receptors to noise levels in excess of applicable standards.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact NOI-3: Construction activities associated with development under the 2020 LRDP could expose existing off-site and future on-site noise-sensitive receptors to elevated noise levels.	*Potentially Significant*	**LRDP MM NOI-3:** Prior to initiation of construction on a project that is within 500 feet of off-site residential receptors, UC Merced shall develop and implement a construction noise mitigation program for that project that includes but is not limited to the following: • Construction activities within 500 feet of any residences shall be restricted to the hours of 7:00 AM and 6:00 PM on weekdays and Saturdays with no construction on Sundays and holidays. • All noise-producing project equipment and vehicles using internal combustion engines shall be equipped where appropriate with exhaust mufflers and air-inlet silencers in good operating condition that meet or exceed original factory specifications. • Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) shall be equipped with shrouds and noise control features that are readily available for that type of equipment. • All mobile or fixed noise-producing equipment used on the project that is regulated for noise output by local, state or federal agency shall comply with such regulation while engaged in project-related activities. • Electrically powered equipment shall be used instead of pneumatic or internal combustion powered equipment, where practicable.	*Less than Significant*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		• Material stockpiles, mobile equipment staging, construction vehicle parking, and maintenance areas shall be located as far as practicable from noise-sensitive land uses. • Stationary noise sources such as generators or pumps shall be located away from noise-sensitive land uses as feasible. • The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only. No project-related public address loudspeaker, two-way radio, or music systems shall be audible at any adjacent noise-sensitive receptor except for emergency use. • The erection of temporary noise barriers shall be considered where project activity is unavoidably close to noise-sensitive receptors. • The noisiest construction operations shall be scheduled to occur together to avoid continuing periods of the greatest annoyance, wherever possible. • Construction vehicle trips shall be routed as far as practical from existing residential uses. • The loudest campus construction activities, such as demolition, blasting, and pile driving, shall be scheduled during summer, Thanksgiving, winter, and spring breaks when fewer people would be disturbed by construction noise. • Whenever possible, academic, administrative, and residential areas that will be subject to construction noise shall be informed a week before the start of each construction project.	

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
LRDP Impact NOI-4: Pile driving activities during construction could expose nearby receptors to perceptible levels of ground-borne vibration.	*Potentially Significant*	**LRDP MM NOI-4a:** UC Merced shall avoid impact pile driving where possible in vibration-sensitive areas. Drilled piles or the use of vibratory pile driving will be used where geological conditions permit their use. For impact pile driving activities occurring within 50 feet of typical structures, limit groundborne vibration due to construction activities to 0.50 inch/second, ppv (limit of potential for damage to typical structures) in the vertical direction at sensitive receptors. Since in many cases the information available during the preliminary engineering phase would not be sufficient to define specific vibration mitigation measures, UC Merced shall describe and commit to a mitigation plan to minimize construction vibration damage using all feasible means available. **LRDP MM NOI-4b:** For construction adjacent to highly sensitive uses such as laboratories, UC Merced shall apply additional measures as feasible, including advance notice to occupants of sensitive facilities to ensure that precautions are taken in those facilities to protect ongoing activities from vibration effects.	*Less than Significant*
Cumulative Impact C-NOI-1: Development on the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not generate a substantial permanent increase in noise levels at off-site locations.	*Less than Significant*	No mitigation is required.	*N/A*
Cumulative Impact C-NOI-2: Noise from construction and/or stationary sources on the campus, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not combine to substantially affect the same sensitive receptors.	*Less than Significant*	No mitigation is required.	*N/A*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Population and Housing			
LRDP Impact PH-1: Implementation of the 2020 LRDP would not result in substantial unplanned population growth and related demand for housing in the City of Merced and in surrounding communities.	*Less than Significant*	No mitigation is required.	*N/A*
Cumulative Impact C-PH-1: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not substantially increase regional population.	*Less than Significant*	No mitigation is required.	*N/A*
Public Services and Recreation			
LRDP Impact PUB-1: Implementation of the 2020 LRDP would increase demand for law enforcement services and would require the construction of new facilities, but the impacts from construction would be less than significant with mitigation.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact PUB-2: Implementation of the 2020 LRDP would increase demand for fire protection services and could require an expansion of an existing fire station or the construction of a new facility, but the impacts from construction would be less than significant with mitigation.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact PUB-3: Implementation of the 2020 LRDP would increase enrollment in local public schools.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact PUB-4: Implementation of the 2020 LRDP would not substantially increase demand for public libraries.	*Less than Significant*	No mitigation is required.	*N/A*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
LRDP Impact PUB-5: Implementation of the 2020 LRDP would result in an increased demand for parks and recreational facilities but would not require the construction of new recreational facilities off site.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact PUB-6: Implementation of the 2020 LRDP would increase the use of Lake Yosemite Regional Park which could accelerate physical deterioration of park facilities.	*Potentially Significant*	**LRDP MM PUB-6a:** UC Merced shall work with the County to avoid physical deterioration of existing facilities at Lake Yosemite Regional Park, and/or improve park facilities within the existing park site as necessitated by the increased uses associated with development of the campus. **LRDP MM PUB-6b:** UC Merced will pay its fair share of the cost of necessary improvements to the regional park. UC Merced's share of funding will be based on the percentage that on-campus residential population represents of the total population in eastern Merced County at the time that an improvement is implemented. **LRDP MM PUB-6c:** In recognition of the sensitive resources present on lands immediately adjacent to the regional park, all regional park improvement projects that are implemented by the County within 250 feet of the park's eastern boundary pursuant to **LRDP Mitigation Measures PUB-6a** and **PUB-6b** above, will implement mitigation measures to avoid and minimize indirect effects on biological resources.	*Less than Significant*
Cumulative Impact C-PUB-1: Campus development under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would result in increased need for law enforcement services, the provision of which would not result in a significant cumulative environmental impact.	*Less than Significant*	No mitigation is required.	*N/A*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Cumulative Impact C- PUB-2: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would generate an increased demand for fire protection services, the provision of which would not result in a significant cumulative environmental impact.	*Less than Significant*	No mitigation is required.	*N/A*
Cumulative Impact C-PUB-3: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would generate an increased demand for elementary and secondary school facilities, the provision of which would not result in a significant cumulative impact.	*Less than Significant*	No mitigation is required.	*N/A*
Cumulative Impact C-PUB-4: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would result in increased demand for library services, the provision of which would not result in a significant cumulative impact.	*Less than Significant*	No mitigation is required.	*N/A*
Cumulative Impact C-PUB-5: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not result in a cumulative impact related to neighborhood and community parks, but would result in a cumulative impact associated with the deterioration of the Lake Yosemite Regional Park facilities from increased use. The proposed project's contribution would not be cumulatively considerable.	*Less than Significant*	No mitigation is required.	*N/A*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Transportation			
LRDP Impact TRANS-1: Implementation of the 2020 LRDP would significantly affect study area intersections during peak commute hours under 2030 plus project conditions.	*Significant*	**LRDP MM TRANS-1: Campus Traffic Mitigation Program (CTMP).** The Campus Traffic Mitigation Program is a program to monitor trip generation, reduce peak-hour trips, and participate in roadway improvements to mitigate impacts at off-campus intersections, and adjacent roadway segments in the case of Lake Road, determined to be affected by the development of the campus under the 2020 LRDP. CEQA provides that an agency can mitigate its contribution to local and regional environmental impacts by contributing its proportional share of funding to mitigation measures designed to alleviate the identified impact (*CEQA Guidelines* §15130(a)(3)). The CTMP will consist of the following elements/ measures: **Measure TRANS-1a: Travel Demand Management.** To reduce on- and off-campus vehicle trips and resulting impacts, the University will continue to implement and expand a range of Transportation Demand Management (TDM) strategies. TDM strategies will include measures to encourage transit and shuttle use and alternative transportation modes including bicycle transportation, implement parking polices that reduce demand, and implement other mechanisms that reduce vehicle trips to and from the campus. The University shall monitor the performance of campus TDM strategies through annual surveys. **Measure TRANS-1b: Transit Enhancement.** To enhance transit systems serving the campus, the University will work cooperatively with the City of Merced, County of Merced, CatTracks, The Bus, StaRT, YARTS, and other local agencies to coordinate service routes with existing and proposed shuttle and transit programs.	*Significant and Unavoidable*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		Measure TRANS-1c: Sustainability and Monitoring. The University will review individual projects proposed under the 2020 LRDP for consistency with UC Sustainable Practices Policy and UC Merced TDM strategies set forth in the 2020 LRDP to ensure that bicycle and pedestrian improvements, alternative fuel infrastructure, transit stops, and other project features that promote alternative transportation are incorporated in the project. **Measure TRANS-1d: Campus Traffic Impact Monitoring.** The University will monitor trip generation resulting from the campus development under the 2020 LRDP to track the actual trip generation relative to the projections in this SEIR. The University will conduct traffic cordon counts of the campus with each 2,000-person increase in student population, measured by three-term average headcount enrollment increases with 2019 – 2020 as the base academic year. If this monitoring determines that traffic attributable to the campus contributes to a significant traffic impact at any of the intersections listed in **Table 4.8-9,** the University will implement measures to reduce vehicle trips contributing to the impact or provide its proportional share of funding for improvements at the impacted intersections presented in **Table 4.8-9**. **Measure TRANS-1e: Proportional Share Determination.** At the time a significant impact is identified pursuant to the monitoring under Measure TRANS-1d, the University's actual percent contribution to the total traffic volume at pertinent intersections and roadway segments will be calculated and used as the basis for determining the University's mitigation obligation, or proportional share of funding for the traffic improvements listed in the table.	

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
		Measure TRANS-1f: Mitigation Payments. The amount of the University's mitigation funding will be based on the University's proportional share of the affected jurisdiction's actual cost of the relevant traffic improvement(s) at the time of final bid/contract documents. The amount will be calculated by applying the University's proportional share determined in Measure TRANS-1e to the total cost of the improvement. Funding will be internally committed by the University at the time the traffic impact is triggered pursuant to the results of monitoring under Measure TRANS-1d. Payments will be made to the appropriate jurisdiction at the time a Notice to Proceed with the construction of the improvements is issued. If improvements are constructed before the impact is triggered, the University will pay its proportional share at the time that the impact is triggered, based on the University's monitoring under Measure TRANS-1d. Mitigation payments will be made only after the University has been provided the opportunity to review the scope and budget of the improvement project. As Intersection #3, Lake/Bellevue Road intersection, directly serves the campus, the University will be responsible for the entire cost of improvements at this intersection.	
LRDP Impact TRANS-2: Implementation of the 2020 LRDP would not significantly impact study area freeway segments under 2030 plus project conditions.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact TRANS-3: Implementation of the 2020 LRDP would not significantly impact transit facilities.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact TRANS-4: Implementation of the 2020 LRDP would not significantly impact pedestrian and bicycle facilities.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact TRANS-5: The campus road network system would be adequately sized and designed to facilitate emergency access vehicles.	*Less than Significant*	No mitigation is required.	*N/A*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Cumulative Impact C-TRANS-1: Implementation of the 2020 LRDP would significantly impact study area intersections during peak commute hours under 2035 plus project conditions.	*Significant*	**Cumulative MM C-TRANS-1:** The University will implement LRDP MM TRANS-1 to reduce vehicle trips, monitor traffic growth, and make fair share contributions to address the project's contribution to cumulative impacts under 2035 conditions. Certain improvements in Table 4.8-12 are the same as, or similar to, improvements identified in Table 4.8-9 for the 2030 with LRDP Project scenario; therefore, as and when fair share is calculated for these intersection improvements, the calculation shall take into account the redundant improvements. As Intersections #3, #18 and #19 would directly serve the campus, the University will be responsible for the entire cost of improvements at these three intersections.	*Significant and Unavoidable*
Cumulative Impact C-TRANS-2: Implementation of the 2020 LRDP would not significantly affect study area freeway segments under 2035 plus project conditions.	*Less than Significant*	No mitigation is required.	*N/A*
Tribal Cultural Resources			
LRDP Impact TCR-1: The proposed project would not cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Section 21074.	*Less than Significant*	No mitigation is required.	*N/A*
Cumulative Impact C-TCR-1: Implementation of the proposed 2020 LRDP would not result in a significant cumulative impact on Tribal Cultural Resources.	*Less than Significant*	No mitigation is required.	*N/A*
Utilities and Service Systems			
LRDP Impact UTL-1: Implementation of the 2020 LRDP would generate demand for potable water for which sufficient water supplies would be available in normal, dry, and multiple dry years.	*Less than Significant*	No mitigation is required.	*N/A*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
LRDP Impact UTL-2: Implementation of the 2020 LRDP could require the construction of new water supply and conveyance facilities; these facilities would not result in significant impacts on the environment.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact UTL-3: Implementation of the 2020 LRDP would not require construction or expansion of new wastewater conveyance or treatment facilities; nor would the proposed project result in a determination by the wastewater treatment provider that it has inadequate capacity to serve the project's projected demand in addition to existing commitments.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact UTL-4: Implementation of the 2020 LRDP would not generate solid waste that is in excess of State or local standards, or in excess of local infrastructure, or otherwise impair attainment of solid waste reduction goals.	*Less than Significant*	No mitigation is required.	*N/A*
LRDP Impact UTL-5: Implementation of the 2020 LRDP would require on- and off-site improvements to electric transmission lines and natural gas pipelines.	*Less than Significant*	No mitigation is required.	*N/A*
Cumulative Impact C-UTL-1: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not result in a substantial increase in demand for water that would not be served by existing supplies.	*Less than Significant*	No mitigation is required.	*N/A*
Cumulative Impact C-UTL-2: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not result in a significant cumulative impact on wastewater collection and treatment facilities.	*Less than Significant*	No mitigation is required.	*N/A*

Table 2.0-2
Summary of LRDP Impacts and Mitigation Measures

Project Impacts	Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Cumulative Impact C-UTL-3: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not result in a significant cumulative impact on the regional landfill capacity.	*Less than Significant*	No mitigation is required.	*N/A*
Cumulative Impact C-UTL-4: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not result in a significant cumulative impact related to electrical and natural gas facilities.	*Less than Significant*	No mitigation is required.	*N/A*
Energy			
LRDP Impact EN-1: Construction and operation of campus development under the 2020 LRDP would increase the use of energy resources on the campus but would not result in wasteful, inefficient or unnecessary consumption of energy resources nor would the increased energy use conflict with a state or local plan for renewable energy or energy efficiency.	*Less than Significant*	No mitigation is required.	*N/A*
Cumulative Impact EN-1: Implementation of the 2020 LRDP would not contribute substantially to a cumulative impact on energy resources.	*Less than Significant*	No mitigation is required.	*N/A*

Table 2.0-3
Summary Comparison of Project Alternatives

Project Impact	Proposed Project (Before and After Mitigation)	Alternative 1: No Project	Alternative 2: Reduced Development	Alternative 3: Distributed Employment Location
LRDP Impact AQ-2: Campus development under the 2020 LRDP would result in operational emissions that would involve a cumulatively considerable net increase of criteria pollutants for which the air basin is in non-attainment.	*S/SU*	Similar; *S/SU*	Reduced; *S/SU*	Similar; *S/SU*
Cumulative Impact C-AQ-1: The construction and operation of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, could hinder air quality attainment and maintenance efforts for criteria pollutants.	*S/SU*	Similar; *S/SU*	Reduced; *S/SU*	Similar; *S/SU*
LRDP Impact BIO-4: Implementation of the 2020 LRDP would result in a potentially significant adverse impact on nesting and overwintering habitat for the Crotch bumble bee.	*PS/LTS*	Greater; *PS/LTS*	Reduced; *PS/LTS*	Similar; *PS/LTS*
LRDP Impact BIO-9: Implementation of the 2020 LRDP would result in potentially significant adverse impacts on special-status bird species and non-special-status migratory birds and raptors.	*PS/LTS*	Greater; *PS/LTS*	Reduced; *PS/LTS*	Similar; *PS/LTS*
Cumulative Impact C-HYD-2: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not substantially interfere with groundwater recharge but would deplete groundwater supplies and contribute to an overdraft of the regional groundwater aquifer.	*S/SU*	Similar; *S/SU*	Reduced; *S/SU*	Similar; *S/SU*

Table 2.0-3
Summary Comparison of Project Alternatives

Project Impact	Proposed Project (Before and After Mitigation)	Alternative 1: No Project	Alternative 2: Reduced Development	Alternative 3: Distributed Employment Location
LRDP Impact NOI-3: Construction activities associated with development under the 2020 LRDP could expose existing off-site and future on-site noise-sensitive receptors to elevated noise levels.	*PS/LTS*	Similar; *PS/LTS*	Reduced; *PS/LTS*	Similar; *PS/LTS*
LRDP Impact NOI-4: Pile driving activities during construction could expose nearby receptors to perceptible levels of groundborne vibration.	*PS/LTS*	Similar; *PS/LTS*	Reduced; *PS/LTS*	Similar; *PS/LTS*
LRDP Impact PUB-6: Implementation of the 2020 LRDP would increase the use of Lake Yosemite Regional Park which could accelerate physical deterioration of park facilities.	*PS/LTS*	Similar; *PS/LTS*	Reduced; *PS/LTS*	Similar; *PS/LTS*
LRDP Impact TRANS-1: Implementation of the 2020 LRDP would significantly affect study area intersections during peak commute hours under 2030 plus project conditions.	*S/SU*	Similar; *S/SU*	Reduced; *S/SU*	Similar; *S/SU*
Cumulative Impact C-TRANS-1: Implementation of the 2020 LRDP would significantly impact study area intersections during peak commute hours under 2035 plus project conditions.	*S/SU*	Similar; *S/SU*	Reduced; *S/SU*	Similar; *S/SU*

SU = Significant and unavoidable
S = Significant impact
PS = Potentially significant impact
LTS = Less than significant impact
Similar = Impact similar to proposed project
Reduced = Impact less than proposed project
Greater = Impact greater than proposed project

3.0 PROJECT DESCRIPTION

3.1 INTRODUCTION

The University of California system (UC system) consists of 10 campuses. Each campus in the UC system is required to periodically examine its academic goals, and to support those goals, formulate a land use plan in a Long Range Development Plan (LRDP). An LRDP is defined by statute (Public Resources Code [PRC] 21080.09) as a "physical development and land use plan to meet the academic and institutional objectives for a particular campus or medical center of public higher education." As discussed in **Section 1.0, Introduction**, the Regents of the University of California (The Regents) adopted the 2009 LRDP for the UC Merced campus as a guide for physical development to accommodate enrollment growth projected through 2030 and beyond. For reasons set forth in **Section 1.0**, the University determined that an updated LRDP must be prepared to better reflect the revised campus site and changed conditions in the area. The University has prepared an updated LRDP (2020 LRDP or proposed project) to guide the physical development necessary to accommodate the projected growth of the campus through 2030. The proposed 2020 LRDP is the subject of this Subsequent EIR (SEIR), i.e., the "project" that is described in detail below and evaluated in this SEIR for its environmental impacts.

3.2 PROJECT LOCATION

As illustrated in **Figure 3.0-1, Regional Location**, the project site is the Merced campus of the University of California. The campus is located in eastern Merced County, within the sphere of influence (SOI) of the City of Merced, approximately 2 miles northeast of the City limits. The campus occupies portions of Sections 26, 27, 34, and 35, Township 6 South, Range 14 East; and Sections 3 and 2, Township 7 South, Range 14 East. State Route 99 provides regional access to the project site (see **Figure 3.0-2, Project Site and Vicinity**).

3.3 PROJECT SITE AND SURROUNDING LAND USES

The campus, located on Lake Road near its intersection with Bellevue Road, when first established consisted of approximately 815 acres. In 2017, additional land was added to the campus site such that now, the campus encompasses approximately 1,026 acres. The University also owns the adjoining approximately 6,428-acre Merced Vernal Pools and Grassland Reserve.

The campus is situated south-southeast of Lake Yosemite, which is a regulating reservoir owned and operated by the Merced Irrigation District (MID). Two irrigation canals also owned by MID, Le Grand Canal and the Fairfield Canal, convey water from the lake to agricultural areas to the south. Both canals meander through the campus, generally following the contours of the land.

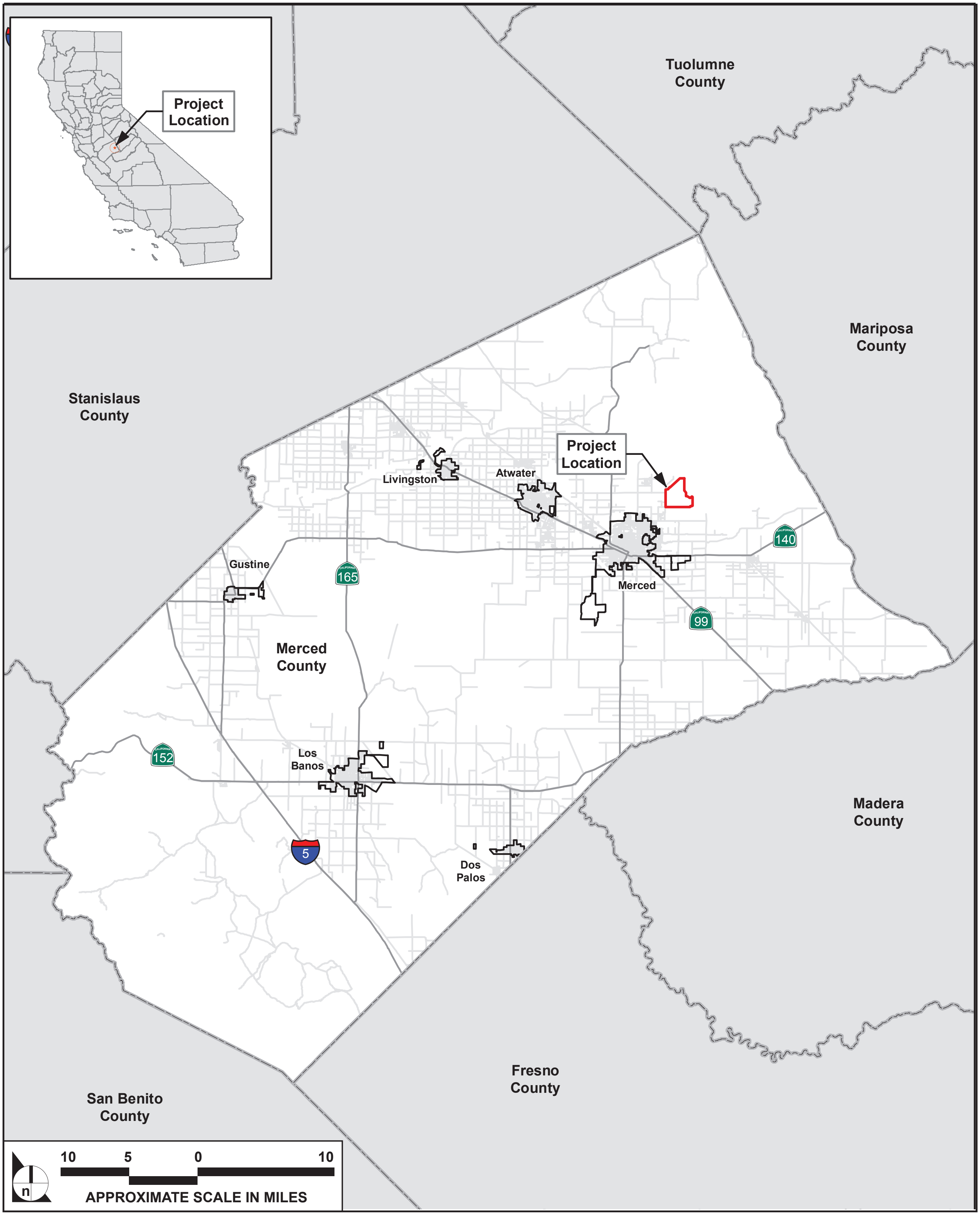
Lake Yosemite Regional Park, owned by MID and managed by Merced County under an easement, is located along the south side of the lake to the north of the campus.

The land between the regional park and the northern boundary of the campus is owned by Merced County and comprises grazing pastures located on gently rolling grasslands. County-owned lands between the campus and the regional park east of Le Grand Canal are a wetlands mitigation site for the campus and are under a conservation easement.

Grasslands used for seasonal grazing also occupy lands to the northeast and east of the campus. All of these lands are also either under a conservation easement or planned for conservation. Most of these lands are part of the Merced Vernal Pools and Grassland Reserve.

Agricultural lands lie to the south of the campus. Lands immediately south of the campus boundary that are owned by UCLC until it is dissolved and the Regents assume direct land ownership, are in agricultural use under grazing licenses. The Regents no longer has any ownership and land use authority over or the responsibility for the VST property south of the campus boundary. The majority of the land owned by VST just south of the UCLC land is currently planted in almond trees. This land has been planned for development since Merced County's adoption of the University Community Plan (UCP). The UCP is a mixed-use development with commercial and residential uses, in addition to substantial open space. The VST is currently preparing a Specific Plan in accordance with the UCP for development of UCP North, the first phase of the UCP. The first and second phases of the Specific Plan for UCP North consist of the development of 200 acres closest to Lake Road. Most of the Phase 1 and Phase 2 areas are not planted in trees. VST is in the process of submitting this plan and its development application to Merced County. When VST obtains land use permits and approvals, it will comply with the mitigation measures that are imposed on the development by the authorizing land use jurisdiction. Land south of the VST property is owned by Hunt Farms and is also in agricultural use, under recently planted almond orchards.

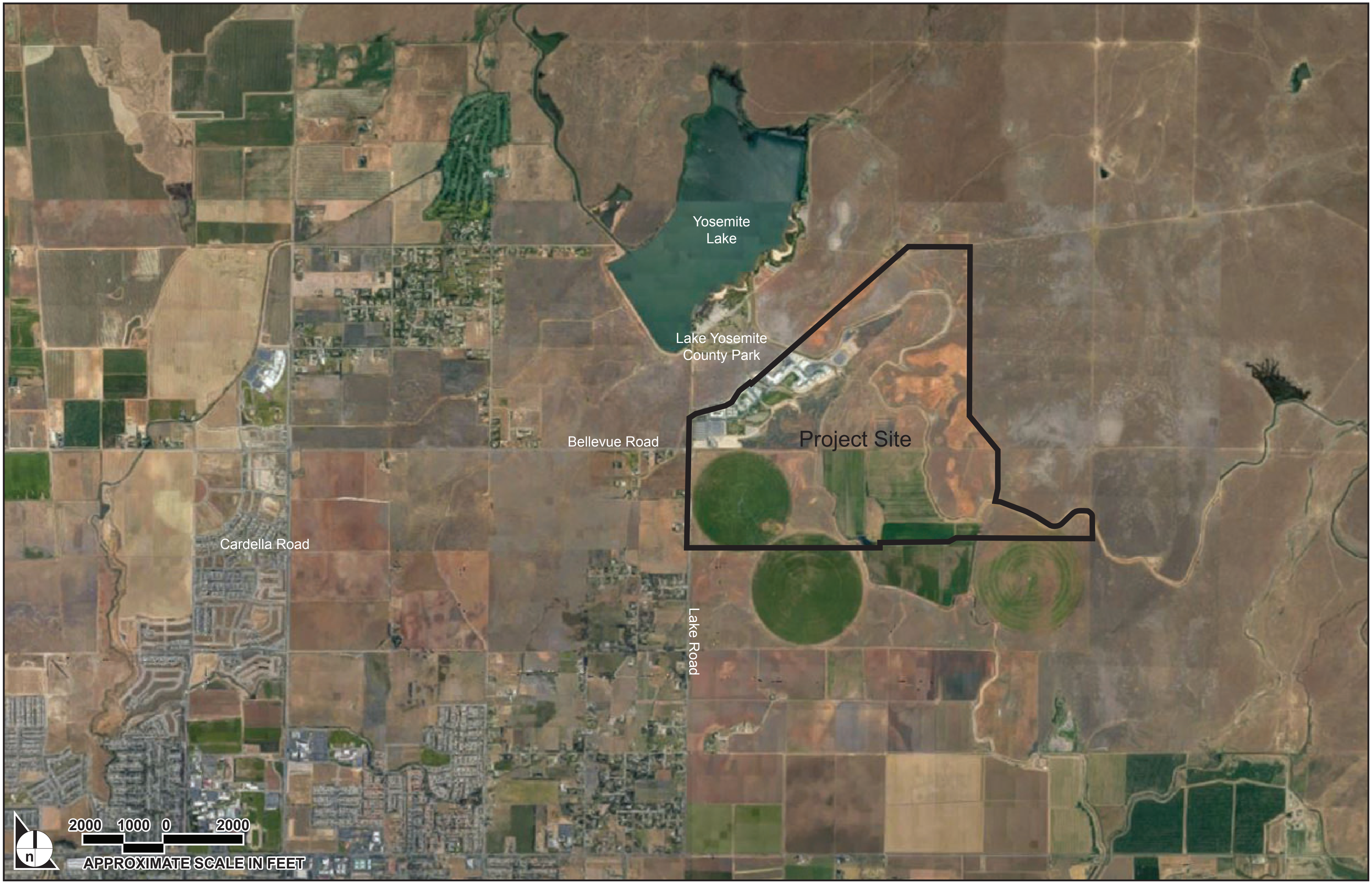
The campus was sited in its current location to take advantage of the significant nearby amenity of Lake Yosemite and to utilize the strong visual identity and environmental amenity provided by the lake. It is also sited to maximize vistas within the valley and to the Sierra Nevada Range.



SOURCE: UC Merced, 2019

FIGURE **3.0-1**

Regional Location



SOURCE: Google Maps, 2018

FIGURE 3.0-2

Project Site and Vicinity

3.4 EXISTING SITE CONDITIONS

3.4.1 Existing Campus Facilities

Phase 1 Development

The development of the campus commenced from the north with the first phase of the campus built on approximately 100 acres in the northern portion of the campus site. The first phase of the campus was developed with a classroom and office building, a library, an academic social sciences and management building, two science and engineering buildings, student housing consisting of residence halls and multiple unit housing clusters, a dining facility, a recreation and wellness center, two recreation fields, a logistical support/service building, and an early childhood education center. Parking is provided in permanent and temporary parking lots near the entrance to the campus and in the North Bowl area at the north end of the campus. The facilities at the campus at this time support an enrollment level of approximately 8,000 students. Existing conditions on the campus are shown on **Figure 3.0-3, Existing Conditions**.

Merced 2020 Project

The UC Merced 2020 Project, also referred to as Phase 2, comprises the second major phase of campus development, with facilities needed to support an enrollment level of approximately 10,000 students.

The 2020 Project is the largest expansion in the 14-year history of the campus. It is a phased, four-year undertaking that will ultimately result in 1.2 million gross square feet of teaching, residential, research, and student-support facilities. This project is necessary to accommodate increasing enrollment demands at the campus. The 2020 Project is scheduled to be completed in June 2020. The first 2020 Project facilities, consisting of two housing and classroom buildings, a new dining center, and a competition playing field, opened in August 2018. The first phase of the 2020 Project also included an extension of Bellevue Road east of Lake and new parking lots south of Bellevue Road that are accessible from both Bellevue and Lake Roads. The second phase of the project includes two new state-of-the-art buildings with labs, classrooms and additional study areas. The buildings are planned to open in Fall 2019. The third phase, which will open in Fall 2020, includes expanded student wellness and counseling facilities, additional student housing, a dedicated transit hub for buses, a student enrollment center, and a swimming pool.

The 2020 Project is being designed and constructed by a joint public-private partnership between the University and a single private developer. This joint venture will be responsible for the construction, operation, maintenance, and partial financing of all new facilities associated with the project over a 39-

year contract.[1] The environmental effects of the 2020 Project were evaluated in Volume 3 of the 2009 LRDP EIS/EIR, as amended.

3.4.2 Existing LRDP Land Uses Designations

Figure 3.0-4, Existing LRDP Land Use Designations shows the land use designations that currently apply to the lands that make up the original 815-acre campus. Brief descriptions of the existing land use designations under the 2009 LRDP are presented in **Table 3.0-1**.

3.4.3 Existing Road Network and Parking

The primary access to the campus from the area's primary population center, the City of Merced, is via Lake and Bellevue Roads. The current core of the campus lies between Scholars Lane and Rancher's Road, both of which are accessed by turning east off of Lake Road. Both Scholars Lane and Rancher's Road run east a short distance before turning northeast and continuing to parallel each other, providing access to Carol Tomlinson-Keasey Quad and the campus facilities that surround it.

Campus expansion associated with the Merced 2020 Project is currently underway immediately south and southeast of the developed portions of the campus, west of the Fairfield Canal. The southwestern portion of this newly developed area will be served by three parallel east-west roads, with two north-south roads forming a grid pattern. The western most of the new north-south roads will connect with Scholars Lane providing access to the western portions of the existing campus. The easternmost north-south road will continue in a northeasterly direction, crossing Fairfield Canal, serving as part of the campus loop and providing access to the North Bowl area.

3.4.4 Existing Utilities and Infrastructure

The campus is currently served by the full range of utilities and a well-developed utility infrastructure, augmented by water, wastewater, natural gas, electricity, and some telecommunications services from outside providers.

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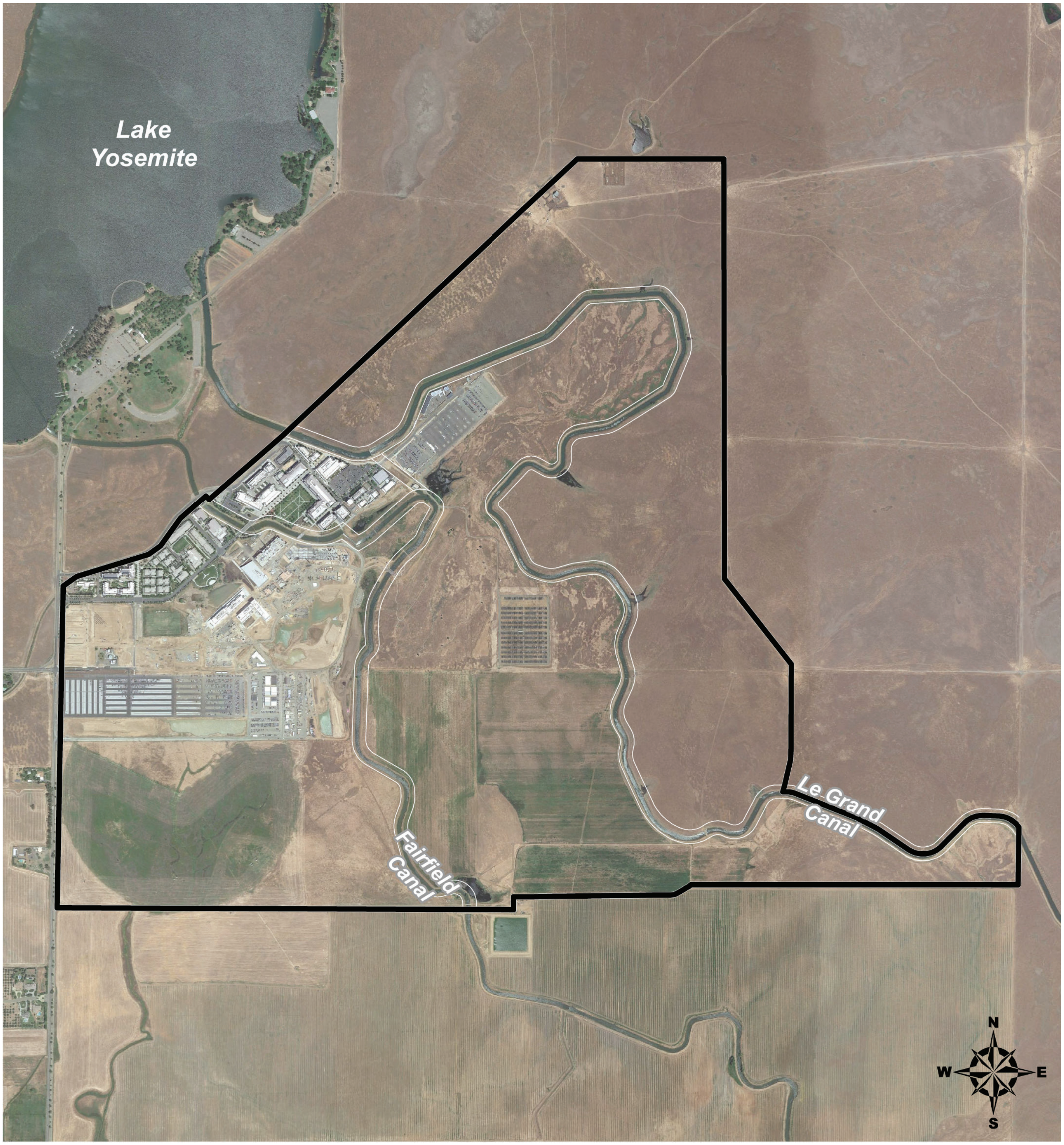
[1] University of California, Merced. http://www.ucmerced.edu/news/2016/uc-merced-kicks-historic-13-billion-expansion. Accessed on December 15, 2017.

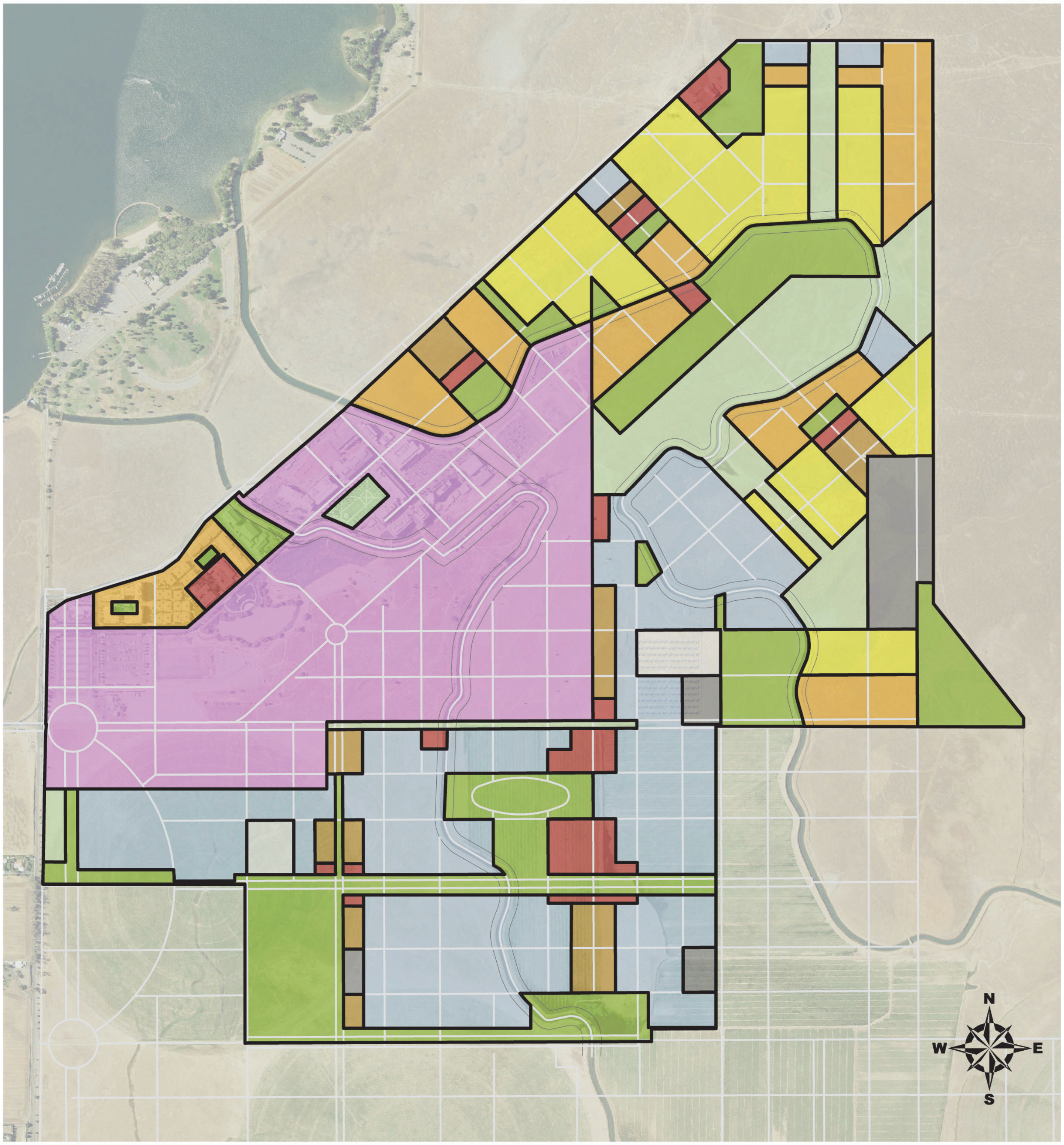


UC Merced Campus

SOURCE: University of California Merced, 2019

FIGURE **3.0-3**

Existing Conditions



LEGEND

Campus Mixed Use	200 ac.	Low Density Residential	84 ac.
Academic/Laboratory	179 ac.	Medium Density Residential	67 ac.
Student Services	24 ac.	High Density Residential	26 ac.
Campus Services	23 ac.	Athletics/Recreation	132 ac.
Parking	10 ac.	Passive Open Space	70 ac.

SOURCE: UC Merced, 2019

FIGURE **3.0-4**

Existing LRDP Land Use Designations

Table 3.0-1
Existing Land Use Designations under the 2009 LRDP

Land Use Category	Description
Campus Mixed Use	The Campus Mixed Use designation includes academic, research, student housing, student and support services, athletic and recreational facilities, administrative offices, service facilities, and parking. This land use designation allows residential density up to 320 beds/gross acre.
Academic Use/Laboratory	This land use designation includes all academic uses include classrooms; instructional and research laboratories; undergraduate, graduate, and professional schools and programs; ancillary support facilities such as administrative facilities, libraries, performance and cultural facilities, clinical facilities, research institutes, conference facilities, and services supporting academic operations.
Alumni/Conference Center	This land use designation includes alumni and conference centers, office space, and meeting rooms.
Student Services	This land use designation includes student unions, admissions, registrar, dining halls, bookstores, financial aid, career, health and counseling services, academic assistance and recreation/fitness centers.
Low Density Residential (36-60 beds/gross acre)	This land use designation includes residential facilities for undergraduate and graduate students, students with families, student groups, international students with families, and other university affiliates.
Medium Density Residential (48-80 beds/gross acre)	This land use designation includes residential facilities for undergraduate and graduate students, students with families, student groups, international students with families, and other university affiliates.
High Density Residential (63-320 beds/gross acre)	This land use designation includes residential facilities for undergraduate and graduate students, students with families, student groups, international students with families, and other university affiliates.
High Density Residential/Mixed Use Main Street (180-320 beds/acre)	This land use designation provides for mixed use and allows for the development of academic space, student services plus residential facilities for undergraduate and graduate students, students with families, student groups, international students with families, and other university affiliates.
Campus Services	This land use designation provides for the development of facilities required to service the campus on a daily basis. This includes facilities for personnel and equipment related to the operations, security and safety, and maintenance of University facilities; e.g., general maintenance activities, materials handling, police offices and facilities, utility plants, service yards, recycling areas, storage, etc.
Parking	The parking land use designation includes parking lots and parking structures, and also on-street and interim parking. It also includes setbacks, landscaping, paths, onsite utility services, sidewalks, and all roads associated with service facilities. Parking would be supplied at a rate of 0.62 per enrolled student. However, it was expected that a higher rate would be necessary until the campus and local transit systems mature.
Athletics/Recreation	This land use designation encompasses indoor and outdoor athletic facilities and fields. It also includes setbacks, landscaping, paths, on-site utility services, sidewalks and roads associated with facilities.
Passive Open Space	The Passive Open Space category designates larger, landscaped spaces within the campus boundaries. It also incorporates the campus storm water management systems, including lakes and detention areas, as well as the irrigation canals, which will be integrated into the campus pathway and open space systems.

Potable and Irrigation Water

Potable water is provided to the campus by the City of Merced via its distribution system. The water is primarily supplied by a 16-inch water line that was constructed within the roadway alignment of Bellevue Road. A water supply well was constructed on the campus as a secondary source of water because the 16-inch line is not sufficient to meet fire flow requirements. This design also assures that water supply to the campus would be uninterrupted in the event that the campus well is taken off-line for any reason. An on-campus distribution system has been developed to deliver potable water to each building. To accommodate fire flow requirements, a 250,000-gallon water storage tank was constructed on the campus near the campus well.

Wastewater Collection and Conveyance

The campus currently connects to the City of Merced wastewater collection and treatment system. To serve the campus, a 27-inch sanitary sewer line was installed by the City in Bellevue Road that connects to an existing 27-inch trunk line on G Street near Merced College. The City and UC Merced have an existing Urban Services Agreement to serve up to 10,000 students. The sewer pipeline in Bellevue Road was constructed to serve a campus with 25,000 students. Therefore, capacity is anticipated to be available for expansion of the campus to 15,000 students under the 2020 LRDP. A revision to the existing Urban Service Agreement with the City will be required to serve the campus population above 10,000 students.

Stormwater

A stormwater collection and conveyance system has been installed on the campus. The stormwater conveyance system is designed to convey runoff from a 10-year, 24-hour storm and consists of a network of grassy swales, detention basins, storm drain inlets, and underground pipes.

MID has jurisdiction and control over the Fairfield and Le Grand Canals, which traverse the campus site. Discharge of stormwater to Le Grand Canal is not permitted because of the possibility that the canal may serve domestic water needs of the town of Le Grand. In 2005, MID and UC Merced executed an agreement that allows the campus to discharge stormwater into Fairfield Canal, provided stormwater is appropriately detained before discharge into the canal and that the discharge into the canal does not exceed 225 gallons per minute.

Solid Waste

Municipal solid waste generated on the campus is disposed of at the Merced County Highway 59 Landfill. The University has established target to reduce per capita municipal solid waste generation as follows:

- Reduce waste generation per capita to FY2015/16 levels by 2020
- Reduce waste generation by 25% per capita from FY2015/16 levels by 2025
- Reduce waste generation by 50% per capita from FY2015/16 levels by 2030

The University plans to achieve zero waste by 2020. Minimum compliance for zero waste is 90% diversion of municipal solid waste from landfills (UCOP 2018; UC Merced 2017).

Fire Services

The campus currently receives fire protection services jointly from the Merced County Fire Department and the California Department of Forestry and Fire Protection (Cal Fire). The Merced County Fire Department provides the fire stations, equipment, and tools while Cal Fire provides administrative staff, firefighting personnel, and training. The City of Merced Fire Department provides mutual aid support, upon request, to Merced County Fire Department/Cal Fire under a signed Mutual Aid Agreement. There is no automatic response contractual agreement in place between the two Fire Departments.

Police Services

The University of California has its own police force, which has been serving the campus since it opened in 2005. The campus site is also within the jurisdiction of the Merced County Sheriff's Department. The University, County, and City police forces have established cooperative working relationships and the Campus Police frequently assists in local law enforcement activities, particularly related to traffic in the vicinity of the campus.

3.5 PROJECT NEED AND OBJECTIVES

The overall goal of the project is to continue the growth of UC Merced as a premier research university, consistent with the University of California's mission of teaching, research, and service excellence. The overarching objective of the 2020 LRDP is to provide an up-to-date land use plan to guide the physical planning and development of the next phase of projected campus growth from about 10,000 to 15,000 students, as well as to establish a paradigm for the campus' character.

The following are the specific project objectives that will facilitate accomplishment of the overarching project objective:

- Provide the physical planning framework to guide development that would be needed to accommodate anticipated increases in enrollment demand for the University of California system, both short-term and long-term.
- Reduce the costs of the next phase of campus development.
- Plan for a compact, pedestrian-oriented campus that reduces the need for new infrastructure.
- Plan and develop the campus to facilitate faculty-student interaction, ease and enjoyment of use of academic facilities, and an environment conducive to learning.

- Offer attractive and centrally located on-campus housing, consistent with UC-wide student housing policies.
- Provide opportunities for on-campus academic field research.
- Provide sufficient athletic facilities to offer high-quality NCAA, recreational, and club athletic programs commensurate with other premier universities.
- To the extent practicable, plan and develop the campus with sustainable design by incorporating energy efficiency, water conservation, protection of biological resources, waste reduction and minimization, on-site stormwater management and reduced dependence on automobiles.
- Promote community integration and reflect the landscape, history, resources, and diverse cultures of the San Joaquin Valley in terms of physical development.

3.6 PROPOSED 2020 LRDP

The proposed 2020 LRDP substantially revises the 2009 LRDP with the objective of accommodating projected increases in programs and providing appropriate space and infrastructure for existing and new initiatives on the campus, while allowing for more flexibility in the manner in which facilities are added to the campus to serve the projected enrollment growth. The salient features of the 2020 LRDP are described below.

3.6.1 Campus Population Projections

UC Merced opened in 2005 with 865 students, 67 faculty, and about 450 staff. As of Fall 2017, the campus's student population was about 7,967 students (headcount)[2] and the campus had approximately 390 faculty and 1,142 staff.

Although the 2020 Project would provide adequate facilities for about 10,000 students, the campus is projected to average approximately 600 additional students (headcount) per year between 2017 and 2020, and by Fall 2020–21, the campus is expected to reach approximately 9,700 students.[3] **Table 3.0-2** presents the projected increase in enrollment (headcount) and employment at the campus through 2030. All

[2] Enrollment at UC campuses is calculated using two metrics. The first metric is headcount which is the actual number of students enrolled at the campus in a given semester or quarter and includes all students that are enrolled whether they are a full-time or a part-time student. The second metric is full-time equivalent (FTE). For this metric, all part-time students are converted into full-time equivalent students using a formula and that number is added to the number of full-time students enrolled at the campus, to get a total FTE count. For most UC campuses including UC Merced, because the majority of the students are full-time students, the headcount is only slightly higher than the FTE number. All analysis in this SEIR is based on headcount.

[3] At the time that the analysis in this SEIR was commenced, UC Merced was projecting an enrollment level of 9,700 students by 2020. However, based on Fall 2019 enrollment, the Campus is now expected to have an enrollment of 9,400 students in 2020. This does not affect the 2030 enrollment projection which UC Merced still projects will be 15,000 students. That number is used in the SEIR for all impact analysis.

numbers reported in the table are in headcount and are current projections. Actual enrollment levels could differ from these numbers depending on demographics and the state of the economy, among other factors. However, these are reasonable estimates and show the manner in which campus population is expected to grow. As noted in **Section 1.0, Introduction**, the 2020 LRDP is a plan to guide campus development and not an implementation plan. Therefore, its approval does not constitute a commitment by the University to enrollment growth or a certain amount of development.

Table 3.0-2
Existing and Projected On-Campus Daily Population

	2017	2018	2020	2030	Projected Increase 2020-2030
Commuting Students	5,152	4,997	4,900	7,800	2,900
Resident Students	2,815	3,503	4,800	7,200	2,400
Subtotal	7,967	8,500	9,700	15,000	5,300
Faculty	384	415	440	786	346
Staff (on-campus)	756	800	840	1,625	785
Subtotal	1,140	1,215	1,280	2,411	1,131
Total Population	9,107	9,715	10,980	17,411	6,431

Source: UC Merced Space Planning and Analysis 2019

UC Merced also owns and leases space in the City of Merced to house several administrative functions. Although the three off-campus facilities are not included in the 2020 LRDP, the employees located in these facilities are included in the analysis of cumulative impacts in this SEIR. UC Merced projects that there will be approximately 300 employees at the Downtown Center in 2030. UC Merced also owns an undeveloped property in Bellevue Ranch West that is designated for multi-family residential development. At this time, UC Merced has no plans to develop that site with housing; as such that site is not included in the cumulative impact analysis.

3.6.2 Projected Building Space and Parking

Table 3.0-3, LRDP Building Space and Parking Projections, summarizes the existing and projected building space on the campus under full 2020 LRDP buildout conditions. UC Merced has developed an estimate of the amount of new building spaces by space type that would be required to accommodate the projected growth on the campus under the 2020 LRDP. As the table shows, approximately 1.83 million gross square feet (gsf) of building space would be required. Total building space on the campus, excluding parking structures, would increase from approximately 2.5 million gsf in 2020 when the UC Merced 2020 Project would be completed to approximately 4.3 million gsf upon full implementation of the 2020 LRDP, anticipated in 2030.

Table 3.0-3
2020 LRDP Building Space and Parking Projections (gsf)

Category	Existing	Building Space added by 2020 Project	Total 2020[a]	Building Space under the 2020 LRDP[b]	Total Building Space 2030
Academic Space	695,143	574,445	1,269,600	639,100	1,908,700
Housing	434,515	413,683	848,200	379,500	1,227,700
Student Life and Athletics	82,455	164,571	247,000	357,500	604,500
Campus Operations	61,325	32,911	94,200	453,800	548,000
Total	1,273,438	1,185,610	2,459,000	1,829,900	4,288,900
Parking					
Parking Spaces	2,776	1,753[c]	4,529	1,680	6,209

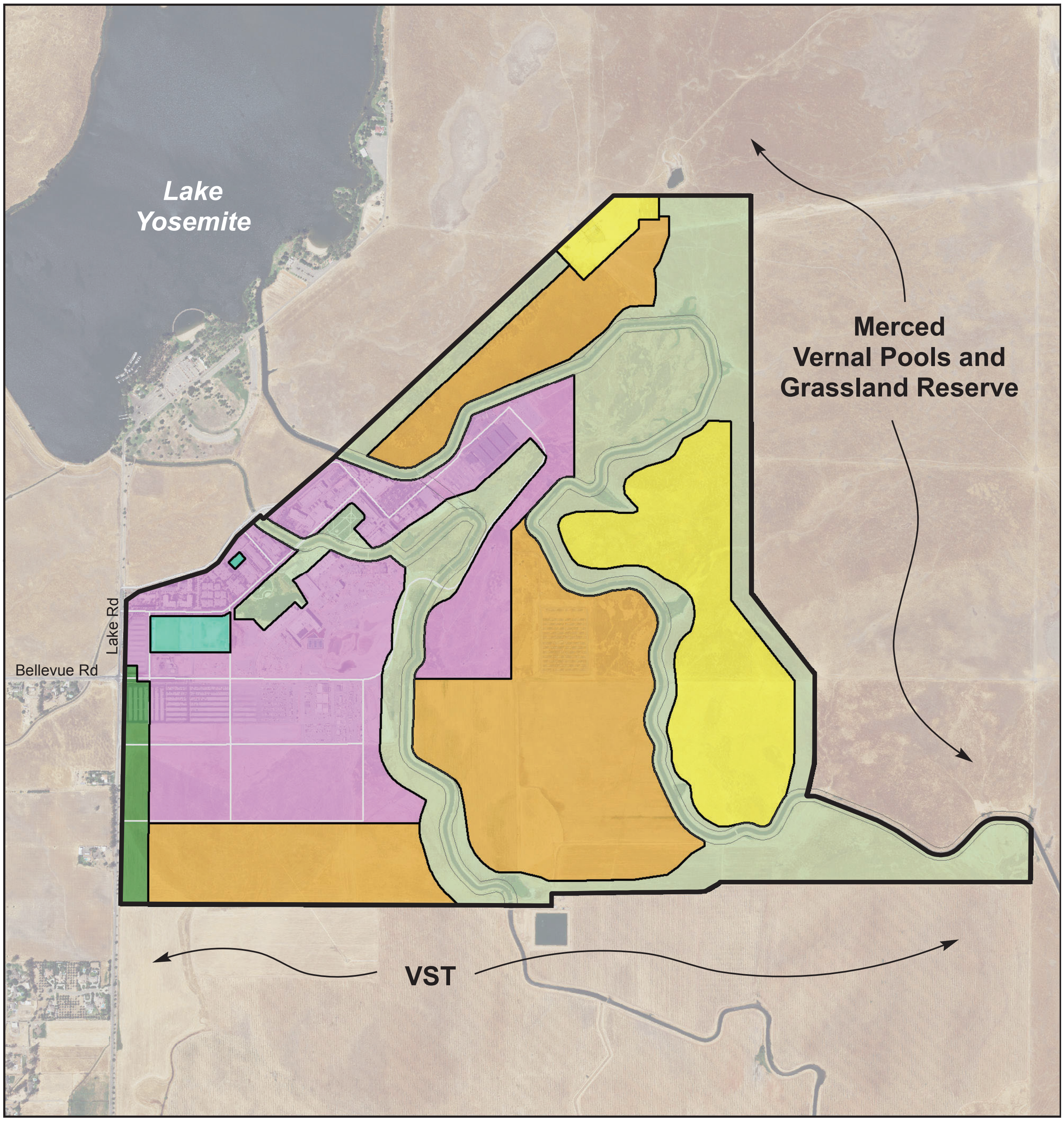
Source: UC Merced Space Planning and Analysis 2019
Notes:
[a] *All 2020 space numbers have been rounded to the nearest 1,000 square feet.*
[b] *All building space estimates for the 2020 LRDP include a 10 percent contingency.*
[c] *The number of parking spaces reported under the 2020 Project represent the net increase in parking; the project displaced existing parking which it will replace as well as additional spaces for a net increase of 1,753 spaces, such that by 2020, there will be a total of 4,529 parking spaces on the campus.*

3.6.3 2020 Land Use Map and Designations

The proposed 2020 LRDP sets forth a revised land use map to inform the pattern of development on the campus. **Figure 3.0-5, Proposed 2020 LRDP Land Use Designations,** shows the proposed land use designations under the 2020 LRDP. This land use map replaces the prior 2009 LRDP land use map in full and establishes new land use designations. **Table 3.0-4, Proposed Land Use Designations and Acreages** below presents a summary of campus land use designations and acres of land under each designation per the proposed 2020 LRDP land use map.

Table 3.0-4
Proposed Land Use Designations and Acreages

Land Use Category	Acres
Campus Mixed Use (CMU)	274
Campus Building Reserve and Support Land (CBRSL)	306
Research Open Space (ROS)	135
Active Open Space (AOS)	9
Passive Open Space (POS)	283
Campus Parkway Open Space (CPOS)	19
Total	**1,026**



Land Use

	Campus Mixed Use (CMU)	274 ac
	Campus Building Reserve & Support Land (CBRSL)	306 ac
	Research Open Space (ROS)	135 ac
	Active Open Space (AOS)	9 ac
	Passive Open Space (POS)	283 ac
	Campus Parkway Open Space (CPOS)	19 ac
	Total Area	1,026 ac

SOURCE: UC Merced, 2019

FIGURE **3.0-5**

Proposed 2020 LRDP Land Use Designations

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Campus Mixed Use (CMU)

The Campus Mixed Use (CMU) designation includes areas of the campus that are either currently developed with campus land uses or would be developed under the 2020 Project and in the future under the proposed 2020 LRDP. The allowed uses include academic, instructional and research laboratories, library and learning facilities, research archive facilities, student housing including both undergraduate and graduate students, student support services, university affiliated dining and retail, athletic and recreational facilities, administrative, childcare, service facilities, warehouse/storage facilities, and parking facilities. Ancillary support facilities include administrative facilities, performance and cultural facilities, clinical facilities, research institutes, conference facilities, services supporting academic operations, and alumni and conference centers.

Campus Building Reserve and Support Land (CBRSL)

The Campus Building Reserve and Support Land (CBRSL) designation includes areas of the campus that will likely be developed at some point in the future but have not at this time been designated for specific uses. Potential future uses could include academic, research, student housing, student and support services, athletic and recreation, parking, and similar uses as identified for the areas designated CMU.

The CBRSL land use designation allows for the development of support services, small solar and other alternate energy projects, and small structures less than 10,000 square feet. This includes facilities for personnel and equipment related to the operation, safety, and maintenance of campus facilities, general maintenance activities, materials handling, utility plants, service yards, recycling areas, and storage. Cattle grazing would continue to be allowed on lands designated CBRSL.

Research Open Space (ROS)

The Research Open Space (ROS) designation includes areas of the campus that would be used for field research and experimentation. This land use designation is assigned to lands that are not planned for development at any point in the future. It is envisioned that these lands would be maintained in their existing state except as needed for maintenance, teaching, and research. Development in this area will be limited to education or research projects that include the development of small-scale facilities less than 10,000 square feet of building space, such as a field station facility, including overnight lodging to support critical research, education, and outreach programs. The land use designation also allows the construction of utilities, parking, paths and trails, and roads. Cattle grazing would also be allowed on lands designated ROS.

Active Open Space (AOS)

The Active Open Space (AOS) designation encompasses indoor and outdoor athletic facilities and fields. The designation also includes setbacks, landscaping, paths, on-site utility services, sidewalks and roads associated with the facilities.

Passive Open Space (POS)

The Passive Open Space (POS) designation applies to larger, landscaped or natural spaces within the campus boundaries. It also includes the campus storm water management systems, including lakes and detention areas, as well as the irrigation canals, which may be integrated into the campus pathway and open space systems. **Figure 3.0-6, Campus Open Space,** shows the extensive open space areas on the campus. Cattle grazing would also be allowed on lands designated POS.

Campus Parkway Open Space (CPOS)

The Campus Parkway Open Space (CPOS) designation applies to areas that are on or adjacent to Lake Road, one of the primary existing thoroughfares into the campus from the City of Merced. The Circulation Plan details future roads that could be built to serve the area as the campus expands. This designation would allow the placement of landscaping, utilities, parking, sidewalks, paths, and roads.

3.6.4 Access and Circulation

The Horizon Year 2030 Circulation Plan is shown in **Figure 3.0-7, Horizon Year 2030 Circulation Plan**. In addition to the main entrance to the campus via the Bellevue extension, two additional roadways off of Lake Road, south of the Bellevue/Lake Road intersection, will need to be established as part of the 2030 circulation network. The existing Scholar's Lane and Rancher's Road entrances would also be maintained.

3.7 SUSTAINABILITY

The University adopted an updated UC Policy on Sustainable Practices[4] in 2018, which set ambitious goals to advance environmental practices. The University is also committed to developing a long-term strategy for meeting the state's goal of a reduction of greenhouse gas (GHG) emissions to 1990 levels by 2020 and requires UC campuses to achieve carbon neutrality for Scope 1 and 2 GHG emissions by 2025.

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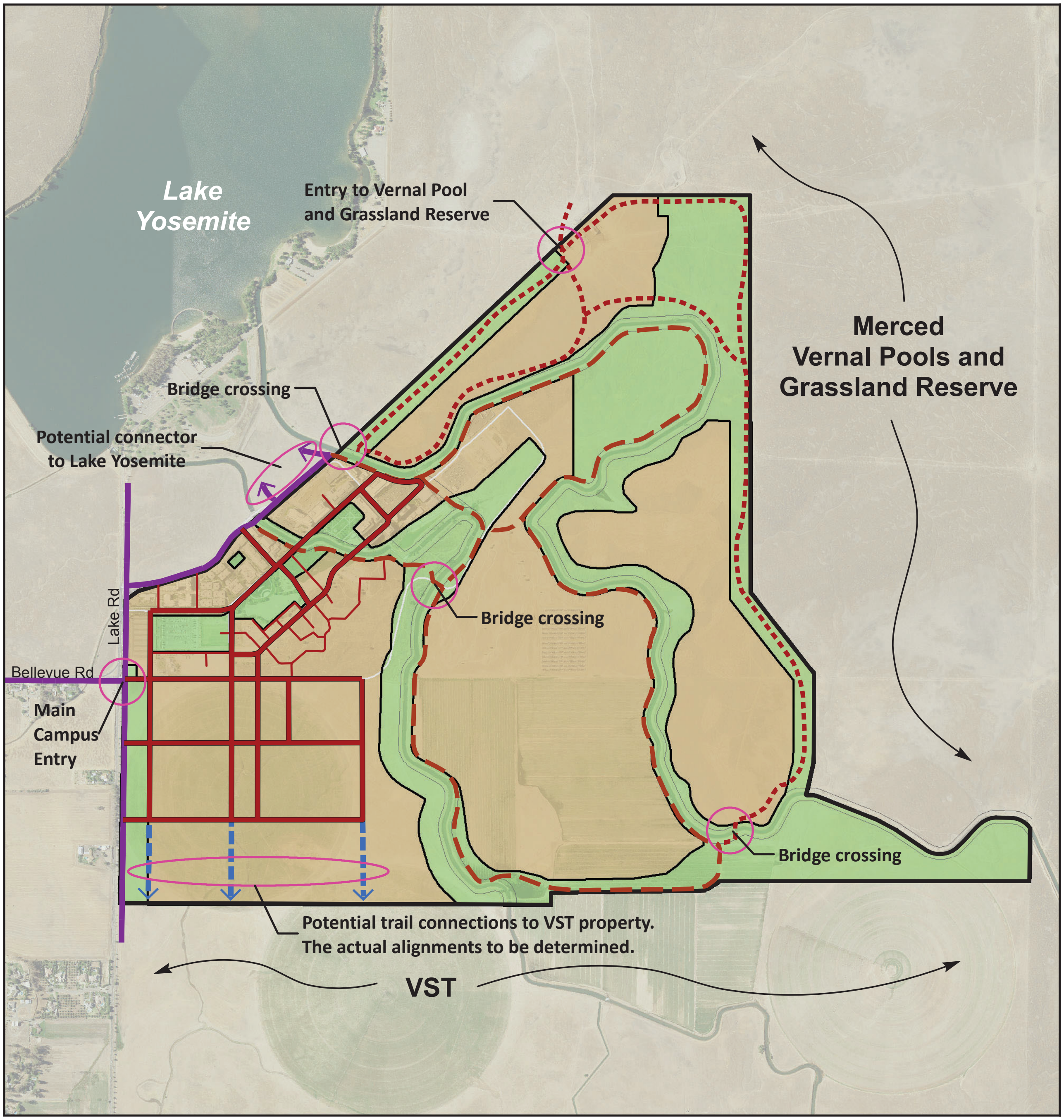
4 https://policy.ucop.edu/doc/3100155/SustainablePractices



Trails

- Campus Pathway
- Secondary Path
- Canal Loop Trail
- Nature Trail
- Community Collector Corridor
- Potential Trail Connection to the VST. The Actual Alignment to be Determined.

Land Use

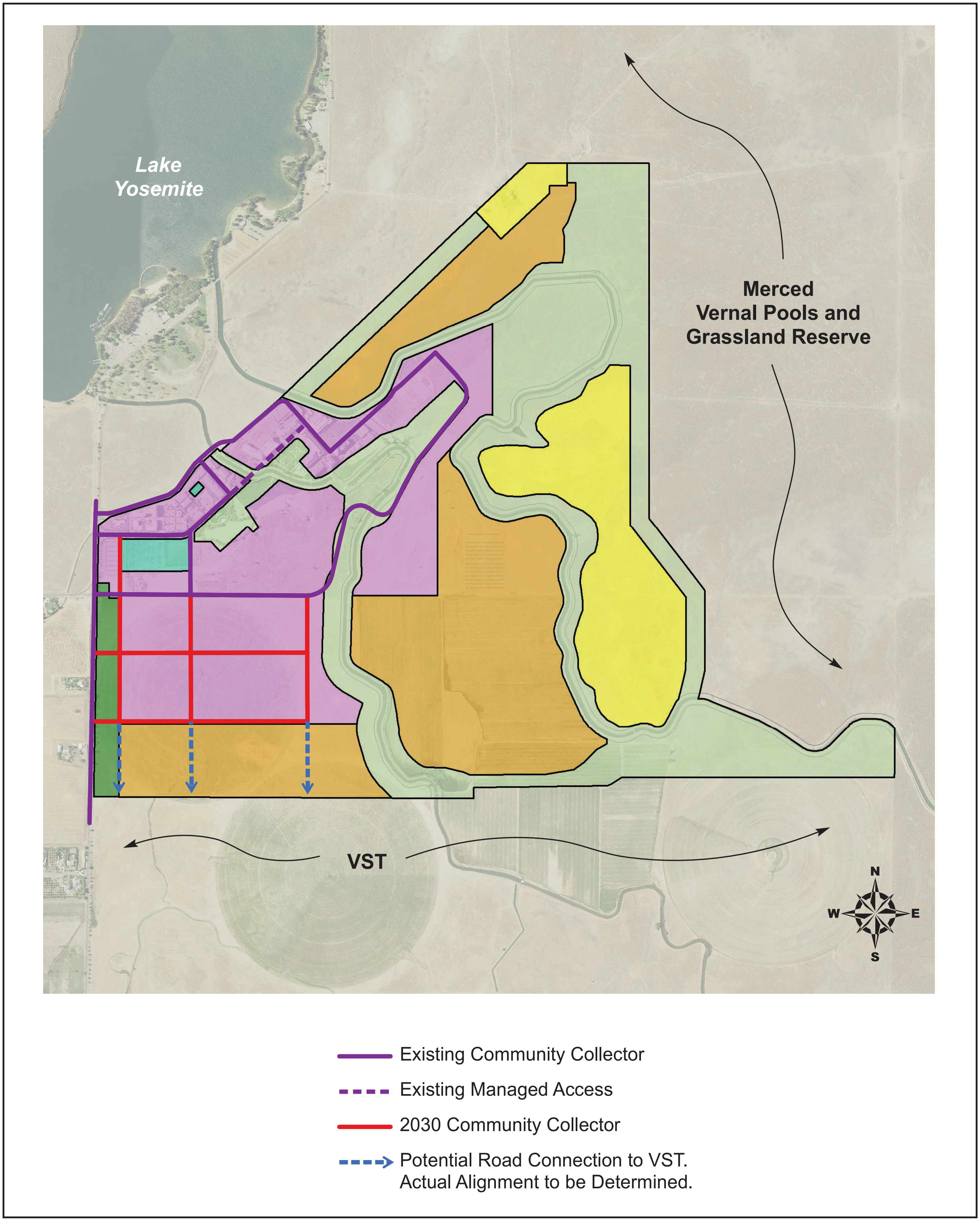
Open Space	311 ac.
Other Land Uses	715 ac.
Total Area	1,026 ac.

UC Merced Campus

SOURCE: University of California Merced, 2019

FIGURE **3.0-6**

Campus Open Space



SOURCE: University of California Merced, 2019

FIGURE **3.0-7**

Horizon Year 2030 Circulation Plan

The proposed 2020 LRDP describes sustainability practices that would be employed at the campus to achieve the University's goals, which include reduction of waste, use of sustainable building materials for new construction projects, energy efficiency principles, minimization of water use, and incorporation of programs for alternate transportation to and from the campus.

3.7.1 Land Use and Site Planning

One of the primary objectives of the 2020 LRDP is to ensure a cost-effective and sustainable expansion of the UC Merced campus in order to serve the University of California's mission, particularly as it relates to the Central Valley. Land use and site planning decisions to this end have been taken to ensure that the physical footprint of the campus expands in a sustainable way, primarily by limiting the amount of land developed and focusing on vertical growth where possible. This not only allows for efficiency in land use and design, but also serves to reduce the cost of infrastructure to an expanded campus.

3.7.2 Energy

UC Merced will incorporate principles of energy efficiency and sustainability in all capital projects, renovation projects, operations, and maintenance within budgetary constraints and programmatic requirements.

3.7.3 Water

In order to minimize its use of water to the extent practicable, UC Merced will implement measures such as water-efficient landscaping and drip or other efficient irrigation systems; use of water-efficient fixtures in new construction and retrofitting of existing buildings; capture rainwater and stormwater for use in irrigation; and exploring opportunities for the use of recycled water in appropriate applications on campus. Sustainable water systems would be designed to promote surface water usage to minimize groundwater use and depletion.

3.7.4 Waste

UC Merced will continue to implement its Integrated Waste Management Plan, including waste reduction and recycling elements. Additionally, the design, development, and technologies used for campus infrastructure place a premium on simple, elegant solutions that minimize waste.

3.7.5 Open Space and Landscape

UC Merced will support bio-diversity and habitat conservation through the use of native plant materials wherever possible. In addition, UC Merced will utilize drought-tolerant and low-water-use plant materials suited to the particular climate and water regime of the Central Valley region.

3.7.6 Materials

Building materials will be selected to reduce embodied energy, maximize building lifespan, and be recyclable or reusable. Material use overall will be minimized, whether in buildings or in other site operations (e.g., paper) and recycled. Materials will be locally sourced and from renewable sources to the degree feasible, including re-use of materials from structures proposed for demolition.

3.7.7 Transportation and Circulation

UC Merced will continue to incorporate alternate means of transportation to and from the campus with a particular focus on the commute habits of faculty, staff, and students. UC Merced will:

- support improved transportation options such as working with local transportation agencies/providers to improve bus service to and near the campus;
- identify potential improvements to the campus-operated transit service;
- implement appropriate alternate mode use incentives such as discounted transit passes, carpool matching services, preferential parking for carpools, vanpools and low emissions vehicles, and flexible car share programs for the campus;
- implement parking management policies, such as not issuing parking permits to freshmen students living on campus to discourage use of automobiles, and pricing parking to encourage use of alternate modes; and
- encourage students in particular to live in close proximity of the campus to reduce commuting by automobile.

3.8 REQUIRED APPROVALS

As a public agency principally responsible for approving or carrying out the proposed 2020 LRDP, the University is the Lead Agency under CEQA and is responsible for reviewing the adequacy of the environmental document and certifying it and approving the proposed 2020 LRDP. Necessary project actions and approvals are anticipated to include, but are not limited to, consideration of the following by the Regents (anticipated in January 2020):

- Certification of the 2020 LRDP SEIR; and
- Approval of the UC Merced 2020 LRDP.

The revised area of the campus, which would be developed in the future under the proposed 2020 LRDP, is covered by the permits and approvals that the University obtained for the Campus and University Community North from federal and state agencies, including the U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and the Central Valley Regional Water Quality Control Board (CVRWQCB). Furthermore, the proposed 2020 LRDP is a plan to guide future development and growth on the campus and is not a specific development project. As such, no other permits and approvals are required for the adoption of the 2020 LRDP. Projects implemented under the 2020 LRDP will be subject to future environmental review and approval, including permits as needed.

3.9 REFERENCES

University of California (UC) Regents, *Sustainable Practices Policy*, Effective September 6, 2016. Available online at http://policy.ucop.edu/doc/3100155/, accessed October 18, 2018.

University of California, Merced. 2017. Zero Waste Business Plan.

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4.0 ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

Introduction

This section of the Recirculated Draft Subsequent Environmental Impact Report (SEIR) presents potential environmental impacts of the proposed UC Merced 2020 LRDP project (2020 LRDP or proposed project). To assist the reader in understanding the manner in which the impact analysis has been conducted in **Sections 4.1** through **4.11**, this introductory section presents the definitions of key terms used in the SEIR and key attributes of the analytical approach to impact assessment.

Levels of Significance

The SEIR uses a variety of terms to describe the levels of significance of adverse impacts identified during the course of the environmental analysis. The following are definitions of terms used in this document:

- **Significant and Unavoidable Impact.** Impacts that exceed the defined standards of significance and cannot be eliminated or reduced to a less than significant level through the implementation of feasible mitigation measures. These can include significant impacts that are unavoidable because available mitigation is not adequate to reduce the impact fully. These can also include significant impacts that are unavoidable because the mitigation measures are within the responsibility and jurisdiction of another public agency, and the University cannot assure the timely implementation of the mitigation measure.

- **Significant Impact.** Impacts that exceed the defined standards of significance and that can be eliminated or reduced to a less than significant level through the implementation of feasible mitigation measures.

- **Potentially Significant Impact.** Potentially Significant Impacts are impacts about which there is not enough information to draw a firm conclusion; however, for the purpose of this SEIR, they are considered significant. Such impacts are equivalent to Significant Impacts and require the identification of feasible mitigation measures.

- **Less Than Significant Impact.** Impacts that are adverse but that do not exceed the specified standards of significance.

- **No Impact.** The project would not create an impact.

Relationship to Previous Environmental Documents

As noted in **Section 1.0, Introduction**, in March 2009, the Board of Regents of the University of California (The Regents) certified a joint EIS/EIR (State Clearinghouse No. 2008041009) that analyzed and disclosed the impacts from the implementation of a LRDP for the UC Merced campus, and adopted the UC Merced

2009 LRDP as a guide for physical development to accommodate growth projected through 2030 and beyond. Now, the University has revised its enrollment projections through 2030 down substantially and has also acquired more land for the campus. UC Merced also anticipates accommodating the projected enrollment growth on a smaller development footprint than previously identified in the 2009 LRDP. As a result of these changes, UC Merced has developed a revised land use plan for the campus site, which is included in the proposed 2020 LRDP. As noted in **Section 1.0**, the current EIR is a subsequent EIR (SEIR) as defined by CEQA. As a SEIR, it incorporates all applicable analysis contained in the 2009 LRDP EIS/EIR, as amended by addenda prepared by UC Merced since 2009, and updates the previous analysis as necessary in light of the revised project and/or due to new information of substantial importance that has become available since the certification of the previous EIR.

Definition of Baseline

CEQA requires a clear identification of the baseline against which environmental impacts of the proposed project must be evaluated. The CEQA baseline is defined by conditions that exist at a point in time. Section 15125 of the *State CEQA Guidelines* requires EIRs to include a description of the physical environmental conditions in the area of a project that exist at the time that the Notice of Preparation (NOP) is circulated. These environmental conditions normally constitute the baseline physical conditions relative to which the CEQA lead agency evaluates the change in conditions that would result from project implementation. The NOP for this SEIR was issued on April 2, 2018. Therefore, environmental conditions as of 2018 represent the baseline for CEQA purposes for all resources except transportation. For transportation and transportation-related environmental impacts, 2017 is used as the baseline year because traffic counts were conducted in late 2017.

However, UC Merced is currently constructing the previously approved 2020 Project, which was fully evaluated in the 2009 LRDP EIS/EIR. The 2020 Project will add approximately 1.19 million square feet of new building space and amenities, including 1,700 new beds to accommodate additional students, faculty and staff such that by 2020, UC Merced will be able to accommodate approximately 10,000 students and associated faculty and staff. The proposed 2020 LRDP would guide the development of the campus after the 2020 Project is completed, essentially between 2020 and 2030. Therefore, this SEIR analyzes the change in conditions between 2020 and 2030 that could result from the implementation of 2020 LRDP. Note that although the 2020 Project will provide facilities for about 10,000 students, based on projected enrollment growth, it is now anticipated that the campus enrollment would increase to approximately 9,700 students by 2020, and this SEIR analyzes the environmental effects from the development of facilities that would accommodate the enrollment increasing from approximately 9,700 students in 2020 to 15,000 students by 2030.[1]

Format of Resource Topic Sections

Each resource topic considered in this section of the SEIR is addressed under seven primary subsections: Introduction; Environmental Setting; Regulatory Considerations; Impacts and Mitigation Measures, which include Significance Criteria, Methodology, Impact Analysis, Cumulative Impacts, and References. An overview of the information included in these sections is provided below.

Introduction

The introduction section describes the topic to be analyzed and the contents of the analysis. It also provides the sources used to evaluate the potential impacts of the project.

Environmental Setting

This section describes the existing conditions on and in the vicinity of the campus.

Regulatory Considerations

This section presents relevant federal, state, and local laws, regulations, plans, and policies. Only those laws, regulations, and policies that are pertinent to the impact analysis are included.

Impacts and Mitigation Measures

This section sets forth the significance criteria used in this SEIR to evaluate impacts, along with the analytical methods, project impacts, and mitigation measures.

Significance Criteria

This subsection presents the significance criteria used in this SEIR to evaluate impacts. This SEIR uses significance criteria derived from Appendix G of the *State CEQA Guidelines* regarding the determination of environmental consequences to identify impacts and underlying statutory authority to the extent applicable.

Methodology

This subsection summarizes the methodology used to evaluate effects. Impacts are evaluated quantitatively where possible and qualitatively where quantification is not feasible.

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1 At the time that the analysis in this SEIR was commenced, UC Merced was projecting an enrollment level of 9,700 students by 2020. However, based on Fall 2019 enrollment, the Campus is now expected to have an enrollment of 9,400 students in 2020. This does not affect the 2030 enrollment projection which UC Merced still projects will be 15,000 students. That number is used in the SEIR for all impact analysis.

LRDP Impacts and Mitigation Measures

This subsection presents the environmental effects from the implementation of the proposed LRDP, using the Appendix G CEQA checklist to identify each impact.

All impacts are numbered (for instance, LRDP Impact AQ-1 refers to the first impact under **Air Quality**) and shown in bold type. For each impact, a summary statement of the impact is presented along with a conclusion with respect to the impact's significance before mitigation and its significance after mitigation (in ***bold italics***). Mitigation measures are numbered to correspond to the impact. Impacts and mitigation measures are numbered consecutively within each topic. In the analysis that follows, the significance of each impact from the development of the campus is determined after taking into account existing environmental commitments made by UC Merced and regulatory permits and approvals already granted to UC Merced.

Cumulative Impacts and Mitigation Measures

This section presents the cumulative impacts of the 2020 LRDP in conjunction with past, present, and reasonably foreseeable future development in the project area. The approach to the analysis of cumulative impacts is described in detail below.

References

This section lists the references used to prepare the environmental setting and impact analysis for each section of the SEIR.

Approach to Cumulative Impact Analysis

CEQA Guidance Regarding Cumulative Impact Analysis

CEQA requires that EIRs disclose the cumulative impacts of a proposed project, and that the analysis reflect the severity of the impacts and the likelihood of their occurrence. Section 15355 of the *State CEQA Guidelines* provides a definition of cumulative impacts:

> *Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.*
>
> *(a) The individual effects may be changes resulting from a single project or a number of separate projects;*
>
> *(b) The cumulative impact from several projects is the change in the environment, which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future project. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.*

Section 15130 of the *State CEQA Guidelines* provides direction regarding cumulative impact analysis as follows:

- A cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts.
- An EIR should not discuss cumulative impacts that do not result, in part, from the proposed project.
- A lead agency may determine a project's incremental effect is not cumulatively considerable and, therefore, is not significant and shall briefly describe in the EIR the basis of its determination.
- A lead agency may determine a project's cumulatively considerable contribution to a significant cumulative impact may be rendered less than cumulatively considerable and, therefore, residually not significant, if the project implements or funds its fair share of a mitigation measure or measures designed to alleviate the cumulative impact.
- The analysis of cumulative impacts should "be guided by the standards of practicality and reasonableness." The discussion of cumulative impacts must reflect the severity of the impacts and the likelihood of their occurrence; however, the discussion need not be as detailed as the discussion of environmental impacts attributable to the project alone.

Year for Cumulative Analysis

The proposed project is the 2020 LRDP, a land use plan that will guide the physical development of the campus over the course of 10 years, from 2020 to 2030. To provide a complete and conservative analysis, the impacts of the project are analyzed at full campus development by 2030 under this proposed LRDP. Cumulative impacts are assessed up to year 2035. This represents about 20 years of growth in the project area which is typically the time period for which cumulative impacts are analyzed. It is also the farthest year for which traffic, population, and housing data are available.

Although the 2020 LRDP is designed to accommodate campus growth through 2030, and at this time, UC Merced does not have growth projections for the years after 2030, for purposes of the cumulative impact analysis in this SEIR, it is assumed that the campus would continue to grow between 2030 and 2035 at the same rate as between 2020 and 2030, and that new facilities would be developed to accommodate an additional 2,500 students, and associated faculty and staff, for an enrollment level of 17,500 students by 2035.

Past, Present and Reasonably Foreseeable Cumulative Projects

State CEQA Guidelines Section 15130(b) provides two alternate approaches as to how other current and reasonably foreseeable future projects may be identified for purposes of a cumulative impact analysis in a CEQA document. Either of the following approaches may be used:

- A list of past, present, and reasonably foreseeable projects; or
- A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document that has been adopted or certified, which describes or evaluates regional or area-wide conditions contributing to cumulative impacts.

UC Merced considered using a summary of projections approach as the proposed project is a plan and not a specific development project. However, given that the plan extends over just 10 years, a list-based approach was determined to be useful. UC Merced contacted both the County of Merced and City of Merced to obtain a list of projects that are on file, either as approved projects or as applications for future land development.

The County informed UC Merced that about 105 residential units would likely be developed by 2030 within the Bellevue corridor area which is the area bound by Bellevue Road and Old Lake Road, between G Street and Lake Road, and that an additional 27 units would likely be developed in the same area by 2035.

The City provided a tentative subdivision projects list dated September 2016, a list of current projects dated August 2017, and a homebuilder activity list dated August 2017. These projects included in these lists are presented in **Table 4.0-1** and **Figure 4.0-1, City of Merced Current Projects**. In addition, the City noted that the cumulative traffic analysis must take into account the full scope of the City's adopted Vision 2030 General Plan. To avoid double counting, the lists were used to develop growth projections through 2035.

The City also noted that Virginia Smith Trust (VST) was in discussions with the City for possible annexation and development of VST lands to the south of the campus with urban uses. However, as of the preparation of the Draft SEIR, there is no application on file with the City for development of the VST lands. Therefore, development of that area is not included in the SEIR cumulative analysis.[2]

Campus Parkway has been approved between Highway 99 and Yosemite Avenue, but not north of Yosemite Avenue. The approved portion of that project has been taken into account in the cumulative traffic analysis.

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2 In its letter on the previously circulated Draft SEIR, VST stated that it is currently preparing a Specific Plan in accordance with the previously adopted University Community Plan (UCP) for development of UCP North, the first phase of the UCP. The first and second phases of the Specific Plan for UCP North consist of the development of 200 acres closest to Lake Road. At the time of recirculation of this SEIR, VST has not yet submitted this plan or its development application to Merced County.

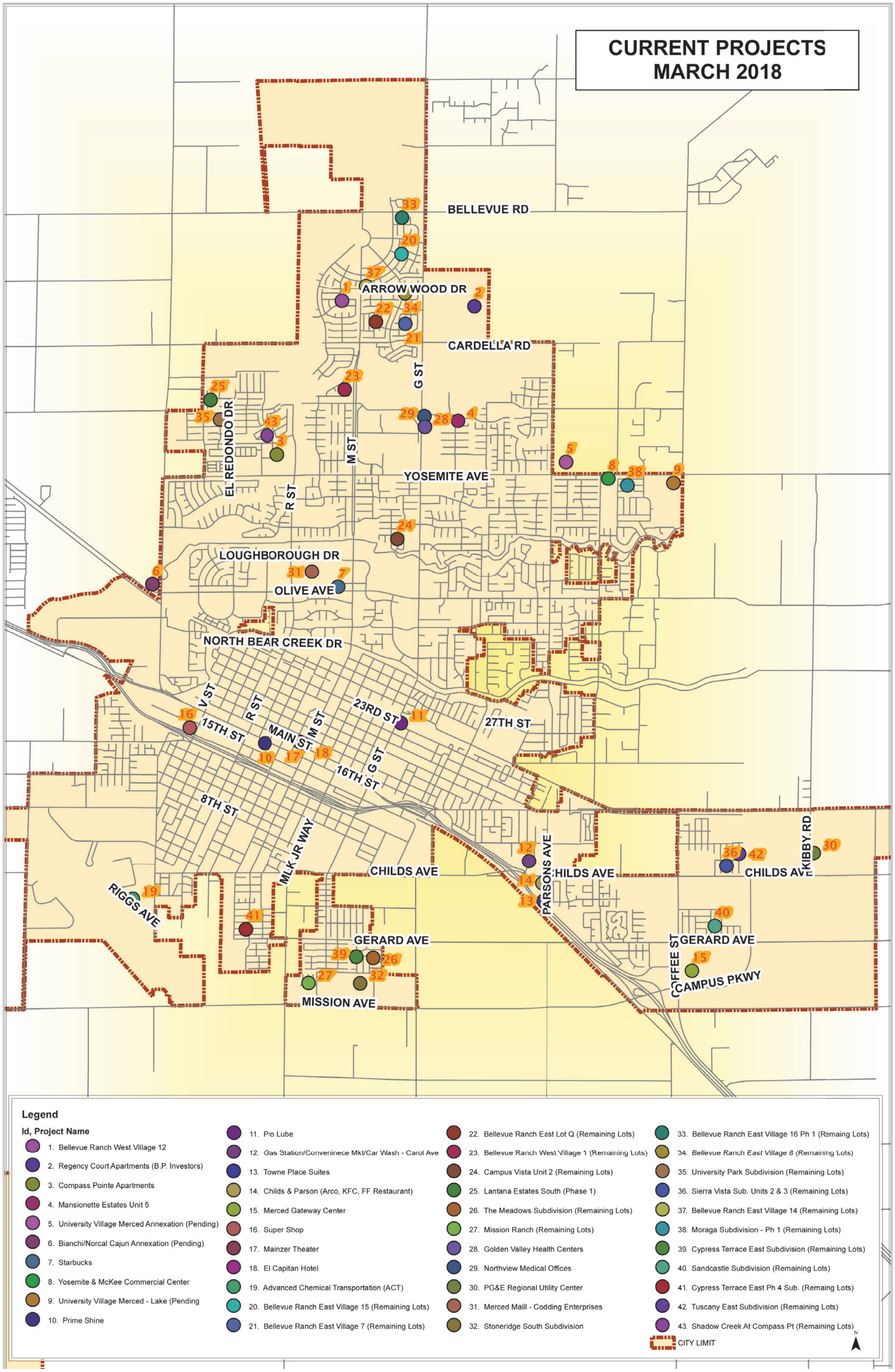
Table 4.0-1
Cumulative Projects List

Project ID	Project Name	Land Use Type	Size	Units
1	Bellevue Ranch West Village 12	Residential - SF	242	DU
2	Regency Court Apartments	Residential - MF	180	DU
3	Compass Pointe II Apartments	Residential - MF	136	DU
4	Mansionette Estates Unit 5	Residential - SF	20	DU
5	University Village Merced Annexation	Mixed Use (MF)	330	DU
5	University Village Merced Annexation	Mixed Use (Retail)	40	KSF
6	Bianchi/Norcal Cajun Annexation	Retail	42	KSF
8	Yosemite & McKee Commercial Center	Retail	62	KSF
9	University Village Merced - Lake ("Merced Station")	Mixed Use (MF)	225	DU
9	University Village Merced - Lake ("Merced Station")	Mixed Use (Retail)	6.6	KSF
10	Prime Shine	Auto Shop	5.5	KSF
11	Pro Lube	Auto Shop	15.7	KSF
12	Gas Station/Conv. Market/Car Wash - Carol Ave	Gas Station/Conv. Market/Retail	6.4	KSF
13	Towne Place Suites	Hotel	87	Rooms
14	Childs and Parsons (Old Bowling Alley)	Gas Station/Conv. Market/Retail	12	KSF
15	Merced Gateway Center	Mixed Use (MF)	178	DU
15	Merced Gateway Center	Mixed Use (Retail)	523	KSF
16	Super Shop	Auto Shop	15	KSF
17	Mainzer Theater	Retail	11.2	KSF
18	El Capitan Hotel	Mixed Use (Hotel)	100	Rooms
18	El Capitan Hotel	Mixed Use (Retail)	74	KSF
19	Advanced Chemical Transportation (ACT)	Industrial	21	KSF
20	Bellevue Ranch East Village 15 (Remaining Lots)	Residential - SF	65	DU
21	Bellevue Ranch East Village 7 (Remaining Lots)	Residential - SF	134	DU
22	Bellevue Ranch East Lot Q (Remaining Lots)	Residential - SF	100	DU
23	Bellevue Ranch West Village 1	Residential - SF	67	DU
24	Campus Vista Unit 2 (Remaining Lots)	Residential - SF	61	DU
25	Lantana Estates South (Phase 1)	Residential - SF	60	DU
26	The Meadows Subdivision (Remaining Lots)	Residential - SF	58	DU
27	Mission Ranch (Remaining Lots)	Residential - SF	134	DU
28	Golden Valley Health Centers (Part of Northview)	Medical Office	27	KSF
29	Northview Medical Offices	Medical Office	66.45	KSF
30	PG&E Regional Utility Center	Industrial	48	KSF

Table 4.0-1
Cumulative Projects List

Project ID	Project Name	Land Use Type	Size	Units
31	Merced Mall Expansion	Mixed Use (Theater)	7	Screens
31	Merced Mall Expansion	Mixed Use (Retail)	50	KSF
32	Stoneridge South Subdivision	Residential - SF	160	DU
32	Stoneridge South Subdivision	Residential - MF	100	DU
33	Bellevue Ranch East Village 16 (Remaining Lots)	Residential - SF	71	DU
34	Bellevue Ranch East Village 8 (Remaining Lots)	Residential - SF	37	DU
35	University Park II, Phase 2 Subdivision (Remaining Lots)	Residential - SF	125	DU
36	Sierra Vista Units 2 and 3 (Remaining Lots)	Residential - SF	44	DU
37	Bellevue Ranch East Village 14 (Remaining Lots)	Residential - SF	48	DU
38	Moraga Subdivision Phase 1 (Remaining Lots)	Residential - SF	249	DU
39	Cypress Terrace East (Remaining Lots)	Residential - SF	101	DU
40	Sandcastle Phase 2 & 3 Subdivision (Remaining Lots)	Residential - SF	144	DU
41	Cypress Terrace East Phase 4 (Remaining Lots)	Residential - SF	101	DU
42	Tuscany East Subdivision (Remaining Lots)	Residential - SF	47	DU
43	Shadow Creek at Compass Point (Remaining Lots)	Residential - SF	293	DU
44	County Housing Project	Residential - SF	127	DU
45	County Housing Project	Residential - SF	25	DU
46	UC Merced Admin Building	Office	300	Emp

Source: City of Merced 2017
DU = dwelling unit
Emp = employees
KSF = thousand square feet
SF = Single-family
MF = Multi-family



SOURCE: City of Merced Planning Department, 2018

FIGURE **4.0-1**

City of Merced Current Projects

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4.1 AIR QUALITY

4.1.1 Introduction

This section of the Recirculated Draft SEIR (SEIR) discusses the existing regional air quality conditions in the northern San Joaquin Valley and evaluates the potential air quality impacts associated with campus development under the 2020 LRDP. The impacts due to air pollutant emissions associated with campus development and operations under the 2020 LRDP are evaluated relative to the thresholds of significance recommended by the San Joaquin Valley Air Pollution Control District (SJVAPCD). A discussion of the applicable federal, state, regional, and local agencies that regulate, monitor, and control air emissions, as well as the applicable SJVAPCD rules and regulations that pertain to the proposed project is also provided. The impact analysis has been prepared in accordance with the CEQA Statute and Guidelines and the SJVAPCD's *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI). Copies of the modeling runs and supporting technical data are presented in **Appendix 4.1** of this SEIR.

The following sources were used to prepare this section of the SEIR:

- UC Merced Draft 2020 Long Range Development Plan (UC Merced 2019)
- SJVAPCD 2016 Moderate Area Plan for the 2012 PM2.5 Standard (SJVAPCD 2016a)
- SJVAPCD 2016 Plan for the 2008 8-Hour Ozone Standard (SJVAPCD 2016b)
- SJVAPCD Guide for Assessing and Mitigating Air Quality Impacts (SJVAPCD 2015)
- SJVAPCD 2013 Plan for the Revoked 1-Hour Ozone Standard (SJVAPCD 2013)
- SJVAPCD 2007 PM_{10} Maintenance Plan and Request for Redesignation (SJVAPCD 2007)

4.1.2 Environmental Setting

Regional Setting

CARB has divided California into regional air basins according to topographic features. The proposed project is located in Merced County, which is within the jurisdiction of the San Joaquin Valley Air Basin (SJVAB). The primary factors that determine air quality are the locations of air pollutant sources, the amount of pollutants emitted, and meteorological and topographical conditions affecting their dispersion. Atmospheric conditions, including wind speed, wind direction, and air temperature gradients, interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. The following sections provide a description of key air pollutants that affect air quality, and the existing environment as it relates to climate, meteorological conditions, and ambient air quality conditions of the SJVAB.

Criteria Air Pollutants

Air pollutants of concern in the SJVAB are primarily generated by three categories of sources: mobile, stationary, and area sources. Mobile sources refer to operational and evaporative emissions from motor vehicles. Stationary sources include "point sources" which have one or more emission sources at a single facility. Point sources are usually associated with manufacturing and industrial uses and include sources such as refinery boilers or combustion equipment that produces electricity or process heat. Area sources include sources that produce widely distributed emissions. Examples of area sources include residential water heaters, painting operations, lawn mowers, agricultural fields, landfills, and consumer products, such as lighter fluid or hair spray.

The criteria pollutants relevant to the proposed project and of concern in the air basin are briefly described below. Note that Reactive Organic Gases (ROGs), which are also known as reactive organic compounds (ROCs) or volatile organic compounds (VOCs), are not classified as criteria pollutants. Similarly, Nitrogen oxide (NOx) is not listed as a criteria pollutant. However, both ROGs and NOx are widely emitted from land development projects and participate in photochemical reactions in the atmosphere to form ozone (O_3); therefore, NOx and ROGs are of concern in the SVJAB and relevant to the proposed project and are therefore listed below.

- **Ozone (O_3).** O_3 is a gas that is formed when nitrogen oxides (NO_X) and ROGs, both byproducts of internal combustion engine exhaust and other sources, undergo slow photochemical reactions in the presence of sunlight. Ozone concentrations are generally highest during the summer months when the combination of direct sunlight, light wind, and warm temperature conditions create conditions favorable to the formation of this pollutant.

- **Reactive Organic Gases (ROGs).** ROGs are compounds comprised primarily of atoms of hydrogen and carbon. Internal combustion associated with motor vehicle usage is the major source of these hydrocarbons. Adverse effects on human health are not caused directly by ROGs, but rather by reactions of ROGs to form secondary air pollutants, including ozone.

- **Nitrogen Dioxide (NO_2) and Nitrogen Oxides (NOx).** Fuel combustion produces nitrogen which combines with oxygen to produce nitric oxide (NO). Further oxidation of NO results in the formation of NO_2, which is a criteria pollutant. NO_2 is a reddish-brown, highly reactive gas which acts as an acute irritant and, in equal concentrations, is more injurious than NO. NO and NO_2 are referred to together as oxides of nitrogen (NOx). As noted above, NOx is involved in photochemical reactions that produce ozone.

- **Carbon Monoxide (CO).** CO is a colorless, odorless gas produced by the incomplete combustion of fuels. CO concentrations tend to be the highest during winter mornings, with little to no wind, when surface-based inversions trap the pollutant at ground levels. Because CO is emitted directly from internal combustion engines and motor vehicles operating at slow speeds are the primary source of CO in the air basin, the highest ambient CO concentrations are generally found near congested transportation corridors and intersections.

- **Sulfur dioxide (SO_2).** SO_2 is a colorless, extremely irritating gas or liquid. It enters the atmosphere as a pollutant mainly as a result of burning high-sulfur-content fuel oils and coal and from chemical processes occurring at chemical plants and refineries. When sulfur dioxide oxidizes in the atmosphere, it forms sulfates (SO_4).

- **Respirable Particulate Matter (PM_{10}).** PM_{10} consists of extremely small, suspended particles or droplets 10 micrometers or smaller in diameter. Some sources of PM_{10}, like pollen and windstorms, are naturally occurring. However, in populated areas, most PM_{10} is caused by road dust, diesel soot, and combustion products, abrasion of tires and brakes, and construction activities.

- **Fine Particulate Matter ($PM_{2.5}$).** $PM_{2.5}$ refers to particulate matter that is 2.5 micrometers or smaller in size. The sources of $PM_{2.5}$ include fuel combustion from automobiles, power plants, wood burning, industrial processes, and diesel-powered vehicles such as buses and trucks. These fine particles are also formed in the atmosphere when gases such as sulfur dioxide, NO_X, and VOCs are transformed in the air by chemical reactions.

- **Lead (Pb).** Pb occurs in the atmosphere as particulate matter. The combustion of leaded gasoline is the primary source of airborne lead in the Basin. The use of leaded gasoline is no longer permitted for on-road motor vehicles, so most such combustion emissions are associated with off-road vehicles such as racecars that use leaded gasoline. Other sources of Pb include the manufacturing and recycling of batteries, paint, ink, ceramics, ammunition, and secondary lead smelters.

Regional Topography and Meteorology

The SJVAB, which is approximately 250 miles long and averages 80 miles wide, is the second largest air basin in the state. Air pollution, especially the dispersion of air pollutants, is directly related to a region's topographic features. The SJVAB is defined by the Sierra Nevada to the east (8,000 to 14,000 feet in elevation), the Coast Range to the west (averaging 3,000 feet in elevation), and the Tehachapi Mountains to the south (6,000 to 8,000 feet in elevation). The valley opens to the sea at the Carquinez Strait where the San Joaquin–Sacramento Delta (Delta) empties into San Francisco Bay.

Localized air quality can be greatly affected by elevation and topography. For the majority of the San Joaquin Valley, air movement through and out of the region is restricted by surrounding hills and mountains. Although marine air generally flows into the basin from the Delta, the Coast Range hinders wind access into the SJVAB from the west, the Tehachapi Mountains prevent the southerly passage of airflow, and the Sierra Nevada is a significant barrier to the east. These topographic features result in weak airflow in the valley, which becomes vertically blocked by high barometric pressure over the SJVAB. As a result, the majority of the SJVAB is highly susceptible to pollutant accumulation over time.

Most of the surrounding mountains are above the normal height of the summer inversion layer (SJVAPCD 2015).

Wind speed and direction play an important role in the dispersion and transport of air pollutants. Ozone and inhalable particulates (PM_{10} and $PM_{2.5}$) are classified as regional pollutants because they can be transported away from the emission source before concentrations peak. In contrast, local pollutants, such as carbon monoxide (CO), tend to have their highest concentrations near the source of emissions. These local pollutants dissipate easily and, therefore, have the highest concentrations during low wind speeds.

During the summer, winds usually originate at the north end of the SJVAB and flow in a south-southeasterly direction through the Tehachapi Pass into the Mojave Desert Air Basin. During the winter, winds occasionally originate from the south end of the SJVAB and flow in a north-northwesterly direction. Also, during winter, the SJVAB experiences light, variable winds, typically less than 10 miles per hour. Low wind speeds, combined with low inversion layers in the winter, create a climate conducive to high CO and inhalable particulate (PM_{10}) concentrations.

The vertical mixing of air pollutants is limited by the presence of persistent temperature inversions. Inversions may be either at ground level or elevated. Ground-level inversions frequently occur during early fall and winter (i.e., October through January). High concentrations of primary pollutants, which are those directly emitted into the atmosphere (e.g., CO), are typically found during ground-level inversions. Elevated inversions act as a lid over the basin and limit vertical mixing. Severe air stagnation occurs as a result of these inversions. Elevated inversions contribute to the occurrence of high levels of ozone during the summer months.

The SJVAB enjoys an inland Mediterranean climate, averaging more than 260 sunny days per year. The valley floor is characterized by warm, dry summers and cooler winters. Average daily temperatures in the basin range from 44.6 degrees Fahrenheit (°F) in January to 76.7°F in July. Summer highs often exceed 100°F, averaging in the low 90s in the northern valley and high 90s to the south. Maximum temperatures of 90°F or greater occur about 88 days per year. Although the SJVAB enjoys a high frequency of sunshine, a reduction in sunshine occurs during December and January because of fog and intermittent stormy weather. Temperatures of 32°F and below occur about 22 days per year. Nearly 90 percent of the annual precipitation falls in the six months between November and April.

Ambient Air Quality Standards

The U.S. Environmental Protection Agency (EPA) is the federal agency responsible for setting the National Ambient Air Quality Standards (NAAQS). The air quality of a region is considered to be in attainment of the NAAQS if the measured ambient criteria pollutant levels do not exceed the NAAQS more than once per year, except for O_3, PM_{10}, and $PM_{2.5}$. The NAAQS for O_3, PM_{10}, and $PM_{2.5}$ are based on statistical calculations over one- to three-year periods, depending on the pollutant. The California Air Resources Board (CARB) is the state agency responsible for setting the California Ambient Air Quality Standards (CAAQS). The air quality of a region is considered to be in attainment of the CAAQS if the measured ambient air pollutant levels for O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead do not exceed the standards, and other standards are not equaled or exceeded at any time in any consecutive three-year period. The NAAQS and CAAQS for each of the monitored pollutants and their effects on human health and other effects are summarized in **Table 4.1-1, Ambient Air Quality Standards**.

Table 4.1-1
Ambient Air Quality Standards

<table>
<tr><th rowspan="2">Air Pollutant</th><th rowspan="2">Averaging Time</th><th rowspan="2">California Standards</th><th colspan="2">National Standards [a]</th><th rowspan="2">Health and Other Effects</th></tr>
<tr><th>Primary [b,c]</th><th>Secondary [b,d]</th></tr>
<tr><td rowspan="2">Ozone (O_3)</td><td>8-hour</td><td>0.070 ppm (137 μg/m³)</td><td>0.070 ppm (137 μg/m³)</td><td>Same as primary</td><td rowspan="2">(a) Pulmonary function decrements and localized lung edema in humans and animals; (b) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (c) Increased mortality risk; (d) Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (e) Vegetation damage; and (f) Property damage</td></tr>
<tr><td>1-hour</td><td>0.09 ppm (180 μg/m³)</td><td>--[e]</td><td>--</td></tr>
<tr><td rowspan="2">Carbon Monoxide (CO)</td><td>8-hour</td><td>9.0 ppm (10 mg/m³)</td><td>9 ppm (10 mg/m³)</td><td>--</td><td rowspan="2">(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; and (d) Possible increased risk to fetuses</td></tr>
<tr><td>1-hour</td><td>20 ppm (23 mg/m³)</td><td>35 ppm (40 mg/m³)</td><td>--</td></tr>
<tr><td rowspan="5">Nitrogen Dioxide (NO_2)</td><td>Annual</td><td>0.030 ppm (57 μg/m³)</td><td>0.053 ppm (100 μg/m³)</td><td>Same as primary</td><td rowspan="5">(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; and (c) Contribution to atmospheric discoloration</td></tr>
<tr><td>1-hour</td><td>0.18 ppm (339 μg/m³)</td><td>0.100 ppm[f] (188 μg/m³)</td><td>--</td></tr>
<tr><td>Annual</td><td>--</td><td>--[g]</td><td>--</td></tr>
<tr><td>24-hour</td><td>0.04 ppm (105 μg/m³)</td><td>--[g]</td><td>--</td></tr>
<tr><td>3-hour</td><td>--</td><td>--</td><td>0.5 ppm (1300 μg/m³)</td></tr>
<tr><td>Sulfur Dioxide (SO_2)</td><td>1-hour</td><td>0.25 ppm (655 μg/m³)</td><td>0.075 ppm[g] (196 μg/m³)</td><td>--</td><td>Bronchoconstriction accompanied by symptoms, which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma</td></tr>
<tr><td rowspan="2">Respirable Particulate Matter (PM_{10})</td><td>Annual</td><td>20 μg/m³</td><td>--</td><td>--</td><td rowspan="2">a) Exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease; (b) Declines in pulmonary function growth in children; and (c) Increased risk of premature death from heart or lung diseases in the elderly</td></tr>
<tr><td>24-hour</td><td>50 μg/m³</td><td>150 μg/m³</td><td>Same as primary</td></tr>
<tr><td>Fine Particulate Matter</td><td>24-hour</td><td>No separate State standard</td><td>35 μg/m³</td><td>--</td><td>(a) Exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease; (b) Declines in pulmonary function</td></tr>
</table>

Table 4.1-1
Ambient Air Quality Standards

Air Pollutant	Averaging Time	California Standards	National Standards [a]		Health and Other Effects
			Primary [b,c]	Secondary [b,d]	
($PM_{2.5}$)	Annual	12 µg/m³	12 µg/m³	--	growth in children; and (c) Increased risk of premature death from heart or lung diseases in the elderly
Lead	Calendar Quarter	--	1.5 µg/m³	Same as primary	(a) Increased body burden; and (b) Impairment of blood formation and nerve conduction
	30-day Average	1.5 µg/m3	--	--	

Source: CARB, Ambient Air Quality Standards, accessed January 9, 2018 (https://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm).
ppm = parts per million by volume; µg/m³ = microgram per cubic meter; mg/m³ = milligrams per cubic meter
[a] *Standards, other than for ozone and those based on annual averages, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.*
[b] *Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.*
[c] *Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than three years after that state's implementation plan is approved by the U.S. Environmental Protection Agency (US EPA).*
[d] *Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.*
[e] *The national 1-hour ozone standard was revoked by US EPA on June 15, 2005. A new 8-hour standard was established in May 2008.*
[f] *The form of the 1-hour NO2 standard is the 3-year average of the 98th percentile of the daily maximum 1-hour average concentration.*
[g] *On June 2, 2010, the US EPA established a new 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of the 1-hour daily maximum. The US EPA also revoked both the existing 24-hour and annual average SO_2 standards.*

The U.S. EPA and CARB designate air basins as being in "attainment" or "nonattainment" for each of the criteria pollutants. Nonattainment air basins are ranked (marginal, moderate, serious, severe, or extreme) according to the degree of nonattainment. Areas that do not meet the standards shown in **Table 4.1-1** are classified as nonattainment areas. Attainment areas are those with air quality that is better than the standards. The determination of whether an area meets the state and federal standards is based on air quality monitoring data. Some areas are unclassified, which means insufficient monitoring data for determining attainment or nonattainment are available. Unclassified areas are typically treated as being in attainment. Because the attainment/nonattainment designation is pollutant specific, an area may be classified as nonattainment for one pollutant and attainment for another. Similarly, because the state and federal standards differ, an area could be classified as attainment for the federal standards of a pollutant and as nonattainment for the state standards of the same pollutant.

As shown in **Table 4.1-2**, **San Joaquin Valley Air Basin Attainment Status**, the SJVAB is in nonattainment for the federal standards for ozone (8 hour) and $PM_{2.5}$. The air basin is in nonattainment for the state standards of ozone (1 hour), ozone (8 hour), PM_{10}, and $PM_{2.5}$.

Table 4.1-2
San Joaquin Valley Air Basin Attainment Status

Pollutant	Federal Standards	State Standards
Ozone-1 hour	No federal standard[1]	Nonattainment
Ozone-8 hour	Nonattainment/Extreme[2]	Nonattainment
PM_{10}	Attainment[3]	Nonattainment
$PM_{2.5}$	Nonattainment[4]	Nonattainment
CO	Attainment/Unclassified	Attainment/Unclassified
Nitrogen dioxide	Attainment/Unclassified	Attainment
Sulfur dioxide	Attainment/Unclassified	Attainment
Lead	No Designation/Classification	Attainment
Hydrogen sulfide	No federal standards	Unclassified
Sulfates	No federal standards	Attainment
Vinyl Chloride	No federal standards	Attainment
Visibility-Reducing particulates	No federal standards	Unclassified

Source: SJVAPCD, Ambient Air Quality Standards & Valley Attainment Status. http://www.valleyair.org/aqinfo/attainment.htm.

[1] *Effective June 15, 2005, the U.S. Environmental Protection Agency (EPA) revoked the federal 1-hour ozone standard, including associated designations and classifications. U.S, EPA had previously classified the SJVAB as extreme nonattainment for this standard. U.S. EPA approved the 2004 Extreme Ozone Attainment Demonstration Plan on March 8, 2010 (effective April 7, 2010). Many applicable requirements for extreme 1-hour ozone nonattainment areas continue to apply to the SJVAB.*

[2] *Though the San Joaquin Valley was initially classified as serious nonattainment for the 1997 8-hour ozone standard, U.S. EPA approved Valley reclassification to extreme nonattainment in the Federal Register on May 5, 2010 (effective June 4, 2010).*

[3] *On September 25, 2008, U.S. EPA re-designated the San Joaquin Valley as attainment for the PM10 National Ambient Air Quality Standard (NAAQS) and approved the PM10 Maintenance Plan.*

[4] *The Valley is designated as nonattainment for the 1997 PM2.5 NAAQS. U.S. EPA designated the Valley as nonattainment for the 2006 PM2.5 NAAQS on November 13, 2009 (effective December 14, 2009).*

Sensitive Receptors

Sensitive populations (sensitive receptors) are more susceptible to the effects of air pollution than is the population at large. The SJVAPCD defines sensitive receptors as "facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants," which include hospitals, schools, convalescent facilities, and residential areas as examples of sensitive receptors (SJVAPCD 2015). Sensitive receptors that are near localized sources of toxic air contaminants and CO are of particular concern. For the purposes of impact assessment, the definition of sensitive receptors is typically expanded to include residences (where elderly and young children may reside), playgrounds, rehabilitation centers, and athletic facilities.

Based on site reconnaissance and available information, sensitive receptors (as defined by SJVAPCD) are located within 0.10 mile of the project site. These include rural residential land uses on the west side of Lake Road. Additional rural residences are located along Bellevue Road. Lake Yosemite Regional Park is located about ½ mile to the northwest of the campus but is not considered a sensitive receptor under the SJVAPCD definition. Student housing on the campus is not treated as a sensitive receptor due to the age of the occupants and the short duration (typically 4 to 5 years) that the occupants typically are in student housing on a campus.

Ambient Air Monitoring

CARB has established and maintains a network of sampling stations in conjunction with local air pollution control districts (APCDs) and air quality management districts (AQMDs), private contractors, and the National Park Service. The air quality sampling stations are referred to as the State and Local Air Monitoring Stations (SLAMS) network. The SLAMS network provides air quality monitoring data, including real-time meteorological data and ambient pollutant levels, as well as historical data. The SLAMS network in the SJVAB consists of 30 monitoring stations, two of which are located in the City of Merced. The closest monitoring station to the project is located at 2334 M Street in Merced, approximately 4.5 miles to the southwest. This station monitors ambient pollutant concentrations of PM_{10} and $PM_{2.5}$. The next nearest monitoring station to the site is located at 385 South Coffee Avenue in Merced, approximately 4.5 miles south of the project site. This station monitors ambient pollutant concentrations of O_3 and NO_2. Neither CO nor SO_2 monitoring data is available for the range of years (2015-2017) listed below.

Table 4.1-3, Ambient Pollutant Concentrations Registered Nearest to the Project Site, lists the measured ambient pollutant concentrations and the violations of state and federal standards that have occurred at the above-mentioned monitoring stations from 2015 through 2017, the most recent years for which data are available. As shown, the monitoring stations in the City of Merced have registered values above state and federal standards for O_3, the state standard for PM_{10}, and the federal standard for $PM_{2.5}$. Concentrations of CO, SO_2, NO_2, lead, and sulfate have not been exceeded anywhere within the basin for several years. Values for lead and sulfate are not presented in the table below since ambient concentrations are well below the state standards. Hydrogen sulfide, vinyl chloride, and visibility reducing particles were not monitored by CARB or the SJVAPCD in the SJVAB during the period from 2015 to 2017.

Table 4.1-3
Ambient Pollutant Concentrations Registered Nearest to the Project Site

Pollutant	Standards[1, 2]	Year		
		2015	2016	2017
OZONE (O_3)				
Maximum 1-hour concentration monitored (ppm)		0.102	0.097	0.093
Maximum 8-hour concentration monitored (ppm)		0.090	0.087	0.085
Number of days exceeding state 1-hour standard	0.09 ppm	2	2	0
Number of days exceeding state 8-hour standard	0.070 ppm	34	29	17
Number of days exceeding federal 8-hour standard 3	0.070 ppm	29	28	16
CARBON MONOXIDE (CO)				
Maximum 1-hour concentration monitored (ppm)		N/A	N/A	N/A
Maximum 8-hour concentration monitored (ppm)		N/A	N/A	N/A
Number of days exceeding state 8-hour standard	9.0 ppm	N/A	N/A	N/A
Number of days exceeding federal 8-hour standard	9 ppm	N/A	N/A	N/A
NITROGEN DIOXIDE (NO_2)				
Maximum 1-hour concentration monitored (ppm)		0.035	0.035	0.039
Annual average concentration monitored (ppm)		N/A	0.006	0.007
Number of days exceeding state 1-hour standard 4	0.18 ppm	0	0	0
PARTICULATE MATTER (PM_{10})				
Maximum 24-hour concentration monitored (µg/m3)		97.2	64.5	146.6
Annual average concentration monitored (µg/m3)		30.7	29.5	35.8
Number of estimated days exceeding state standard	50 µg/m3	32	39	77
Number of estimated days exceeding federal standard	150 µg/m3	0	0	0
PARTICULATE MATTER ($PM_{2.5}$)				
Maximum 24-hour concentration monitored (µg/m3)		61	43	67
Annual average concentration monitored (µg/m3)		12.6	11.1	12.6
Number of estimated days exceeding federal standard 5	35 µg/m3	15.2	6.3	20.4
SULFUR DIOXIDE (SO_2)				
Maximum 24-hour concentration monitored (ppm)		N/A	N/A	N/A
Number of samples exceeding 24-hour state standard	0.04 ppm	N/A	N/A	N/A
Number of samples exceeding federal 24-hour standard	0.14 ppm	N/A	N/A	N/A

Sources: California Air Resource Board, "Air Quality Data Statistics," http://www.arb.ca.gov/adam/welcome.html; US Environmental Protection Agency, "Air Data: Access to Air Pollution Data," http://www.epa.gov/air/data/.
N/A = No air quality data received for this year.
1 *Parts by volume per million of air (ppm), micrograms per cubic meter of air (µg/m³), or annual arithmetic mean (aam).*
2 *Federal and state standards are for the same time period as the maximum concentration measurement unless otherwise indicated.*
3 *US EPA revised the 8-hour standard effective October 1, 2015. The statistics are based on the previous standard of 0.07 ppm.*
5 *CARB revised the 1-hour standard effective March 20, 2008. The statistics are based on the previous standard of 0.25 ppm. In addition, CARB adopted an annual standard of 0.030 ppm, which is more stringent than the federal standard of 0.053 ppm.*
6 *The federal standard for $PM_{2.5}$ was changed to 35 µg/m³ in 2006.*

Human Health Effects of Air Pollution

Air pollution is a major public health concern. Studies conducted in various parts of the world, including the United States, have documented a wide range of adverse effects of ambient air pollution on human health. Adverse health effects from short-term and long-term exposure to air pollution evaluated in this SEIR include the following:

- Increased respiratory illnesses (asthma incidence, asthma severity, hospital care for asthma, infections, and other symptoms);
- Exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease;
- Decreased lung function and lung inflammation;
- Increased mortality, including increased risk of premature death from heart or lung diseases in the elderly and people with potentially predisposing conditions (such as chronic obstructive pulmonary disease, diabetes, congestive heart failure, and myocardial infarction);
- Declines in pulmonary function growth in children;
- Potential immunological changes;
- Increase in physician and emergency room visits, and hospitalization; and
- Increase in absence from school.

Although numerous air pollutants are emitted by both natural and anthropogenic sources and contribute to adverse human health effects (see **Table 4.1-1** above for health effects of criteria pollutants), ozone and particulate matter have been identified as the pollutants of greatest concern. The two pollutants are also considered co-pollutants in terms of their incidence, and one pollutant has the effect of confounding the effect of the other. According to the World Health Organization, "The correlations between ozone and other harmful air pollutants differ by season and place, making confounding control complicated. During summer, there is often a positive correlation with secondary particles, since similar conditions increase the formation of both. On the other hand, especially when ozone formation is limited (winter), there are often strong inverse correlations between ozone and primary pollutants from traffic and heating, because nitric oxide emissions scavenge ozone." "A further complexity in the study of the health effects of ground level ozone, particularly the health effects associated with short-term exposures, arises from the close correlation between ozone production and depletion with meteorological conditions (Royal Society, 2008). Since high temperatures (Baccini et al., 2008) and heat waves in particular (Kovats & Hajat, 2008) are associated with increased mortality, the separation of the health effects of ozone from those of temperature is problematic" (WHO 2013).

Further, several factors influence health impacts, which include the concentrations of ground-level ozone; the duration of exposure, the volume of air that is inhaled per minute, the intervals between exposures, and the sensitivity of the persons to the exposure. As noted earlier in this section, ozone is not emitted directly but is formed under certain meteorological conditions from ozone precursors ROG and NOx. Consequently, ground-level concentrations of ozone are highly variable and are influenced by the volume of air available for dilution, the temperature, and the intensity of ultraviolet light. Similarly, concentrations of other pollutants, such as particulate matter, vary depending on meteorological conditions, distance between source and receptors, and other factors. For the same level of exposure, health effects can vary from individual to individual. Certain subgroups of the population, such as children, persons with preexisting respiratory conditions, and individuals exercising outdoors are at greater risk from exposure to outdoor ozone and particulate matter than the general population.

4.1.3 Regulatory Considerations

Air quality within the SJVAB is addressed through the efforts of various federal, state, regional, and local government agencies. These agencies work individually, as well as jointly, to improve air quality through legislation, regulations, planning, policy making, education, and a variety of other programs. The agencies primarily responsible for improving the air quality within the SJVAB include the U.S. EPA, CARB, SJVAPCD, and the Regional Council of Governments. These agencies, their laws, regulations, rules, plans, and policies as they pertain to air quality and the proposed project are discussed below.

Federal Regulations

U.S. Environmental Protection Agency

The U.S. EPA is responsible for implementing and enforcing the federal Clean Air Act (CAA) and the NAAQS. The U.S. EPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain locomotives. The U.S. EPA also maintains jurisdiction over emissions sources beyond State waters (outer continental shelf) and establishes various emissions standards for vehicles sold in states other than California. These standards identify levels of air quality for seven criteria pollutants: O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. The thresholds are considered to be the maximum concentrations of ambient (background) air pollutants determined safe to protect the public health and welfare with an adequate margin of safety.

As part of its enforcement responsibilities, the U.S. EPA requires each state with areas that do not meet the federal standards to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain federal standards. The SIP must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution, using a combination of performance standards and market-based programs within the time frame identified in the SIP.

The 1990 Clean Air Act Amendments were enacted to better protect the public's health and create more efficient methods for lowering pollutant emissions. The major areas of improvement addressed in the amendments include NAAQS, air basin designations, automobile/heavy-duty engine emissions, and hazardous air pollutants. The U.S. EPA has designated air basins as being in attainment or nonattainment for each of the seven criteria pollutants. Nonattainment air basins for ozone are further ranked (marginal, moderate, serious, severe, or extreme) according to the degree of nonattainment. CARB is required to describe in its SIP how the State will achieve federal standards by specified dates for each air basin that has failed to attain a NAAQS for any criteria pollutant.

State Regulations

California Air Resources Board

CARB oversees air quality planning and control throughout California. It is primarily responsible for ensuring implementation of the California Clean Air Act (CCAA), responding to the federal CAA planning requirements applicable to the State, and regulating emissions from motor vehicles and consumer products within the State. In addition, CARB sets health-based air quality standards and control measures for TACs. Much of CARB's research goes toward automobile emissions, as they are primary contributors to air pollution in California. Under the CCAA, CARB has the authority to establish more stringent standards for vehicles sold in California and for various types of equipment available commercially. It also sets fuel specifications to further reduce vehicular emissions.

The CCAA established a legal mandate for air basins to achieve the CAAQS by the earliest practical date. These standards apply to the same seven criteria pollutants as the federal CAA and also include sulfates, visibility-reducing particles, hydrogen sulfide, and vinyl chloride. The State standards are generally more stringent than the federal standards.

CARB supervises and supports the regulatory activities of local air quality districts as well as monitors air quality itself. Health and Safety Code Section 39607(e) requires CARB to establish and periodically review area designation criteria. These designation criteria provide the basis for CARB to designate areas of the State as attainment, nonattainment, or unclassified according to State standards. CARB makes area designations for 10 criteria pollutants: O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, sulfates, lead, hydrogen sulfide, and visibility-reducing particles.[1] The air quality of a region is considered to be in attainment of the State standards if the measured ambient air pollutant levels for O_3, CO, NO_2, PM_{10}, $PM_{2.5}$, SO_2 (1- and 24-hour), and lead do not exceed standards, and all other standards are not equaled or exceeded at any time in any consecutive three-year period. As aforementioned, the SJVAB is classified by the state as a nonattainment area for the O_3, PM_{10}, and $PM_{2.5}$ standards.

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1 California Air Resources Board, "Area Designations (Activities and Maps)," http://www.arb.ca.gov/desig/desig.htm. 2010. According to California Health and Safety Code, Section 39608, "State board, in consultation with the districts, shall identify, pursuant to subdivision (e) of Section 39607, and classify each air basin which is in attainment and each air basin which is in nonattainment for any State ambient air quality standard." Section 39607(e) States that the State shall "establish and periodically review criteria for designating an air basin attainment or nonattainment for any State ambient air quality standard set forth in Section 70200 of Title 17 of the California Code of Regulations. California Code of Regulations, Title 17, Section 70200 does not include vinyl chloride; therefore, CARB does not make area designations for vinyl chloride.

Regional Plans and Policies

The SJVAPCD has jurisdiction over most air quality matters[2] within the SJVAB, which includes San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, and Tulare Counties and the valley portion of Kern County. The district regulates most air pollutant sources in the air basin, maintains ambient air quality monitoring stations at numerous locations throughout the air basin, and prepares the air quality management/attainment plans for the SJVAB that are required under the CAA and CCAA.

SJVAPCD Air Quality Plans

As shown in **Table 4.1-2**, the SJVAB is in nonattainment for the federal standards for ozone (8-hour) and $PM_{2.5}$. The air basin is also in nonattainment for the state standards of ozone (1-hour), ozone (8-hour), PM_{10}, and $PM_{2.5}$. Therefore, the district has prepared attainment plans for the SJVAB in order to demonstrate achievement of the state and federal ambient air quality standards for ozone, PM_{10}, and $PM_{2.5}$. The most recent plans include:

- 2016 Plan for the 2008 8-Hour Ozone Standard (SJVAPCD 2016b)
- 2014 Reasonably Available Control Technology Demonstration for the 8-Hour Ozone State Implementation Plan (RACT SIP) (SJVAPCD 2014)
- 2013 Plan for the Revoked 1-Hour Ozone Standard (SJVAPCD 2013)

The SJVAPCD must continuously monitor its progress in implementing these attainment plans and must periodically report to CARB and the U.S. EPA. It must also periodically revise its attainment plans to reflect new conditions and requirements in accordance with schedules mandated by the CAA and the CCAA. The following sections provide an overview of these three plans.

2016 Plan for the 2008 8-Hour Ozone Standard

The SJVAPCD approved the 2016 Plan for the 2008 8-Hour Ozone Standard in June 2016 to severely reduce NOx emissions and meet the federal 8-Hour ozone standard. In compliance with the federal CAA, the 2016 Plan provides a comprehensive strategy that builds upon current efforts to minimize 1-hour O_3, 8-hour O_3, and PM emissions. The Plan details health implications associated with O_3 and PM and the importance of preventing emissions and explains current standards and regulations regarding such pollutants. Most importantly, the Plan provides an attainment strategy that focuses on regulatory actions, incentive programs, technological advancements, and public outreach. As O_3 and PM emissions

[2] SJVAPCD does not regulate air pollutants from motor vehicles, locomotives, aircraft, agriculture equipment, and marine vessels.

standards become more stringent, the 2016 Plan not only provides guidance to reducing such emissions, but also lays a malleable base plan to be improved and expanded upon in the future.

2014 RACT SIP

The 2014 RACT SIP was created as an update to the 2009 RACT SIP, focusing on new technologies and regulations that have been developed within the five-year period. The U.S. EPA defines RACT as "lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonable available considering technological and economic feasibility." All California air districts must develop an RACT SIP proving regulations and efforts fulfill RACT before it can be certified. While the goal of the 2014 RACT SIP is to reduce emissions to the maximum extent possible, it recognizes that economic and technological barriers make an RACT less stringent (and more feasible in most cases) than other emission controls, such as Best Available Control Technology (BACT) and Lowest Achievable Emission Rate (LAER).

2013 Plan for the Revoked 1-Hour Ozone Standard

In 2013, the SJVAPCD developed the 2013 Plan to satisfy federal requirements under U.S. EPA's revoked 1-hour O_3 standard. The Plan adds to previous O_3 and PM strategies to lessen 1-hour O_3 concentrations in the San Joaquin Valley. As O_3 attainment can be difficult, with high levels for a couple of hours ruining years of attainment in some cases, the attainment year for this plan was 2017. The O_3 attainment standard under the 2013 Plan was met ahead of the planned attainment year, despite fires outside the SJVAB causing exceedance in pollution levels.

SJVAPCD Rules and Regulations

The SJVAPCD's primary means of implementing its attainment plans is through its adopted rules and regulations. Campus development under the 2020 LRDP would be subject to the following rules adopted by the SJVAPCD that are designed to reduce and control pollutant emissions throughout the basin.

- **Rule 2010 (Permits Required)** – This rule requires that any project constructing, altering, replacing, or operating any source operation, the use of which emits, may emit, or may reduce emissions, to obtain an Authority to Construct (ATC) and a Permit to Operate (PTO). This rule applies to the construction and operation of new or modified processes and equipment, except those specifically exempted from permitting requirements.

- **Rule 2201 (New and Modified Stationary Source Review)** – This rule applies to all new and modified stationary sources that would emit, after construction, a criteria pollutant for which there is an established NAAQS or CAAQS. The rule provides mechanisms by which an ATC can be granted without interfering with the basin's attainment with ambient air quality standards. These mechanisms offer methods to generate no net increases in emissions of nonattainment pollutants over specific thresholds as detailed in the rule.

- **Rule 2520 (Federally Mandated Operating Permits)** – This rule requires that major sources of criteria pollutants or HAPs obtain a Title V federal operating permit within one year after becoming a major source. This rule would apply to the campus if the total facility emissions of criteria pollutants from permitted stationary sources exceed the major source thresholds in Rule 2201 or the major source thresholds for HAPs as defined in the CAA.

- **Rule 3135 (Dust Control Plan Fee)** – This rule recovers District costs for reviewing Dust Control Plan and conducting site inspections. Should a Dust Control Plan be deemed necessary to minimize air quality impacts, the campus could be subject to this rule.

- **Rule 3180 (Administrative Fees for Indirect Source Review) –** This rule applies to development projects subject to Rule 9510 regarding Indirect Source review. When the developer submits an Air Impact Assessment, in accordance with Rule 9510, an application fee, and potentially an evaluation fee, must be paid to recover District's costs for administering Rule 9510.

- **Rule 4102 (Nuisance)** – This rule applies to any source operation that emits or may emit air contaminants or other materials. In the event that the project or construction of the project creates a public nuisance, it could be in violation and subject to district enforcement action.

- **Rule 4306 (Boilers, Steam Generators, and Process Heaters – Phase 3)** – This rule limits the NO_X and CO emissions from boilers, steam generators, and process heaters with heat input ratings greater than 5 million British thermal units per hour (MMBtu/hr). The source must also comply with the monitoring and reporting requirements specified in the rule.

- **Rule 4601 (Architectural Coatings)** – This rule limits VOCs from architectural coatings by specifying architectural coatings storage, cleanup, and labeling requirements and applies to any person who supplies, sells, offers for sale, applies, or solicits the application of any architectural coating.

- **Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving, and Maintenance Operations)** – Asphalt paving operations are subject to Rule 4641. This rule applies to the manufacture and use of rapid and medium cure cutback asphalt, slow cure asphalt, and emulsified asphalt for paving and maintenance operations. The user or manufacturer of cutback, slow cure, and emulsified asphalt must comply with the recordkeeping requirements specified in Rule 4641.

- **Rule 4702 (Internal Combustion Engines – Phase 2)** – This rule limits the emissions of NO_X, CO, and VOCs emitted from internal combustion engines. The rule is applicable to any internal combustion engine with a rated brake horsepower greater than 50 horsepower. Emission standards for the three pollutants are specified for each category of engine along with compliance dates for each standard. The source must also comply with the monitoring methods and other requirements specified in the rule.

- **Rule 4901 (Wood-burning Fireplaces and Wood-burning Heaters)** – This rule limits CO and particulate emissions from wood-burning fireplaces and heaters. The rule specifies that only U.S. EPA Phase II Certified or pellet-fueled wood-burning heaters are to be sold, installed, transferred, or offered for sale within the district. The rule sets wood-burning heater and fireplace limitations for new residential developments as follows:

   - 5.3.1 No person shall install a wood-burning fireplace in a new residential development with a density greater than two dwelling units per acre.

   - 5.3.2 No person shall install more than two U.S. EPA Phase II Certified wood-burning heaters per acre in any new residential development with a density equal to or greater than three dwelling units per acre.

   - 5.3.3 No person shall install more than one wood-burning fireplace or wood-burning heater per dwelling unit in any new residential development with a density equal to or less than two dwelling units per acre.

- **Rule 4902 (Residential Water Heaters) –** This rule applies to and limits emissions of NO_X from residential natural gas-fired heaters. Natural gas-fired heaters with a rated heat input equal to or less than 75,000 British thermal units per hour (Btu/hr) and manufactured after December 17, 1993, are not to be sold, installed, or offered for sale that emit more than 40 nanograms of NO_X per joule of heat output.

- **Rule 8021 (Construction, Demolition, Excavation, Extraction, and Other Earthmoving Activities) –** This rule limits fugitive dust emissions from construction, demolition, excavation, extraction, and other earthmoving activities. Development of the 2020 LRDP will involve such activities.

- **Rule 8031 (Bulk Materials) –** This rule details steps to be followed when handling bulk materials, such as utilizing wind barriers, applying water or stabilizers to limit Visible Dust Emissions (VDE), and covering materials when storing. This rule is intended to limit fugitive dust emissions from the outdoor handling, storage, and transport of bulk materials.

- **Rule 8041 (Carryout and Trackout) –** This rule applies to sites where carryout and trackout will occur. Earthmoving activities, moving bulk materials, and unpaved roads/and traffic areas subjects the project to this rule, which limits vehicle trips and mandates cleanup of carryout and a Dust Control Plan.

- **Rule 8051 (Open Areas) –** This rule applies to any open area having 0.5 acres or more in urban areas or 3.0 or more acres in rural areas, and therefore applies to campus development under the 2020 LRDP. To limit fugitive dust emissions, the rule mandates at least one of the following: the application of water or dust suppressants, the establishment of vegetation on disturbed areas, and/or the paving, graveling, or application of stabilizers to unvegetated areas.

- **Rule 8061 (Paved and Unpaved Roads) –** This rule limits fugitive dust in relation to roads, requiring compliance with the American Association of State Highway and Transportation Officials (AASHTO) guidelines.

- **Rule 8071 (Unpaved Vehicle/Equipment Traffic Areas) –** In order to limit fugitive dust emissions from unpaved areas, this rule requires compliance with Regulation VIII to limit VDE. The rule also mandates restricted access on disturbed surfaces and reducing such surfaces through vegetative materials, watering, graveling, paving, etc.

- **Rule 9510 (Indirect Source Review) –** This rule fulfills the district's emission reduction commitments in the PM_{10} and O_3 attainment plans. Applicants developing property over the limits specified in the rule (e.g., 50 or more residential units) or nonresidential projects emitting more than 2 tpy of operational NO_X or PM_{10} are subject to this rule and must file an Air Impact Assessment (AIA) application prior to applying for a final discretionary approval from a lead agency (e.g., tentative tract map). This rule is discussed in more detail below.

Indirect sources are land uses that attract or generate motor vehicles trips. Indirect source emissions contain many pollutants, principally PM_{10}, reactive organic gases (ROG), and NO_X. The SJVAPCD included a requirement in the adopted *2003 PM_{10} Plan* and the *Extreme Ozone Attainment Demonstration Plan* to develop and implement an indirect source rule (ISR) by July 2004, with implementation to begin in 2005. The SJVAPCD adopted Rule 9510 (Indirect Source Review) on December 15, 2005, and it became effective in March 2006.

The purpose of Rule 9510 is to reduce emissions of NO_X and PM_{10} from new development projects. The rule applies to projects that, upon full buildout, will include any one of the following:

- 50 residential units
- 2,000 square feet of commercial space
- 25,000 square feet of light industrial space
- 20,000 square feet of medical or recreational space
- 39,000 square feet of general office space
- 100,000 square feet of heavy industrial space
- 9,000 square feet of educational space
- 10,000 square feet of government space
- 9,000 square feet of any land use not identified above

Several sources are exempt from the rule, including transportation projects, transit projects, reconstruction projects that result from a natural disaster, and development projects that have primary sources of emissions that are subject to SJVAPCD Rule 2201 (New and Modified Stationary Source Review) and Rule 2010 (Permits Required). Any development project that has a mitigated baseline below 2 tpy for NO_X and 2 tpy for PM_{10} is also exempted from the mitigation requirements of the rule.

Local Plans and Policies

Local governments have the authority and responsibility to reduce air pollution through their police power and land use decision-making authority. In general, a first step toward implementation of a local government's responsibility is accomplished by identifying air quality goals, policies, and implementation measures in its general plan. Local jurisdictions are also encouraged by the SJVAPCD to incorporate air quality elements in local plans. In 1994, SJVAPCD published *Air Quality Guidelines for General Plans,* which was subsequently revised in June 2005. The guidelines provide assistance to local governments for developing policies and implementing strategies at the local level that are consistent with regional efforts to manage air quality. In 2009, the Guidelines were supplemented with the AB 170 Requirements for General Plans and an Emissions Inventory Data Guide.

Through capital improvement programs, local governments can fund infrastructure that contributes to improved air quality. Examples of infrastructure improvements include bus turnouts, energy-efficient streetlights, and synchronized traffic signals.

Finally, CEQA requires local governments to assess air quality impacts, and recommend and enforce feasible mitigation of potential air quality impacts by conditioning discretionary permits, and by monitoring and ensuring implementation of the mitigation. To facilitate compliance with CEQA requirements, the SJVAPCD published in 2015 the *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI). The GAMAQI is an advisory document that provides local jurisdictions with procedures for addressing air quality impacts in environmental documents. The guide provides methods for assessing air quality impacts, thresholds of significance recommended in the *State CEQA Guidelines* and those adopted by the SJVAPCD, and recommended mitigation measures.

The SJVAPCD requires all local governments within its eight-county jurisdiction to adopt resolutions as part of the *Extreme Ozone Attainment Demonstration Plan*. The resolutions, which must be approved by the U.S. EPA, must describe reasonably available control measures that each jurisdiction will implement in order to reduce ozone-causing emissions from transportation sources. The SJVAPCD has also developed plans regarding PM to maintain healthy levels of PM_{10} (PM_{10} Plan, 2007) and to attain 1997 federal standards for $PM_{2.5}$ (2016 Moderate Area Plan).

To ensure a coordinated approach between the SJVAPCD, local governments, and regional transportation plans, the air district entered into a memorandum of understanding with the Merced County Association of Governments (MCAG), which includes the City and County of Merced. As a regional transportation planning agency, one of the purposes of MCAG is to inform and advise member agencies on air quality issues and policies; to ensure that MCAG's transportation plans, programs, and projects conform to the most recent air quality requirements, and to coordinate effectively with other government agencies on these matters.

4.1.4 Impacts and Mitigation Measures

Significance Criteria

This SEIR uses significance criteria derived from Appendix G of the *State CEQA Guidelines*. For the purposes of this SEIR, impacts related to air quality would be significant if implementation of the 2020 LRDP would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard;
- Expose sensitive receptors to substantial pollutant concentrations; or
- Result in other emissions (such as those leading to odors adversely affecting a substantial number of people.

To assess a project's impact relative to the significance criteria listed above, the SJVAPCD has established air quality significance thresholds to determine whether air quality impacts from implementing proposed projects would be significant. These thresholds are contained in the SJVAPCD's GAMAQI. If project-specific emissions exceed any of the emission thresholds listed in **Table 4.1-4, SJVAPCD Air Quality Significance Thresholds**, the impact from the emissions of the specific pollutant will be considered a significant impact.

In addition to the thresholds presented in **Table 4.1-4**, the GAMAQI recommends procedures for identifying cumulative impacts by pollutant. Lead agencies are recommended to use the project thresholds for ROG and NO_X (O_3 precursors) in **Table 4.1-4** to determine cumulative O_3 impacts. For cumulative PM_{10} impacts, lead agencies are recommended to examine the potential exposure of nearby sensitive receptors to PM_{10} emissions from earthmoving activities associated with the project and any nearby projects that may occur at the same time. If warranted, enhanced dust control measures listed in the GAMAQI should be used to reduce the cumulative PM_{10} impact to less than significant levels.

Cumulative CO impacts are considered less than significant if future cumulative traffic levels, including the project's contribution to traffic, does not cause an exceedance of the ambient air quality standards.

Cumulative impacts from TACs would be considered significant if the estimated health risk exceeds the thresholds listed in **Table 4.1-4**.

Table 4.1-4
SJVAPCD Air Quality Significance Thresholds

Mass Emissions Thresholds	
Pollutant	**Construction/Operation (tpy)**
NO_X	10
ROG	10
PM_{10}	15
$PM_{2.5}$	15
SO_X	27
CO	100
Lead	—
Toxic Air Contaminants and Odor Thresholds	
TACs	Probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 20 in 1 million; or Ground-level concentrations of non-carcinogenic toxic air contaminants would result in a Hazard Index equal or greater than 1 for the MEI.
Odor	More than one confirmed complaint per year averaged over a three-year period or three unconfirmed complaints per year averaged over a three-year period.
Ambient Air Quality for Attainment Criteria Pollutants of Concern	
NO_2 1-hour average annual average	In attainment; significant if project causes or contributes to an exceedance of either of the following standards: 0.18 parts per million (state) 0.03 parts per million (state)
CO 1-hour average 8-hour average	In attainment; significant if project causes or contributes to an exceedance of either of the following standards: 20 parts per million (state) 9.0 parts per million (state)

Source: SJVAPCD, Air Quality Significance Thresholds – Criteria Pollutants, 2015. http://www.valleyair.org/transportation/0714-GAMAQI-Criteria-Pollutant-Thresholds-of-Significance.pdf; SJVAPCD, Air Quality Thresholds of Significance – Toxic Air Contaminants, 2015. http://www.valleyair.org/transportation/0714-GAMAQI-TACs-Thresholds-of-Significance.pdf
Note: The SJVAPCD's approach to analyses of construction impacts is to require implementation of effective and comprehensive control measures rather than to require detailed quantification of emission concentrations for modeling of direct impacts. The SJVAPCD has determined that compliance with Regulation VIII for all sites and implementation of all other control measures indicated in Tables 6-2 and 6-3 of the GAMAQI (as appropriate, depending on the size and location of the project site) would constitute sufficient mitigation to reduce PM_{10} impacts to a level considered less than significant.

Issues Not Discussed Further

Although campus development under the 2020 LRDP would include sources that would result in TAC emissions, at this time adequate information with respect to these sources (including but not limited to the exact location of each future source; the types and quantities of chemicals that would be used in the case of laboratories; the types and volumes of fuels that would be used in the case of combustion sources; building and stack heights; types of controls; etc.) is not available to allow for the quantification and evaluation of the potential human health risk. However, based on data from other UC campuses such as UC Davis, it is anticipated that the human health risk from the development of the campus under the 2020 LRDP would not result in a significant human health risk on or off site. For instance, according to the 2018 LRDP EIR prepared for UC Davis which evaluated impacts from the development of that campus through 2031 to an enrollment level of 39,000 full-time equivalent students, the cumulative human health risk from all on-campus TAC sources (existing and future research laboratories, boilers and generators, a cogeneration plant, etc., for a total of more than 100 individual TAC sources) was determined to be less than 10 in 1 million (This impact is considered significant if the probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 10 in 1 million) (UC Davis 2018). Given that UC Davis campus with a much larger existing research program (including a medical school and an extensive veterinary medicine program) and certain unique TAC sources (such as a wastewater treatment plant and a cogeneration plant) is not expected to result in a significant human health risk in the region, UC Merced upon completion of development under the 2020 LRDP would be considered unlikely to result in TAC emissions that would result in a significant human health risk in the region. Furthermore, to the extent that UC Merced proposes to add new sources such as diesel-operated emergency generators that could result in TAC emissions, UC Merced would conduct an evaluation of the testing emissions from the proposed generator to make sure its operation does not result in a human health impact on the campus population. Human health risk from TAC emissions therefore are not a concern and are not discussed further in this section.

UC Merced notes that Merced County Regional Waste Management Authority (MCRWMA) and UC Merced are working together on a landfill-gas-to-energy project, which involves the collection and treatment of landfill gas (methane) at the Highway 59 Landfill, conveyance of the treated gas to UC Merced campus via pipeline, and the combustion of the gas in three microturbines to produce electricity and hot water for campus use. The microturbines would allow UC Merced to discontinue the use of three natural gas fired boilers that are located in the Central Plant and are used to produce hot water. The microturbines would be located in an enclosed structure adjacent to the Central Plant. Project construction is anticipated to take place over a period of about 1.5 to 2 years, with completion in 2020. The MCRWMA has conducted environmental review of the proposed project which shows that the proposed microturbines would produce TAC emissions that would be less than the TAC emissions that result from the operation of the three boilers. As a result, the project would not adversely affect receptors on the campus (MCRWMA 2019).

Methodology

The 2020 LRDP is not a specific development project but a plan for development of the Merced campus, which if fully implemented, would ultimately support a student population of 15,000 students, and about 2,411 on-campus faculty and staff by 2030, and would allow the construction of an additional 1.83 million gross square feet (gsf) of new building space on the campus such that by 2030, there would be a total of about 5 million gsf of building space. According to the land use diagram included in the 2020 LRDP, the additional facilities would be located almost entirely with the areas designated Campus Mixed Use (CMU). As noted in **Section 3.0, Project Description**, of the 274 acres of CMU land on the campus, 171 acres are either already developed or will be developed with the 2020 Project facilities, and therefore, new facilities under the 2020 LRDP would either be built as infill development within the developed area or on the remaining 103 acres.

Because the proposed project is a plan and not a specific project with a defined construction schedule, construction emissions from the construction of the planned building space were calculated by assuming that about 1.83 million gsf of building space would be constructed over a 10-year period and that no more than 103 acres of land would be graded to construct the facilities. CalEEMod 2016.3.2 (CalEEMod) was used to estimate construction emissions. More information on the assumptions and methodology used is presented under **LRDP Impact AQ-1**, below

CalEEMod was also used to estimate operational emissions from the campus under 2030 conditions. Area source emissions were calculated based on the amount and types of building spaces that would be added to the campus. Mobile source emissions were calculated based on project trip generation data from the Traffic Impact Assessment prepared for this SEIR. Other than emergency generators that would not operate routinely, new stationary sources such as boilers would not be added to the campus under the 2020 LRDP. This is because in order to comply with the UC Sustainable Practices Policy, all new buildings added to the campus will be fully electric (for lighting, space heating, and hot water production), with electricity obtained either from on-campus renewable sources or as 100 percent renewable energy from the grid.

4.1.5 LRDP Impacts and Mitigation Measures

LRDP Impact AQ-1: Campus development under the 2020 LRDP would not result in construction emissions that would result in a cumulatively considerable net increase of criteria pollutants for which the air basin is in non-attainment. *(Less than Significant)*

The 2009 LRDP EIS/EIR analyzed the potential for campus development under the 2009 LRDP to result in an impact on air quality from construction of campus facilities. That analysis, which was presented under Impact AQ-1, analyzed construction air emissions from the construction of approximately 8.9 million gsf of building space over a 21-year period extending from 2009 through 2030. That analysis assumed that the entire 815-acre campus would be graded at the maximum rate of 10 acres per day. URBEMIS was used to estimate emissions and the results of the modeling indicated that campus construction would result in a less than significant impact on air quality.

As noted in **Section 3.0, Project Description**, UC Merced is now expected to grow at a slower pace than originally anticipated, such that by 2030, the enrollment level is expected to be 15,000 students, and the faculty and staff projection for 2030 is also substantially lower than previously projected and analyzed in the 2009 LRDP EIS/EIR. Also, by 2020 UC Merced would have constructed about 2.5 million gsf of building space, and between 2020 and 2030, UC Merced would construct an additional 1.83 million gsf of building space within a 103-acre portion of the campus. Given these changes in the proposed project and the conditions in which it would be implemented, a revised analysis of the project's construction emissions impact is presented below. The analysis below presents the potential for construction activities on the campus under the 2020 LRDP to result in a cumulatively considerable net increase in pollutants for which the air basin is in non-attainment.

Construction of campus facilities under the 2020 LRDP would require site preparation (i.e., clearing and grading); pavement and asphalt installation; and construction of the buildings. For purposes of this assessment, it was assumed that there would be ongoing construction on the campus between 2021 and 2030, and site buildout under the 2020 LRDP was assumed to be completed by 2030; although, in reality, development could take longer and buildout may not be completed until several years later. During this period, construction emissions would be generated by heavy-duty construction equipment, on-road trucks for material deliveries, and construction worker vehicles. ROG emissions would occur as a result of asphalt paving and architectural coatings. Fugitive dust would be generated by grading and related activities.

Because of the construction time frame and the normal day-to-day variability in construction activities, it is difficult, if not impossible, to precisely quantify the emissions associated with each construction subphase. In order to estimate the construction emissions using CalEEMod, a conservative approach was taken in which construction of the campus was assumed to occur over the following four construction subphases within an overall time schedule from January 1, 2021 to November 30, 2030:

- **Site Preparation:** Site preparation would take place from January 2021, to March 2021.
- **Grading:** It is assumed that the entire 103-acre CMU area would be graded. Grading would take place from March 2021 to October 2021.
- **Building Construction:** Building construction would take place from October 2021 to October 2027. A total of 1.83 million gsf of buildings would be built.
- **Paving:** Paving would occur from October 2023 to November 2030, and approximately 15 acres would be paved.
- **Architectural Coatings:** Architectural coatings would be applied from October 2023 to December 2030.

Based on the schedule and assumptions described above and CalEEMod default assumptions, the CalEEMod model was used to estimate annual construction emissions of criteria pollutants from 2021 to 2030, which are shown in **Table 4.1-5, Estimated Unmitigated Construction Emissions**.

Table 4.1-5
Estimated Unmitigated Construction Emissions

Construction Year	Emissions in Tons per Year					
	ROG	**NO_X**	**CO**	**SO_X**	**PM_{10}[1]**	**$PM_{2.5}$[1]**
2021	0.69	6.14	4.85	0.01	1.69	0.89
2022	1.22	6.94	9.20	0.03	2.20	0.68
2023	1.42	6.00	9.04	0.03	2.25	0.69
2024	2.83	7.07	11.25	0.04	2.63	0.82
2025	2.73	6.69	10.62	0.04	2.60	0.80
2026	2.67	6.62	10.20	0.04	2.60	0.80
2027	2.42	5.33	8.19	0.03	2.09	0.65
2028	1.73	1.33	2.93	0.01	0.44	0.16
2029	1.73	1.33	2.88	0.01	0.44	0.16
2030	1.62	0.93	2.59	0.01	0.38	0.13
Maximum Emissions in Any Year	**2.83**	**7.07**	**11.25**	**0.04**	**2.63**	**0.89**
SJVAPCD Threshold:	10	10	100	27	15	15
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Source: Impact Sciences, Inc.
Emissions calculations are provided in ***Appendix 4.1****.*
Totals in the table may not appear to add exactly due to rounding in the computer model calculations.
1 PM_{10} and $PM_{2.5}$ emissions reflect compliance with SJVAPCD Regulation VIII.

As discussed in the **Regional Topography and Meteorology** section above, the SJVAB is in nonattainment for the federal standards for ozone (8 hour) and $PM_{2.5}$. The air basin is in nonattainment for the state standards of ozone (1 hour), ozone (8 hour), PM_{10}, and $PM_{2.5}$. O_3 precursors include NO_x and ROG. According to the SJVAPCD's GAMAQI, "If a project is significant based on the thresholds of significance for criteria pollutants, then it is also cumulatively significant. This does not imply that if the project is below all such significance thresholds, it cannot be cumulatively significant" (SJVAPCD 2015).

As shown in **Table 4.1-5,** the emissions associated with the construction of facilities under the 2020 LRDP would not exceed SJVAPCD significance thresholds for any of the pollutants, including those for which the air basin is in non-attainment. Therefore, construction emissions associated with campus development under the 2020 LRDP would result in a less than significant impact on air quality.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the small size and nature of these projects and for the same reasons set forth above, they would be unlikely to result in construction emissions that would exceed applicable thresholds. The impact would be less than significant.

Although SJVAPCD significance thresholds are not anticipated to be exceeded given the construction schedule detailed above, the exact construction schedule for future projects as part of the 2020 LRDP has yet to be determined. Should a number of projects be constructed concurrently on the campus, it is possible that the SJVAPCD threshold for NOx could be exceeded. Therefore, **LRDP Mitigation Measure AQ-1a**, which is a construction best practice, is set forth below and would be implemented during construction of future projects to minimize NOx emissions and avoid a significant air quality impact. Similarly, **LRDP Mitigation Measure AQ-1b** is proposed to reduce emissions of dust during the construction of projects on the campus. **Table 4.1-6, Estimated Mitigated Construction Emissions,** reports the emissions that would result following the implementation of fugitive dust control measures that would be applied during grading to comply with SJVAPCD Regulation VIII along with a requirement that Tier 4 construction equipment be used to minimize NOx emissions during construction.

Table 4.1-6
Estimated Mitigated Construction Emissions

Construction Year	Emissions in Tons per Year					
	ROG	NO_X	CO	SO_X	PM_{10}[1]	$PM_{2.5}$[1]
2021	0.28	1.30	5.02	0.01	0.88	0.37
2022	1.05	5.20	9.35	0.03	2.10	0.58
2023	1.24	4.19	9.26	0.03	2.16	0.59
2024	2.57	4.37	11.77	0.04	2.49	0.69
2025	2.49	4.26	11.15	0.04	2.48	0.69
2026	2.44	4.19	10.74	0.04	2.48	0.68
2027	2.21	3.22	8.69	0.03	1.99	0.55
2028	1.63	0.24	3.28	0.01	0.38	0.11
2029	1.63	0.23	3.24	0.01	0.38	0.11
2030	1.49	0.20	2.75	0.01	0.35	0.10
Maximum Emissions in Any Year	**2.57**	**5.20**	**11.77**	**0.04**	**2.49**	**0.69**

Source: Impact Sciences, Inc.
*Emissions calculations are provided in **Appendix 4.1**.*
Totals in the table may not appear to add exactly due to rounding in the computer model calculations.
[1] *PM_{10} and $PM_{2.5}$ emissions reflect compliance with SJVAPCD Regulation VIII.*

Mitigation Measures:

LRDP MM AQ-1a: The construction contractors shall be required via contract specifications to use construction equipment rated by the U.S. EPA as meeting Tier 4 (model year 2008 or newer) emission limits for engines between 50 and 750 horsepower.

LRDP MM AQ-1b: UC Merced shall include in all construction contracts the measures specified in SJVAPCD Regulation VIII (as it may be amended for application to all construction projects generally) to reduce fugitive dust impacts, including but not limited to the following:

- All disturbed areas, including storage piles, which are not being actively utilized for construction purpose, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, or vegetative ground cover.

- All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant.

- All land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities shall be effectively controlled of fugitive dust emissions using application of water or by presoaking.

- When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, or at least 6 inches of freeboard space from the top of the container shall be maintained.

- All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit visible dust emissions. Use of blower devices is expressly forbidden.)

- Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, storage piles shall be effectively stabilized of fugitive dust emissions by using sufficient water or chemical stabilizer/ suppressant.

LRDP Impact AQ-2: **Campus development under the 2020 LRDP would result in operational emissions that would involve a cumulatively considerable net increase of criteria pollutants for which the air basin is in non-attainment.** ***(Significant; Significant and Unavoidable)***

The 2009 LRDP EIS/EIR analyzed the potential for campus development under the 2009 LRDP to result in an impact on air quality from campus operations. That analysis, which was presented under Impact AQ-2, analyzed impacts of a 25,000-student campus in 2030. URBEMIS was used to estimate emissions and the results of the modeling indicated that campus operations would result in a significant impact on air quality due to emissions of ROG, NOX, and PM10 that would exceed SJVAPCD thresholds.

As noted in **Section 3.0, Project Description**, UC Merced is now expected to grow at a slower pace than originally anticipated, such that by 2030, the enrollment level is expected to be 15,000 students, and the faculty and staff projection for 2030 is also substantially lower than previously projected and analyzed in the 2009 LRDP EIS/EIR. In light of this change in the proposed project and the conditions in which it would be implemented, a revised analysis of the project's operational emissions impact is presented below.

Under the 2020 LRDP, UC Merced would develop facilities, which would accommodate approximately 15,000 students and 2,411 employees. Campus facilities involving approximately 1.83 million gsf of building space would be added, including 0.67 million gsf of academic space, such as classrooms, laboratory and research areas, and alumni and conference centers; 0.33 million gsf of student life and athletic uses; 0.48 million gsf of campus operations; 0.35 million gsf of housing; and approximately 1,680 parking spaces.

Emissions resulting from area sources, such as landscape maintenance equipment, and periodic architectural coating activities, were estimated using CalEEMod. The area sources emissions are shown in **Table 4.1-7, Estimated Unmitigated Operational Emissions**. Trip generation rates for use in CalEEMod were obtained from the Traffic Impact Assessment for the proposed project. The estimated mobile source emissions are based on buildout of all land uses planned under the 2020 LRDP and are also presented in **Table 4.1-7**.

Table 4.1-7
Estimated Unmitigated Operational Emissions

Emissions Source	Emissions in Tons per Year					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Area Sources	8.51	0.10	8.96	0.00	0.05	0.05
Energy/Stationary Sources	0.23	2.08	1.47	0.01	0.16	0.16
Mobile Sources	1.59	22.05	14.93	0.11	6.74	1.85
Annual Emissions Total	**10.34**	**24.24**	25.36	0.12	6.95	2.06
SJVAPCD Threshold	10	10	100	27	15	15
Exceeds Threshold?	**Yes**	**Yes**	**No**	**No**	**No**	**No**

Source: Impact Sciences, Inc. Emissions calculations are provided in ***Appendix 4.1****.*
Emissions totals do not include wood-burning stoves or fireplaces which would not be built on the campus
Totals in table may not appear to add exactly due to rounding in the computer model calculations.

Table 4.1-7 reports the maximum level of emissions that would result when all of the development on the campus under the 2020 LRDP has been completed. In the years before that, when the level of development and campus size is smaller, the emissions would be lower, and would likely not exceed the significance thresholds. Furthermore, area source and energy emissions would likely be much lower than reported because pursuant to UC Sustainable Practices Policy, future buildings on the campus would be fully electric and would not involve natural gas combustion for heating purposes. Nonetheless, based on the estimated emissions reported in **Table 4.1-7**, the campus at full development under the 2020 LRDP would generate annual emissions that would exceed the SJVAPCD significance thresholds for ROG and

NOx, and result in a cumulatively considerable net increase in ozone for which the air basin is in non-attainment. Therefore, operational emissions of ROG and NOx generated by campus operations would be considered to have a significant air quality impact.

As noted earlier in this section, NOx and ROG are ozone precursors. The main health concern regarding exposure to ground-level ozone is its effects on the respiratory system, particularly on lung function. As noted earlier, several factors influence these health impacts, including the concentration of ground-level ozone in the atmosphere, the duration of exposure, the average volume of air breathed per minute, the length of intervals between short-term exposures, and the sensitivity of the person to the exposure.[3,4]

As stated by SJVAPCD in an amicus brief that the Air District submitted to the California Supreme Court in *Sierra Club v. County of Fresno* (Friant Ranch L.P.), it is not feasible to conduct an analysis of the effects of a project's criteria pollutant emissions (i.e., NOx and ROG) on human health. Ozone is not directly emitted and is formed when precursors NOx and ROG undergo complex chemical reactions in the presence of sunlight. Once formed, ozone can be transported long distances by wind. Because of this complexity, a specific amount of NOx or ROG emitted in a given area cannot be equated to a particular concentration of ozone in that area. In addition to duration of exposure, it is the concentration of ozone that results in health effects, and no computer models are available to estimate the concentrations of ozone that would result near a project site or even at a distance that could result in specific health effects (SJVAPCD 2018). Similarly, South Coast Air Quality Management District (SCAQMD) in its amicus brief to the California Supreme Court in *Sierra Club v. County of Fresno* (Friant Ranch L.P.) stated that from a scientific standpoint, it takes a large amount of additional precursor emissions to cause a modeled increase in ambient ozone levels over an entire air basin, and provided evidence from its 2012 AQMP that showed that if the daily emissions of NOx and ROG were reduced in amounts of 432 and 187 tons per day respectively, the ozone concentrations in the air basin would go down by only 9 parts per billion (SCAQMD 2018). For all these reasons, it is difficult to estimate the change in ozone concentrations that would result from a project's emissions of NOx and ROG and then to predict the magnitude of health effects from the project's exceedance of the significance criteria for regional ROG and NOx emissions.

To provide some context, the daily emissions due to project operations were compared to the total daily emissions of NOx and ROG in the air basin. The estimated increase in ROG emissions of up to 10 tons per year or approximately 0.03 tons per day due to the proposed project would be a relatively small fraction

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3 The World Bank Group, Pollution Prevention and Abatement Handbook 1998: Toward Cleaner Production, pp. 227–230, 1999, www.ifc.org/wps/wcm/connect/dd7c9800488553e0b0b4f26a6515bb18/.pdf?MOD=AJPERES, accessed February 11, 2019.

4 U.S. EPA, Air Quality Guide for Ozone, March 2015b, https://airnow.gov/index.cfm?action=pubs.aqiguideozone, accessed February 11, 2019.

of the estimated 1,046 tons per day in the air basin in 2018.[5] Similarly, the increase in NOx emissions of up to 24 tons per year or approximately 0.07 tons per day of NOx due to the project would be a relatively small fraction compared to an estimated 226 tons per day in the SJVAB in 2018. Nonetheless, the project's operational ROG and NOx emissions would exceed the applicable threshold and before mitigation would have the potential to result in new or exacerbated air quality violations in the air basin. **Table 4.1-3**, above, indicates that the applicable ozone standards were exceeded in the SJVAB multiple times during the years 2015 to 2017. By emitting ROG and NOx emissions in excess of the thresholds, the project would contribute to more days of ozone exceedance or result in Air Quality Index values that are unhealthy for sensitive groups and other populations. Potential outcomes from exposures during periods of ozone exceedance would include an increase or exacerbation of respiratory illnesses, cardiovascular disease, other associated health effects, and increased mortality. Other likely outcomes would be increases in physician and emergency room visits as well as hospitalization and more school days missed by school-aged children living in the air basin.

LRDP Mitigation Measures AQ-2a and **AQ-2b** are proposed to reduce the increase in the campus's operational air emissions of ROG and NOx. **LRDP Mitigation Measure AQ-2a** requires UC Merced to promote the use of alternative transportation, alternative-fuel vehicles, and to improve traffic flow. Although implementation of **LRDP Mitigation Measure AQ-2a** would reduce NOx emissions, the reduction is not quantifiable and it is unlikely that it would reduce emissions to below the SJVAPCD significance threshold. **LRDP Mitigation Measure AQ-2b** includes measures to reduce ROG emissions, by planting low maintenance landscaping, and utilizing electric landscaping equipment, low-VOC cleaning supplies and consumer products, and low-VOC paints in campus maintenance. **LRDP Mitigation Measure AQ-2b** also recommends the use of solar water heating systems to reduce the combustion of natural gas for water heating (the reduction due to this measure is not quantifiable at this time). **Table 4.1-8, Estimated Mitigated Operational Emissions,** shows the anticipated operational emissions from the campus upon full development under the 2020 LRDP after mitigation.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the small size (less than 10,000 square feet of building space and less than 2 acres of ground disturbance) and nature of these projects, they would be unlikely to result in operational emissions that would exceed applicable thresholds. The impact would be less than significant.

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5 California Air Resources Board, CEPAM 2016- Standard Emission Tool February 15, 2017, https://www.arb.ca.gov/app/emsinv/fcemssumcat/fcemssumcat2016.php, accessed February 12, 2019.

Table 4.1-8
Estimated Mitigated Operational Emissions

Emissions Source	Emissions in Tons per Year					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Area Sources	7.50	0.08	6.79	0.00	0.04	0.04
Energy/Stationary Sources	0.23	2.08	1.47	0.01	0.16	0.16
Mobile Sources	1.59	22.05	14.93	0.11	6.74	1.85
Annual Emissions Total	9.33	**24.21**	23.19	0.12	6.94	2.05
SJVAPCD Threshold	10	10	100	27	15	15
Exceeds Threshold?	**No**	**Yes**	**No**	**No**	**No**	**No**

*Source: Impact Sciences, Inc. Emissions calculations are provided in **Appendix 4.1**.*
Totals in table may not appear to add exactly due to rounding in the computer model calculations.

Mitigation Measures:

LRDP MM AQ-2a: UC Merced shall implement the following measures to reduce emissions from vehicles:

- Provide pedestrian-enhancing infrastructure to encourage pedestrian activity and discourage vehicle use.
- Provide bicycle facilities to encourage bicycle use instead of driving, such as bicycle parking, bicycle lanes, bicycle lockers, and showers and changing facilities for employees.
- Provide preferential carpool and vanpool parking for non-residential uses.
- Provide transit-enhancing infrastructure to promote the use of public transportation, such as covered bus stops and information kiosks.
- Provide facilities such as electric car charging stations and a CNG refueling station to encourage the use of alternative-fuel vehicles.
- Improve traffic flows and congestion by timing of traffic signals at intersections adjacent to the campus to facilitate uninterrupted travel.
- Work with campus transit provider to replace CatTracks buses with either electric buses or buses operated on alternative fuels.
- Work with the City of Merced to establish park and ride lots and provide enhanced transit service between the park and ride lots and the campus.
- Replace campus fleet vehicles with electric vehicles or vehicles that operate on alternative fuels.
- Reduce the number of daily vehicle trips by providing more housing on campus.

LRDP MM AQ-2b: UC Merced shall implement the following measures to reduce emissions from area and energy sources, as feasible:

- Utilize low-VOC[6] cleaning supplies and low-VOC paints (100 grams/liter or less) in building maintenance.
- Utilize electric equipment for landscape maintenance.
- Plant low maintenance landscaping.
- Implement a public information program for resident students to minimize the use of personal consumer products that result in ROG emissions, including information on alternate products.
- Instead of natural gas water heaters, install solar water heating systems.

Significance after Mitigation: With implementation of **LRDP Mitigation Measures AQ-2a** and **AQ-2b**, although the emissions would be reduced, campus operations would still result in annual emissions that exceed the SJVAPCD significance threshold for NOx, and thereby still result in a cumulatively considerable net increase in ozone for which the air basin is in non-attainment. The operational emissions of NOx generated by the campus would result in a significant and unavoidable impact on air quality.

LRDP Impact AQ-3: **Implementation of the 2020 LRDP would not expose sensitive receptors to substantial pollutant concentrations of carbon monoxide.** ***(Less than Significant)***

The 2009 LRDP EIS/EIR analyzed the potential for campus development under the 2009 LRDP to cause high levels of CO due to traffic associated with the campus. That analysis, which was presented under Impact AQ-3, analyzed impacts of a 25,000-student campus in 2030. A simplified CALINE2 screening model was used to estimate CO concentrations at intersections most affected by project traffic. The results of the modeling indicated that campus-related traffic would not result in CO concentrations that would exceed the state CO standards, and that a less than significant impact would occur.

As noted in **Section 3.0, Project Description**, UC Merced is now expected to grow at a slower pace than originally anticipated, such that by 2030, the enrollment level is expected to be 15,000 students, and the faculty and staff projection for 2030 is also substantially lower than previously projected and analyzed in

[6] As explained in the **Criteria Air Pollutants** section, volatile organic compounds (VOCs) are the same as ROGs.

the 2009 LRDP EIS/EIR. In light of this change in the proposed project and the conditions in which it would be implemented, a revised analysis of the project's CO impact is presented below.

Campus operations under the 2020 LRDP would not generate TAC or $PM_{2.5}$ emissions that could affect the health of the community near the project site, as the majority of the vehicles associated with the campus would operate on gasoline and not diesel which is the primary source of TACs and $PM_{2.5}$. CO emitted by traffic generated under the 2020 LRDP is the criteria pollutant that would have the potential to result in substantial concentrations.

Traffic-congested roadways and intersections have the potential to generate localized high levels of CO. Localized areas where ambient concentrations exceed state and/or federal standards are termed CO "hotspots." CO is produced in greatest quantities from vehicle combustion and is usually concentrated at or near ground level because it does not readily disperse into the atmosphere. As a result, potential air quality impacts to sensitive receptors are assessed through an analysis of localized CO concentrations.

Air pollutant monitoring data indicate that CO levels have been at healthy levels (i.e., below State and federal standards) in San Joaquin Valley for several years. As a result, the region has been designated as attainment for the CO standard. Nonetheless, congested intersections with a large volume of traffic have the greatest potential to cause high, localized concentrations of CO. To analyze the potential for the proposed project to cause or contribute to high CO concentrations, a CO screening guidance provided by the Bay Area Air Quality Management District (BAAQMD) was used. This guidance provides that a project would have a less than significant impact with respect to CO levels if the addition of project traffic would not increase the total traffic at any affected intersection to more than 44,000 vehicles per hour. Buildout under 2020 LRDP would generate a relatively small amount of new traffic: 8,406 total daily trips or 739 AM peak hour trips and 808 PM peak hour trips. The Traffic Impact Assessment prepared for the 2020 LRDP (**Appendix 4.8**) shows that the cumulative traffic volumes, including the traffic due to the proposed project, at all intersections affected by the project would be less than 44,000 vehicles per hour. Therefore, the project will not result in the violation of the CO standards and would not expose sensitive receptors to substantial CO concentrations. The impact would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the small size and nature of these projects and for the same reasons set forth above, they would be unlikely to result in CO emissions that would exceed applicable thresholds. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact AQ-4: Implementation of the 2020 LRDP would not conflict with or obstruct implementation of the applicable air quality plan. ***(Less than Significant)***

In compliance with the *State CEQA Guidelines*, the analysis below evaluates whether implementation of the 2020 LRDP would conflict with or otherwise obstruct implementation of regional air quality plans. For air quality planning purposes, the SJVAPCD creates emissions inventories based on existing and foreseeable future land uses within its jurisdiction. If a new project is consistent with the planned land use designation that was considered in the development of an air quality management plan, the proposed project would not conflict and would not obstruct implementation of the applicable air quality management plan. Generally, a project's conformance with a local general plan that was taken into account in the preparation of an air quality management plan would demonstrate that the project would not conflict with or obstruct implementation of the air quality management plan. As noted in the 2009 LRDP EIS/EIR, Merced County has recognized the Merced campus since it amended the Merced County General Plan in 1996 to designate a UC Merced Specific Urban Development Plan. Development of the campus is also included in the City of Merced 2030 Vision General Plan, the growth projections of which are reflected in the SJVAPCD's air quality plans. All of the previous UC Merced LRDPs projected an enrollment level of 25,000 students by 2030. However, based on more recent enrollment growth rates, the campus is expected to grow to 15,000 students by 2030. Because a higher level of growth at the campus has been accounted for and included in the air quality planning efforts of the region, implementation of the 2020 LRDP would not conflict with or obstruct implementation of the applicable air quality plan. Although the emissions associated with campus operation at full development under the 2020 LRDP would result in a significant impact for the reasons set forth in the discussion of **LRDP Impact AQ-2**, the effect of campus buildout under the 2020 LRDP with respect to the regional air quality management plan would, of itself, be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the small size and nature of these projects and for the same reasons set forth above, they would be unlikely to conflict with an applicable air quality plan. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact AQ-5: Implementation of the 2020 LRDP would not result in odors adversely affecting a substantial number of people. ***(Less than Significant)***

Construction activities under the 2020 LRDP would require the use of diesel-fueled equipment, architectural coatings, and asphalt, all of which have an associated odor. However, these odors are not pervasive enough to cause objectionable odors affecting a substantial number of people. Consequently, construction under the 202- LRDP would not cause odors.

Buildout under the 2020 LRDP consists of the development of a university campus, including academic facilities, athletic facilities, and student housing. The operation of such facilities is not considered to be a significant source of odors, and all research using odorous materials would take place inside buildings, so there would be no odorous emissions associated with research activities. In addition, the project would not be located near any significant odor sources. Consequently, implementation of the 2020 LRDP would not cause or be affected by odors. This impact is less than significant.

Mitigation Measures: No mitigation is required.

4.1.6 Cumulative Impacts and Mitigation Measures

Cumulative Impact C-AQ-1: **The construction and operation of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, could hinder air quality attainment and maintenance efforts for criteria pollutants.** ***(Significant; Significant and Unavoidable)***

For air pollutants such as CO that result in impacts that are highly localized, the study area is focused on the roadways and intersections that would be used by the project-related traffic. For pollutants that are regional in nature, the study area for potential cumulative air quality impacts is the SJVAB. The SJVAB, which is approximately 250 miles long and averages 80 miles wide, is the second largest air basin in the state. The SJVAB is defined by the Sierra Nevada to the east (8,000 to 14,000 feet in elevation), the Coast Range to the west (averaging 3,000 feet in elevation), and the Tehachapi Mountains to the south (6,000 to 8,000 feet in elevation). The valley opens to the sea at the Carquinez Strait where the San Joaquin–Sacramento Delta (Delta) empties into San Francisco Bay. Due to its topography and location relative to other air basins, the airflow in the valley becomes vertically blocked by high barometric pressure over the SJVAB and as a result, the majority of the SJVAB is highly susceptible to pollutant accumulation over time.

As shown in **Table 4.1-2**, the SJVAB is in nonattainment for the federal standards for O_3 (8 hour) and $PM_{2.5}$. The air basin is in nonattainment for the state standards of O_3 (1 hour), O_3 (8 hour), PM_{10}, and $PM_{2.5}$.

Cumulative Construction Impacts

Campus construction under the 2020 LRDP would occur between 2021 and 2030, and construction activities would be located in the central portions of the campus site in the area designated CMU on the land use diagram. At this time, there are no foreseeable construction projects that would be under construction near the campus between 2021 and 2030. Therefore, there is no potential for campus construction emissions, especially of pollutants such as PM10 and PM2.5, and construction TACs to combine with emissions of these pollutants from other nearby construction projects. There would be no cumulative impact related to construction emissions.

Cumulative Traffic and Other Operational Emissions Impacts

As noted above, campus development under the 2020 LRDP would generate annual operational emissions from project-related mobile and other sources that would exceed the SJVAPCD significance thresholds for NO_X even after mitigation. Other development under the City's current General Plan would also result in new vehicle trips that would increase vehicle emissions in the air basin. Therefore, cumulative operational impacts to air quality would be significant and the proposed project's contribution to the impact would be cumulatively considerable.

No significant CO hotspot impacts would affect sensitive receptors in the vicinity of the study intersections upon implementation of the 2020 LRDP. The CO hot spot analysis in **LRDP Impact AQ-3** above takes into account not only the traffic associated with the proposed project but also all the existing and future traffic in the City of Merced as a result of the projected growth. Based on that analysis, cumulative CO hotspot impacts would be less than significant.

Mitigation Measures:

Cumulative MM C-AQ-1: **Implement LRDP Mitigation Measures AQ-2a and AQ-2b. No additional mitigation is available.**

Significance after Mitigation: Significant and unavoidable

4.1.7 References

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2007. *2007 PM_{10} Maintenance Plan and Request for Redesignation*. Fresno: SJVAPCD.

SJVAPCD. 2013. *2013 Plan for the Revoked 1-Hour Ozone Standard*. September.

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SJVAPCD. 2015. *Guide for Assessing and Mitigating Air Quality Impacts*. March.

SJVAPCD. 2018. *SJVAPCD Application for Leave to File Amicus Curiae Brief for Sierra Club, Revive the San Joaquin, and League of Women Voters of Fresno V. County of Fresno and Friant Ranch.*

SJVAPCD. 2016a. *2016 Moderate Area Plan for the 2012 PM2.5 Standard*.

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SJVAPCD. 2018. *Current District Rules and Regulations*. Available online at: http://www.valleyair.org/rules/1ruleslist.htm, accessed October 16, 2018.

South Coast Air Quality Management District (SCAQMD). 2018. *SCAQMD Application for Leave to File Amicus Curiae Brief for Sierra Club, Revive the San Joaquin, and League of Women Voters of Fresno V. County of Fresno and Friant Ranch.*

World Health Organization (WHO). 2013. Review of evidence on health aspects of air pollution – REVIHAAP Project.

4.2 BIOLOGICAL RESOURCES

4.2.1 Introduction

This section of the Recirculated Draft SEIR (SEIR) provides an evaluation of the biological resources, including special-status species and sensitive habitats, on and in the immediate vicinity of the campus site, and describes the impacts to these resources that could result from campus development pursuant to the 2020 LRDP.

Data Sources

Information presented in this section is based on the following data sources:

- California Department of Fish and Wildlife, California Natural Diversity Database (CNDDB) records search of the Winton, Yosemite Lake, Haystack Mountain, Atwater, Merced, Planada, Sandy Mush, El Nido, and Plainsburg U.S. Geological Society (USGS) 7.5 Minute Topographic Quadrangles (California Natural Diversity Database 2018 and 2019);
- California Native Plant Society (CNPS) Rare Plant Program Online Inventory of Rare and Endangered Plants of California (California Native Plant Society 2018);
- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) list of endangered, threatened, and proposed species for the project area obtained from the USFWS IPaC website (USFWS 2018b);
- Biological Assessment Clean Water Act (CWA) Section 404 permit applications for UC Merced Campus Project and County of Merced Infrastructure in Support of UC Merced Project (County of Merced 2002);
- Supplement to the Biological Assessment for the UC Merced Campus Project and County of Merced Infrastructure in Support of UC Merced Project (Jones & Stokes 2002a);
- Final Biological Opinion on the Proposed University of California Merced Campus, Phase 1 and Campus Buildout (USFWS 2002);
- 2008 Supplement to Biological Assessment for the University of California, Merced Campus and University Community North (Airola 2008a);
- Compensatory Wetland Mitigation and Monitoring Plan (Gibson & Skordal 2008);
- Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced (Airola 2008b);
- Amended Biological Opinion for the University of California, Merced Campus and Community North Project (USFWS 2009);

- Second Amended Biological Opinion for the University of California, Merced Campus and Community North Project (USFWS 2016a);
- Modification of Formal Consultation for the UC Merced Project, Merced County, California (USFWS 2016b);
- Incidental Take Permit for the University of California, Merced Campus and Community North Project (California Department of Fish and Game 2011a);
- Amendment No. 1 to the Incidental Take Permit for the University of California, Merced Campus and Community North Project in Merced County (California Department of Fish and Game 2011b);
- Amendment No. 2 to the Incidental Take Permit for the University of California, Merced Campus and Community North Project (California Department of Fish and Wildlife 2015); and
- Numerous other survey reports, as referenced in this section, associated with the preconstruction survey requirements for the ongoing campus expansion (2020 Project).

Field Surveys

Since the inception of the UC Merced Campus and University Community Project, numerous biological surveys have been conducted on the project site and in the project vicinity. General types of surveys conducted include botanical surveys, wildlife surveys, and wetland delineations. Surveys were conducted by ICF Jones & Stokes, EIP Associates, Vollmar Consulting, URS, Gibson and Skordal, Salix Consulting, LSA, Live Oak Associates, Sequoia Ecological Consulting, Padre Associates, PES Environmental, Inc., UC Merced Natural Reserve System staff, and the UC Merced Campus Biologist. **Table 4.2-1, Biological Resource Surveys in the Project Site and Vicinity**, contains a summary of each of these surveys.

4.2.2 Environmental Setting

The proposed project is located in the San Joaquin Valley in eastern Merced County, a transition zone between the Sierra Nevada foothills to the east and the flat San Joaquin Valley floor to the west. The campus is located about 2 miles northeast of the City limits of Merced, southeast of Lake Yosemite Regional Park (see **Figure 3.0-2** in **Section 3.0, Project Description**).

Table 4.2-1
Biological Resource Surveys in the Project Site and Vicinity

Survey Dates	Survey Purpose	Survey Area	Surveyor (s)
February 4-April 16, 1999	Vernal pool branchiopod surveys	1999 (10,360 acre) UC Merced / University Community Planning Area	EIP Associates (1999a)
February 8, 21, and 22, and March 8-11, and 20-26, 1999	California tiger salamander larval surveys	Vernal pool grasslands north of Yosemite Avenue, vernal pools in the upper portion of Black Rascal Creek, seasonal wetlands associated with the headwaters of Cottonwood Creek, vernal pool grasslands located north of Cardella Road.	URS Corporation (UC Merced 2001)
February 8-March 26, 1999	Vernal pool branchiopod surveys	Vernal pool grasslands located north of Cardella Road and ponded water along Arboleda Drive, Yosemite Avenue, Kibby Road, South Orchard Drive, Olive Avenue, and Bear Creek Drive	URS Corporation (1999)
February 8-March 26, April 12, and May 3, 1999 and January 18, and 25, and June 19-20, 2000	Avian surveys	Campus Parkway (including northern half of 2001 University Community Plan site)	URS Corporation (UC Merced 2001)
Various surveys between April 19 June 16, and July 6-August 27, 1999	Botanical surveys	1999 (10,360 acre) UC Merced / University Community Plan Planning Area	EIP Associates (1999b)
April 19 and June 9 and 10, 1999 and April 17, May 9, and 24, and September 15, 2000	Botanical surveys	Campus Parkway (including northern half of 2001 University Community Plan)	URS Corporation (UC Merced 2001)
Between April 19-June 16, 1999 and July 6-August 27, 1999	Avian surveys	1999 (10,360 acre) UC Merced / University Community Plan Planning Area	EIP Associates (UC Merced 2001)
May and June 1999 and April and May 2000	Wetland delineation	UC Merced/University Community Planning Area	EIP Associates (2000)
May 18-19, 1999 and June 19-20, 2000	Swainson's hawk surveys	Campus Parkway (including northern half of 2001 University Community Plan) and 10-mile radius	URS Corporation (UC Merced 2001)
July 12-23, July 28-August 8, and August 16-27, 1999	San Joaquin kit fox protocol surveys	1999 (10,360 acre) UC Merced / University Community Plan Planning Area	EIP Associates (1999c)
January 18 and 25, 2000	California tiger salamander nocturnal surveys	Study area included areas north of Bellevue Road and west of Lake Road, south of the Flying M Ranch dirt road, east of Lake Road, grassland located north of the golf course, east of Lake Road, east of Lake Road between the golf course and the Flying M Ranch dirt road	URS Corporation (UC Merced 2001)
February 1- March 16, 2000	Vernal pool branchiopod protocol surveys	Campus Parkway study area	URS Corporation (2000)
February 14-April 29, 2000	Vernal pool branchiopod protocol surveys	Subset of 1999 (10,360 acre) UC Merced / University Community Plan Planning Area	EIP Associates (2001a)

Table 4.2-1
Biological Resource Surveys in the Project Site and Vicinity

Survey Dates	Survey Purpose	Survey Area	Surveyor (s)
March 30-April 7, April 18-19, and May 8-11, 2000	California tiger salamander larval surveys	1999 (10,360 acre) UC Merced / University Community Plan Planning Area in the larger marshes located adjacent to Merced Irrigation District's Le Grand and Main Canals	EIP Associates (2001d)
August 9-23, 2000	San Joaquin kit fox protocol surveys	Campus Parkway (including northern half of 2001 University Community Plan)	URS Corporation (UC Merced 2001)
February 9 to mid-April, 2001	Vernal pool branchiopod surveys	Tier 2 Conservation Lands (Chance Ranch, Cunningham Ranch, Nelson [San Felipe] and various other lands in project region (Flying M Ranch, China Hat Ranch, Richards Ranch, Kelsey Ranch, Rodner Ranch, Ichord Ranch, Crookam Ranch, Ranch, Chowchilla Ranch, Knapp Ranch and Flynn Ranch)	Vollmar Consulting (UC Merced 2001)
Various dates during February 14 through April 12, 2001	Wetland delineation	2001 (2,396 - acre) University Community Plan site	EIP Associates (2001e)
Early March to mid-June, 2001	Avian surveys	Tier 2 Conservation Lands (Chance Ranch, Cunningham Ranch, Nelson [San Felipe] and various other lands in project region (Flying M Ranch, China Hat Ranch, Richards Ranch, Kelsey Ranch, Rodner Ranch, Ichord Ranch, Crookam Ranch, Ranch, Chowchilla Ranch, Knapp Ranch and Flynn Ranch)	Vollmar Consulting (UC Merced 2001)
March 27-May 10, 2001	California tiger salamander surveys	Tier 2 Conservation Lands (Chance Ranch, Cunningham Ranch, Nelson [San Felipe] and various other lands in project region (Flying M Ranch, China Hat Ranch, Richards Ranch, Kelsey Ranch, Rodner Ranch, Ichord Ranch, Crookam Ranch, Ranch, Chowchilla Ranch, Knapp Ranch and Flynn Ranch)	Vollmar Consulting (UC Merced 2001)
April 2-3, May 8, and June 26, 2001	Botanical surveys	2001 (2,396 acre) University Community Plan site	EIP Associates (2001b)
April 4-mid-July, 2001	Botanical surveys	Tier 2 Conservation Lands (Chance Ranch, Cunningham Ranch, Nelson [San Felipe]) and various other private lands in project region (Flying M Ranch, China Hat Ranch, Richards Ranch, Kelsey Ranch, Rodner Ranch, Ichord Ranch, Crookam Ranch, Ranch, Chowchilla Ranch, Knapp Ranch and Flynn Ranch)	Vollmar Consulting (UC Merced 2001)

Table 4.2-1
Biological Resource Surveys in the Project Site and Vicinity

Survey Dates	Survey Purpose	Survey Area	Surveyor (s)
April 30-June 7, 2001	Small mammal trapping	Tier 2 Conservation Lands (Chance Ranch, Cunningham Ranch, Nelson [San Felipe] and various other lands in project region (Flying M Ranch, China Hat Ranch, Richards Ranch, Kelsey Ranch, Rodner Ranch, Ichord Ranch, Crookam Ranch, Ranch, Chowchilla Ranch, Knapp Ranch and Flynn Ranch)	Vollmar Consulting (UC Merced 2001)
Various dates in June and July 2002	Wetland assessment	Eastern Merced County	EIP Associates (2002)
Various dates in 2007 (surveys excluded vernal pool branchiopods) and 2008 (surveys included all species)	Surveys for listed vernal branchiopods, California tiger salamander, western spadefoot, western burrowing owl and other raptors, and special-status plants.	Tier 2 mitigation land (Robinson Ranch)	Vollmar Consulting (2008)
August 20 and 21, 2007 and February 4, 2008	Wetland delineation	University Community Land Company (UCLC) (229 acres) and Hunt Property (80 acres) within the 2008 University Community site	Gibson & Skordal, LLC (2008)
May 23, 2008	General site visit	2008 (2,925 acre) Long Range Development Plan (LRDP) and University Community Project Site	ICF Jones & Stokes
February 15, 2011	San Joaquin kit fox preconstruction survey	North Bowl Parking Lot Project site	PES Environmental, Inc.
November 2011 - January 2012	Burrowing owl and San Joaquin kit fox preconstruction surveys	Campus Phase 6 Project site	Live Oak Associates, Inc. (2012a)
March 2014 – May 2015	Camera trapping for San Joaquin kit fox consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands and Campus Build-Out Lands	Merced Vernal Pools and Grassland Reserve staff (UC Merced 2015x)
April 4, 2012 – May 15, 2012	Succulent owl's clover preconstruction surveys	Campus Phase 6 Project site	Live Oak Associates, Inc. (2012b)
April 2015	Presence/absence surveys for California tiger salamander larvae consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	Vollmar Natural Lands Consulting (2015)
September and October 2015	Colusa grass and San Joaquin Valley Orcutt grass surveys consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	LSA (2015b)
November 2015	San Joaquin kit fox preconstruction survey and biological monitoring for artificial kit fox den installation	Tier 1(a) Conservation Lands	LSA (2015c)
November 2015	Little Lake/North Basin and South Basin habitat assessment	Little Lake/North Basin and South Basin within the 2020 Project site	Salix Consulting (2016)

Table 4.2-1
Biological Resource Surveys in the Project Site and Vicinity

Survey Dates	Survey Purpose	Survey Area	Surveyor (s)
February 2016	Preconstruction San Joaquin kit fox survey for the California tiger salamander exclusion fence installation	2020 Project site perimeter	Padre Associates (2016a)
February 2016	Preconstruction nesting bird surveys for the California tiger salamander exclusion fence installation	2020 Project site perimeter	LSA (2016b)
February and March 2016	Protocol wet season vernal pool crustacean surveys consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	LSA (2017a)
February, April, and May 2016	Presence/absence surveys for California tiger salamander larvae consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	LSA (2016b)
April, May, June, and August 2016	Preconstruction surveys for succulent owl's clover, Colusa grass, and San Joaquin Valley Orcutt grass	2020 Project site	LSA (2016a)
April, June, September, and October 2016	Succulent owl's clover, Colusa grass, and San Joaquin Valley Orcutt grass surveys consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	LSA (2016d)
May 2016	Preconstruction San Joaquin kit fox survey and camera trapping	North Bowl Parking Lot Expansion site	Padre Associates (2016b)
May 2016 – November 2016	Camera trapping for San Joaquin kit fox consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	Merced Vernal Pools and Grassland Reserve staff (UC Merced 2017b)
August 2016	Preconstruction surveys for nesting birds, burrowing owl, Swainson's hawk, California tiger salamander, western pond turtle and San Joaquin kit fox	2020 Project site	Sequoia Ecological Consulting (and Padres Associates by reference) (2016b)
October 2016	Preconstruction survey for western pond turtle	2020 Project site	Sequoia Ecological Consulting (2016a)
January and February 2017	Protocol wet season vernal pool crustacean surveys consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	LSA (2017b)
March, April, May, and August 2017	Presence/absence surveys for California tiger salamander larvae consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	LSA (2017c)

Table 4.2-1
Biological Resource Surveys in the Project Site and Vicinity

Survey Dates	Survey Purpose	Survey Area	Surveyor (s)
April 2017 – October 2017	Succulent owl's clover, Colusa grass, and San Joaquin Valley Orcutt grass surveys consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	UC Merced and Merced Vernal Pools and Grassland Reserve staff (UC Merced 2017c)
July 2017	Camera trapping for San Joaquin kit fox consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	UC Merced and Merced Vernal Pools and Grassland Reserve staff (UC Merced 2017a)
March and April 2018	Protocol wet season vernal pool crustacean surveys consistent with the Management Plan for Conservation Lands and Adjacent Campus Buildout Lands	Tier 1(a) Conservation Lands	UC Merced and LSA staff (UC Merced 2018)

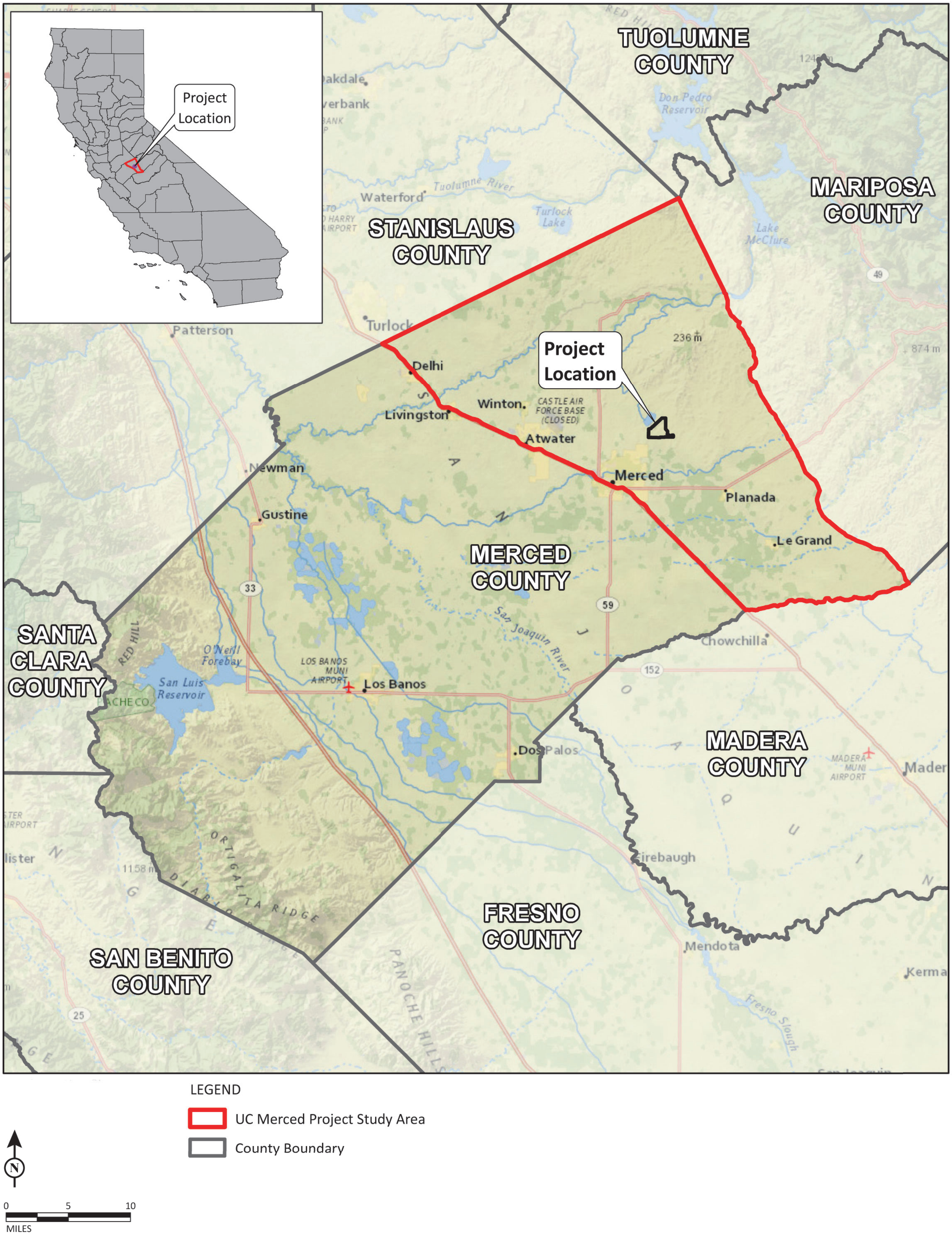
Regional Setting

For the purposes of this section, the project study area is defined as the eastern portion of Merced County (see **Figure 4.2-1, Project Study Area**). The proposed project is located in the transition zone between land utilized for grazing and land developed for intensive agriculture and urban development. This transition zone is marked by changes from older alluvial soils with well-developed hardpans or claypans to younger alluvial soils that lack well-developed hardpans or claypans. The poorly drained soils with hardpans or claypans are primarily utilized for grazing, while level, well-drained soils on the valley floor have been largely converted to agriculture or urban land uses. Evidence of claypans and hardpans throughout the eastern San Joaquin Valley is demonstrated most effectively at the soils' surface by the presence of seasonally inundated areas—vernal pools and swales. Grazing of grassland areas with poorly drained soils, and the conversion of younger, more fertile lands to agricultural, residential, and commercial land uses, have altered the landscape through the removal of trees and native vegetation, the introduction of nonnative species, and the modification of natural watercourses. Habitat types typical of the region include annual grasslands, irrigated pasture and croplands, oak woodlands, vernal pool and swale complexes, seasonal seeps and marshes, ponds, riparian forest and scrub, perennial streams, and scattered areas of ruderal vegetation.

Project Site History

The topography of the project site is relatively level with elevations ranging from approximately 200 to 300 feet above mean sea level. The northeastern portion of the project site contains small hills and valleys while the remainder of the undeveloped portion of the project site slopes gently from the northeast to southwest. Three canals that are located on the project site include Le Grand Canal, Fairfield Canal, and the Yosemite Lateral.

The topography of the project site is altered from historical conditions due to three to four separate phases of development. Historically, prior to any land development on the campus site, the site was altered in conjunction with agriculture. Although early agriculture in Merced County focused on "dry-farming" methods, during the 1860s many local ranchers and farmers began to develop small-scale irrigation projects. By the early 1880s, Charles H. Huffman, a prominent businessman and landowner instrumental in the formation of the town of Merced, controlled the irrigation system in the project area.



SOURCE: UC Merced, 2019

FIGURE **4.2-1**

Project Study Area

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The Crocker-Huffman Land & Water Company constructed the Fairfield Canal between 1903 and 1909. In 1919, Merced County voters approved the creation of the Merced Irrigation District (MID), a publicly owned entity that purchased the Crocker-Huffman system in 1922. At some point in the mid to late 1920s, following its acquisition by MID, the function, alignment, and geometry of Fairfield Canal was fundamentally realigned. Sometime between 1922 and 1927, the MID built the Le Grand Canal. The two canals traverse through the campus site from northwest to southeast. Although the canals were developed to follow the contours of the land, nonetheless, the canals resulted in the interruption of the sheet flow of runoff that drained generally from northeast to southwest across the campus site. The construction of the canals resulted in the truncation of the headwaters of a creek that were located within the central portion of the current campus site. Additional alterations of the campus site related to agriculture included grading of unimproved roadways to provide access to grazing land and the construction of ponds for cattle watering, and in the southern portion of the campus site, the land was leveled and placed under irrigated pasture.

In the 1990s, the project site was altered by the construction of a golf course. The Merced Hills Golf Course was constructed on approximately 200 acres in the north-central portion of the campus site and opened to the public in 1995. The golf course included a clubhouse and other built facilities adjacent to what is now called Ranchers Road, and the 18-hole course occupied the lands to the south, and included one man-made lake (now called Little Lake) and a second pond (Lower Pond) to the southwest of the man-made lake. The golf course was closed in 2002, when the site was approved for the development of the campus.

The first phase of the campus (Phase 1) was developed beginning in 2002 on the northern 80 acres of the 200-acre Merced Hills Golf Course, in the area occupied by the clubhouse facilities (UC Merced 2001; County of Merced 2001). In 2011, upon receipt of applicable permits and approvals from the U.S. Army Corps of Engineers (USACE) and California Department of Fish and Wildlife (CDFW), in anticipation of further campus development, UC Merced implemented Phase 6 Site Development and Infrastructure Project (Phase 6 project) which resulted in the grading and filling of several wetlands throughout the campus site. The second major phase of campus construction (2020 Project) commenced in 2016 and is currently underway to the south of the first phase. As part of the 2020 Project, Little Lake has been modified and Lower Pond has been filled. The 2020 Project, when completed, will provide academic, housing, athletics, support, and other facilities.

Prior to the development of the UC Merced campus and the grading activities associated with the infrastructure and the 2020 Project, the central portion of the project site contained mima mound topography (hummocking) associated with the vernal pool complexes. Remnants of this topography are still present in the northeastern portion of the project site.

To compensate for losses of vernal pool plants (and invertebrates) that were considered unavoidable for the development of the UC Merced campus (including the 2020 Project) and the University Community North, the University committed to and proceeded with protecting nearly 24,000 acres of Tier 1 and Tier 2 Conservation lands that contain suitable habitat for the affected species, as described in the 2009 LRDP EIS/EIR. In 2012, UC Merced commenced the process of providing compensatory wetlands mitigation for the wetlands fill to date and, in 2016, was successful in completing two compensatory mitigation projects, reflecting an additional approximately 191 acres of conservation lands. **Table 4.2-2** below presents the properties that have been placed under conservation easements or for which conservation easements are currently in process or have been previously pursued by the University to address impacts to vernal pool plants, invertebrates, and wildlife species. **Figure 4.2-2, Project Site and Tier 1 Conservation Lands** presents the project site and Tier 1 Conservation Lands, and **Figure 4.2-3, Tier 2 Conservation Lands,** presents Tier 2 Conservation Lands.

Table 4.2-2
Conservation Lands (Units and Sizes)

Major Land Category	Land Unit	Size (Acres)[1]	Owner
Tier 1(a)[2]	Virginia Smith Trust (VST) Preserve	5,130	UC
	Campus Natural Reserve (CNR)	1,339	UC
	Myers Easterly	92	UCLC
Tier 1(b)[3]	Cyril Smith Trust	3,070	TNC
	Tier 1 Subtotal	*9,631*	
Tier 2	Carlson	305	Private
	Chance	7,619	Private
	Cunningham	1,761	Private
	Nelson	3,861	Private
	Robinson	3,595	Private
	Tier 2 Subtotal	*17,141*	
2016 Mitigation Properties	Yosemite Lake Conservation Area	75[4]	Private
	Merced County Preserve	166	Merced County
	2016 Mitigation Properties Subtotal	*241*	
Total: All Conservation Lands		**27,013**	

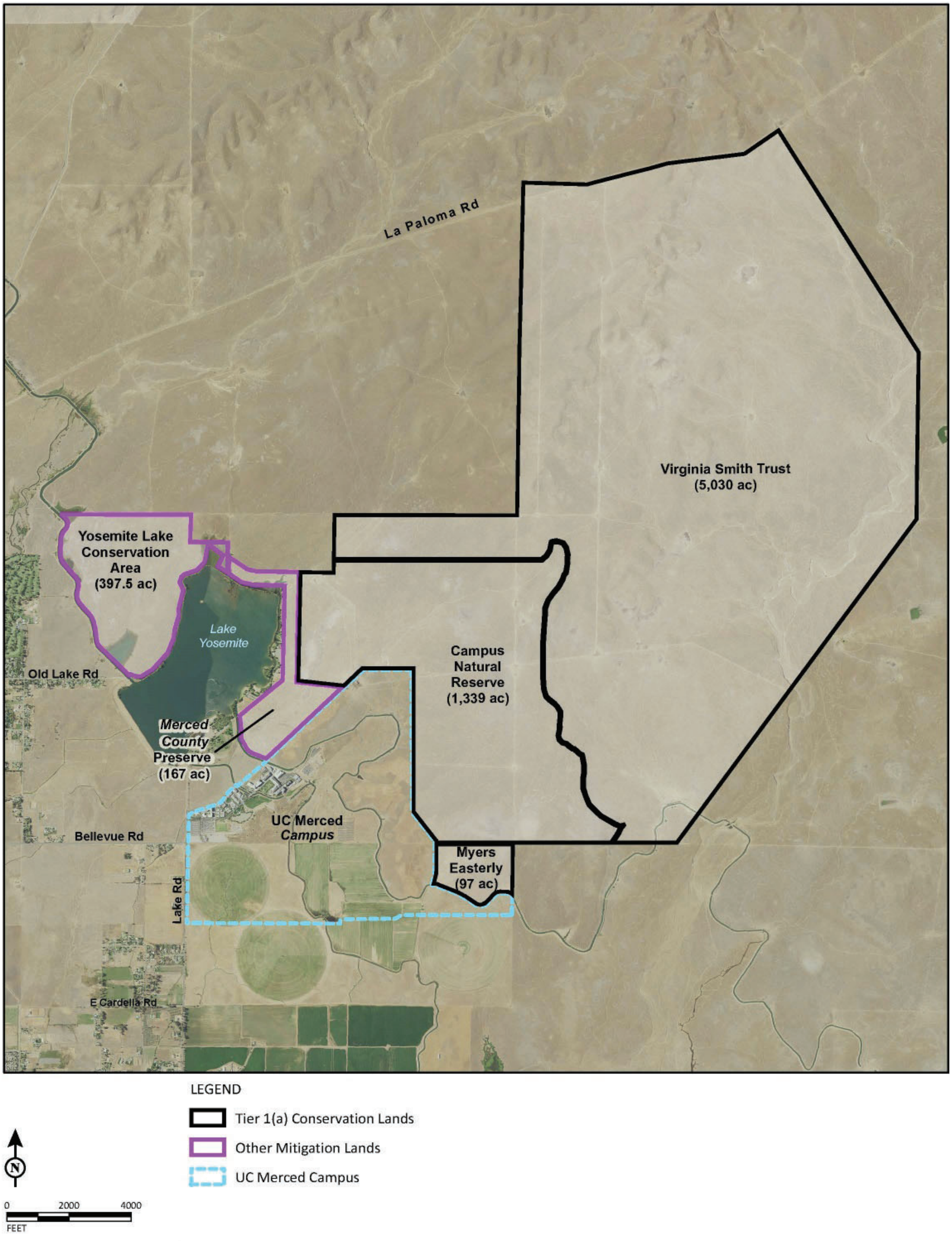
Source: University of California, Merced 2019

1 *Tier 1(a) Conservation Lands acreages updated slightly from acreages reported in the 2009 LRDP EIS/EIR.*

2 *Conservation easement establishment is in process for the Tier 1(a) Conservation Lands.*

3 *As reported in the 2009 LRDP EIS/EIR, UC Merced committed to placing the Tier 1(b) Conservation Lands/Cyril Smith Trust property under a conservation easement, and this property is included in UC Merced's Management Plan for Conservation Lands and the Adjacent Campus Buildout Lands for the University of California, Merced (Airola 2008b). However, the property was acquired in fee for conservation purposes and is currently owned by The Nature Conservancy (TNC) an environmental nonprofit organization which is holding the property for conservation purposes and cattle grazing. Therefore, while UC Merced has previously pursued the establishment of a conservation easement for the Tier 1(b) Lands, these lands are already being managed by TNC for conservation purposes which achieves the purposes of the UC Merced Management Plan. UC Merced is not currently involved in the management of this property.*

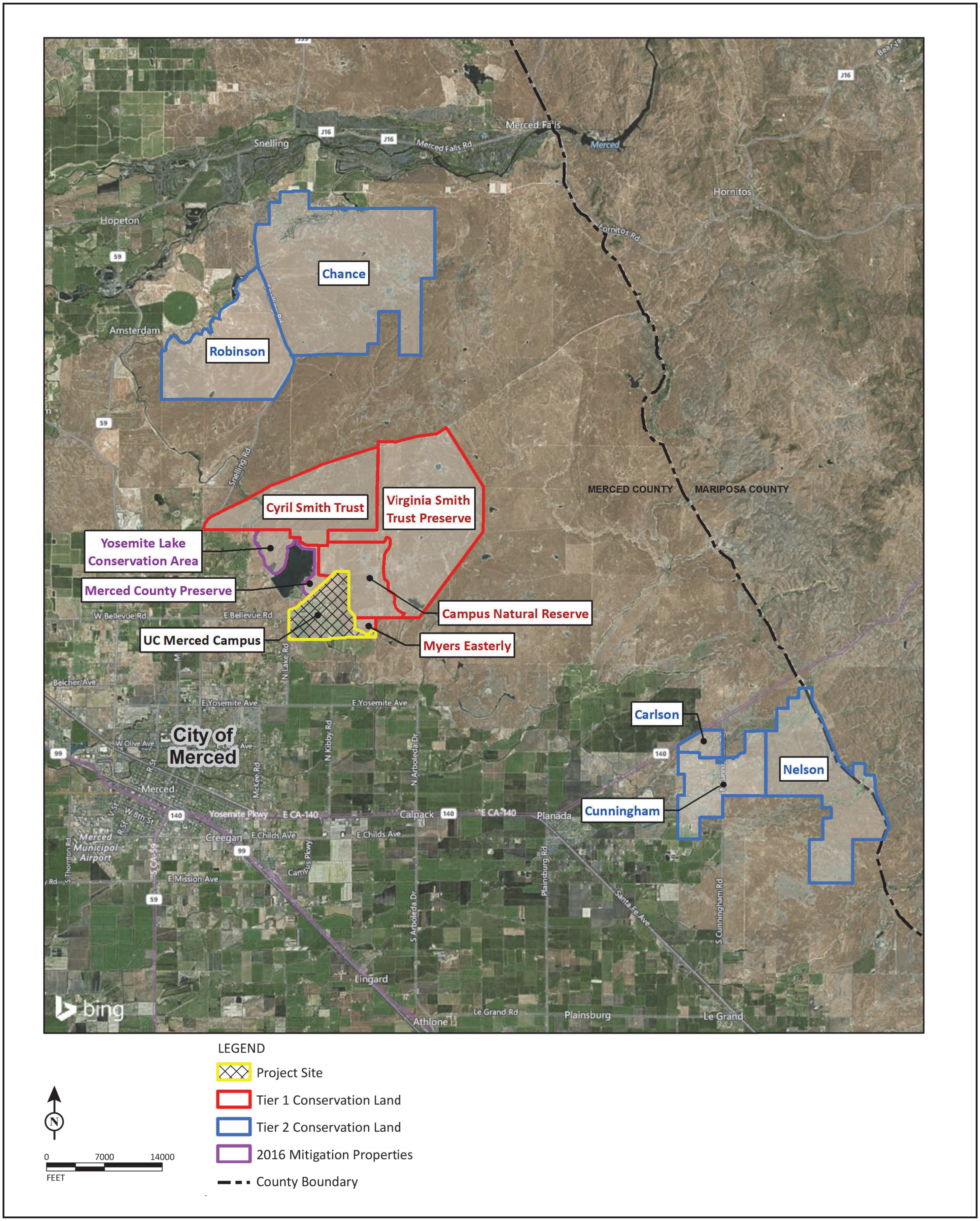
4 *Twenty-five acres of wetland re-establishment and 50 acres of upland habitat preservation on an approximately 392-acre site placed under a conservation easement.*



SOURCE: USDA NAIP Imagery, 2014

FIGURE **4.2-2**

Project Site and Tier 1 Conservation Lands



SOURCE: World Imagery Service, 2018

FIGURE **4.2-3**

Tier 2 Conservation Lands

Land Cover Types within the Project Site

The primary land cover types identified on the project site are California annual grasslands, agricultural lands (irrigated pasture), vernal pools, vernal swales, seasonal wetlands, man-made ponds, seasonal freshwater marsh, drainages, canals, and developed areas (See **Figure 4.2-4, Land Cover Types in the Campus Site,** and **Table 4.2-3** below).

Historically, the project site also contained two other land cover types. There was a small (0.33 acre) area of clay slope wetlands. However, that land cover type was filled in 2011, and is no longer present on the project site and is not discussed below. Similarly, riparian habitat was historically located along the edges of the Little Lake. However, nearly all of the riparian vegetation was removed during the construction of the 2020 Project. Because UC Merced is required to replace the riparian habitat that was removed, riparian habitat will be reestablished along the margins of Little Lake and that land cover type is discussed below.

Table 4.2-3
Cover Types in the Project Site[1]

Cover Type	Acres[2]
Annual Grassland	570.9
Irrigated Pasture	196.3
Vernal Pools	0.4
Vernal Swales	11.2
Seasonal Wetlands	2.1
Manmade Ponds	3.9
Seasonal Freshwater Marsh	9.3
Drainages	2.5
Developed Areas	229.3
Totals	**1,026[2]**

Source: University of California, Merced 2019

[1] *Cover type acreages do not include areas within canal easements because, with the exception of bridges associated with the campus circulation system, these areas will not be developed and are not within the bounds of the project.*

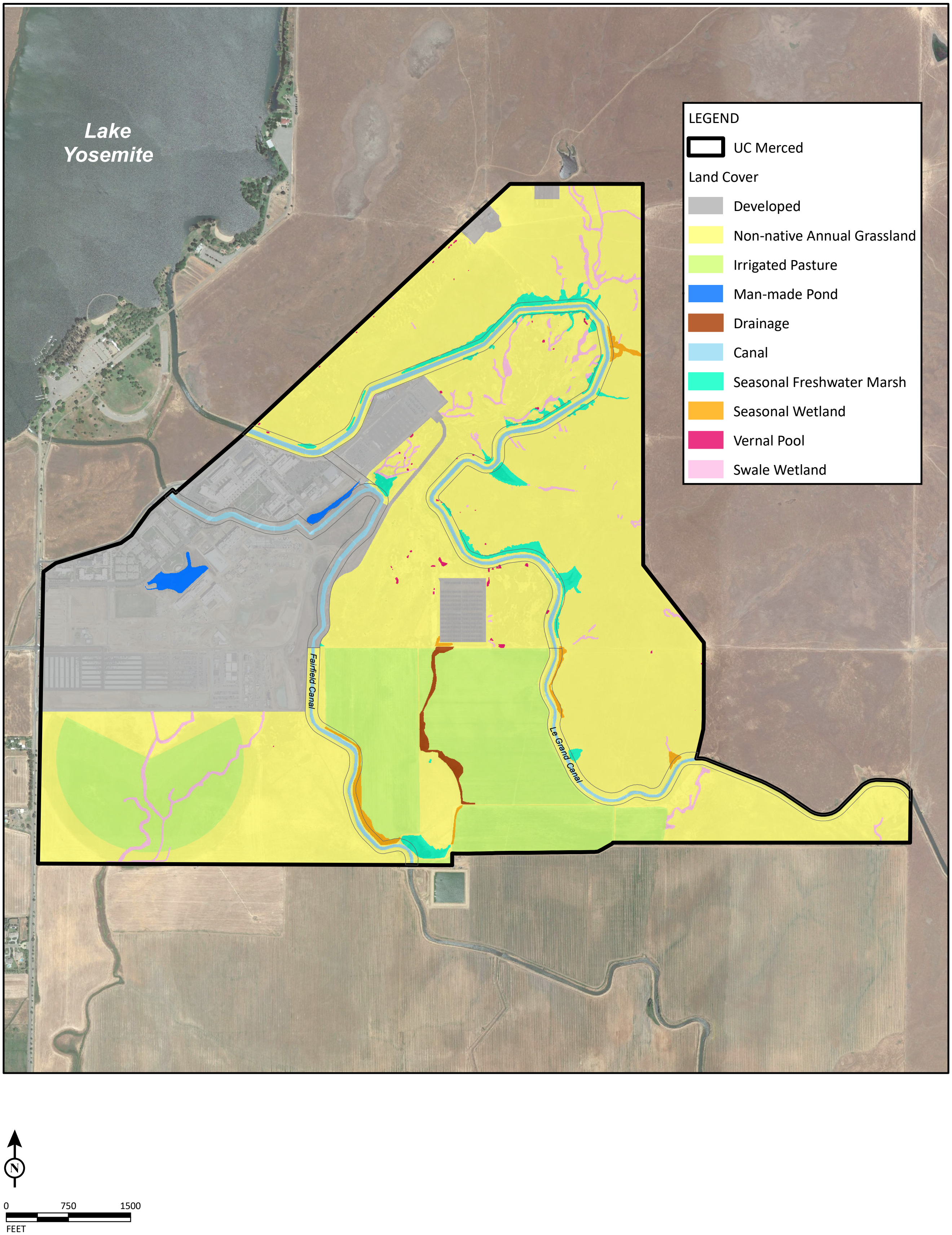
[2] *Total rounded to the nearest whole acre.*

California Annual Grassland

The dominant plant community within the project site is California annual grassland (Sawyer and Keeler-Wolf 1995). Although historically, annual grassland occurred throughout the project site, at the present time, approximately 571 acres in the northern, eastern and southern portions of the project site are under this community (see **Table 4.2-3, Cover Types in the Project Site,** and **Figure 4.2-4**).

California annual grassland, also known as non-native grassland (Holland 1986), is dominated by non-native annual grass species such as soft chess (*Bromus hordeaceus*), oats (*Avena fatua*, *A. barbata*), foxtail barley (*Hordeum murinum* ssp. *leporinum*), and rattail sixweeks grass (*Festuca myuros*), but it also contains a high diversity of native grasses and native and non-native forbs, such as filarees (*Erodium cicutarium*, *E. moschatum*, *E. botrys*), shining peppergrass (*Lepidium nitidum*), small-flowered fiddleneck (*Amsinckia menziesii*), mouseear chickweed (*Cerastium glomeratum*), dwarf brodiaea (*Brodiaea nana*), wild hyacinth (*Triteleia hyacinthina*), Ithuriel's spear (*T. laxa*), and yellow mariposa lily (*Calochortus luteus*). In addition, other species that appear later in the growing season (e.g., June and July) have a limited distribution in the project site, including narrow tarplant (*Holocarpha virgata*) and prickly lettuce (*Lactuca serriola*). In addition to non-native grass species, other invasive ruderal (i.e., weedy) species that are often found in annual grasslands occur on the project site. Such species, including yellow star thistle (*Centaurea solstitialis*) and black mustard (*Brassica nigra*), are most commonly located adjacent to the canals and along the edge of existing campus development.

Wildlife known to use annual grassland for all or part of their life cycle include numerous mammal and avian species. Small mammals including California vole (*Microtus californicus*), black-tailed jackrabbit (*Lepus californicus*), California ground squirrel (*Otospermophilus beecheyi*), deer mouse (*Peromyscus maniculatus*), Merced kangaroo rat (*Dipodomys heermanni dixoni*), and western harvest mouse (*Reithrodontomys megalotis*) provide foraging opportunities for mammalian predators, such as coyote (*Canis latrans*), bobcat (*Felis rufus*), and avian predators such as American kestrel (*Falco sparverius*), merlin (*F. columbarius*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*B. swainsoni*), burrowing owl (*Athene cunicularia*), barn owl (*Tyto alba*), short-eared owl (*Asio flammeus*), northern harrier (*Circus cyaneus*), white-tailed kite (*Elanus leucurus*), prairie falcon (*F. mexicanus*), and golden eagle (*Aquila chrysaetos*). Other avian species known to forage in annual grasslands include, mountain plover (*Charadrius montanus*), long-billed curlew (*Numenius americanus*), California horned lark (*Eremophila alpestrisis actia*), loggerhead shrike (*Lanius ludovicianus*), tricolored blackbird (*Agelaius tricolor*), and numerous other common raptors and other migratory birds. The annual grasslands also provide potential nesting habitat for burrowing owl, northern harrier, and California horned lark, and potential denning and dispersal habitat for San Joaquin kit fox (*Vulpes macrotis mutica*).



SOURCE: UC Merced, 2019

FIGURE **4.2-4**

Land Cover Types in the Campus Site

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Irrigated Pasture

Agricultural land within the project site includes flood-irrigated pastures and pivot-irrigated pastures which occupy approximately 196 acres in the southern portion of the project site (see **Table 4.2-3** and **Figure 4.2-4**). Flood-irrigated pastures are grassland areas irrigated during the spring and summer months. Flow of irrigation water in the pastures is controlled by a series of parallel levees or contour checks constructed approximately 12 to 14 inches high and approximately 6 to 10 feet apart, extending for the full length of each field. Vegetation in flood-irrigated pastures consists primarily of pasture grasses and other weedy species favored by summer irrigation. The characteristic species within the project site include sporadic to dense stands of Pacific rush (*Juncus effusus*), Italian rye grass (*Festuca perennis*), Bermuda grass (*Cynodon dactylon*), white clover (*Trifolium repens*), and annual blue grass (*Poa annua*). With the exception of the Pacific rush, all of the above species are common in pasture seed mixes and were likely seeded for pasture cultivation. The project site also contains pivot-irrigated pasture. Pivot-irrigated pastures receive less summer water than flood-irrigated pastures but function very similarly and have vegetation similar in composition to flood-irrigated pasture.

Irrigated pastures support many of the same wildlife species found in annual grassland habitats. Mammals known to occupy these habitats include California vole, black-tailed jackrabbit, California ground squirrel, deer mouse, and Botta's pocket gopher (*Thomomys bottae*). San Joaquin kit fox and coyote may also use these areas for foraging. Birds known to use these areas for foraging are similar to those known to forage in annual grasslands.

Vernal Pools

Historically, numerous vernal pool complexes occurred on the project site, embedded in the annual grasslands. Vernal pools are seasonally inundated wetland communities. Vernal pools occur in shallow depressions in areas that are underlain by an impermeable subsurface layer, such as hardpan, claypan, or bedrock. Vernal pools at the project site have been classified as northern hardpan vernal pools (Holland 1986; Sawyer and Keeler-Wolf 1995). These hardpans are so thick and dense that they do not allow water from winter rains to seep into the lower soil column. Instead, the water accumulates or "ponds," above the hardpan. Small hummocks or mounds frequently characterize the topography in these areas. Vernal pools develop in areas where depressions between the hummocks meet areas underlain with a hardpan. Vernal pools collect winter and spring rain and dry out completely in the summer and fall months. Subsequently, these vernal pools support unique vegetation and wildlife endemic only to vernal pools. As discussed above, in 2011 and 2016, in conjunction with the Phase 6 project and the 2020 Project, areas that contained vernal pools were graded and filled. As a result, at the present time, there is about 0.4 acre of vernal pools on the campus site (see **Table 4.2-3** and **Figure 4.2-4**).

The dominant plant species in the vernal pools in the project site include coyote thistle (*Eryngium* sp.), vernal pool goldfields (*Lasthenia fremontii*), bristled downingia (*Downingia bicornuta*), adobe popcornflower (*Plagiobothrys acanthocarpus*), stalked popcornflower (*P. stipitatus*), woolly marbles (*Psilocarphus brevissimus* var. *brevissimus*), white meadowfoam (*Limnanthes alba*), annual hairgrass (*Deschampsia danthonioides*), and Pacific foxtail (*Alopecurus saccatus*). The remnant vernal pools within the project site and on the adjacent Tier 1 Conservation Lands are also known to support several federal and State listed species, including succulent owl's clover (*Castilleja campestris* ssp. *succulenta*), Colusa grass (*Neostapfia colusana*), and San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*). Of these three, only succulent owl's clover has been observed within the project site.

Wildlife species found in vernal pools on the project site include vernal pool fairy shrimp (*Branchinecta lynchi*), midvalley fairy shrimp (*B. mesovallensis*), vernal pool tadpole shrimp (*Lepidurus packardi*), California linderiella (*Linderiella occidentalis*), and California tiger salamander (*Ambystoma californiense*). Other vernal pool species known to occur in the region include Conservancy fairy shrimp (*B. conservatio*), molestan blister beetle (*Lytta molesta*), and western spadefoot (*Spea hammondii*).

Within the project site, the plant species and some of the wildlife species (e.g., vernal pool invertebrates) described above are adapted to, and depend on, the cyclical inundation of water and complete desiccation of the soil that occurs in vernal pools. Most vernal pool-associated plant and wildlife species life cycles can only be completed by the progression of inundation and desiccation. Avian species that rely on vernal pools for resting and foraging during the winter and spring migration periods include mallard (*Anas platyrhynchos*), cinnamon teal (*Anas cyanoptera*), killdeer (*Charadrius vociferus*), and greater yellowlegs (*Tringa melanoleuca*).

Vernal Swales

Swales are narrow, linear seasonal wetlands found in low-lying areas, often at the base of hills where surface water collects and the underlying soil often remains saturated for extended periods during the rainy season. Swales can connect vernal pools into large complexes. Some vernal pool/swale complexes are so interrelated by hydrology that isolated features cannot be discerned. Swales are integral to the health and sustainability of vernal pools and seasonal wetlands. Swales provide important hydrology to the pool and wetland basins and also provide linkages between plant and invertebrate populations for genetic exchange. While many of the swale systems within the campus site have been graded as part of the Phase 6 project and the ongoing 2020 Project, there are approximately 11.2 acres of remnant swale features on the project site (see **Table 4.2-3** and **Figure 4.2-4**). The swales on the project site lack a well-defined channel and are sparsely vegetated or are dominated by mesic grassland species such as Italian rye grass. Swales are essential to the health of vernal pool ecosystems and provide habitat values similar to vernal pools.

Seasonal Wetlands

Numerous seasonal wetlands occur within the project site (see **Table 4.2-3** and **Figure 4.2-4**). The term seasonal wetland is used within the context of this SEIR to describe wetlands that fill naturally during the winter through direct precipitation and either natural or man-maintained overland flows and are dry during most of the year. Within the project site, this habitat occurs in areas where the natural hydrology of the landscape has been altered to create wetland features that did not naturally occur or in areas where the natural hydrology has been augmented with summer irrigation with a resultant change in the vegetation composition of the natural feature. Although their hydrology is similar to that of vernal pools, they do not support typical vernal pool vegetation diversity and abundance due to disturbance or due to their recent formation.

Seasonal wetlands appear along the Le Grand Canal and Fairfield Canal in several overflow areas where the surrounding topography prevents water from draining away from the canal. These areas, as well as some seasonal freshwater marsh areas (see discussion below) were previously delineated on site as canal wetlands. Seasonal wetlands also appear in areas where irrigation waters from pastures create summer flooding in former vernal pool systems. These areas were previously delineated on site as irrigation wetlands.

Seasonal wetlands within the project site provide similar habitat for wildlife as vernal pools and may occasionally support vernal pool fairy shrimp, midvalley fairy shrimp, California linderiella, and a variety of shorebird and waterfowl species

Manmade Ponds

There are about 4 acres of artificial ponds within the project site (see **Table 4.2-3** and **Figure 4.2-4**), including the Little Lake, a small settling pond located just north of the Fairfield Canal within the 2020 Project site, and one permanent storm water detention basin located within the developed portion of the campus (Northern Pond). The Little Lake was constructed as part of the Merced Hills Golf Course and was historically and is currently maintained by pumping groundwater from a well near the lake. The lake has been modified as part of the 2020 Project. While vegetation surrounding the Little Lake is currently limited, it generally includes Pacific rush and cattail (*Typha sp*.), as well as an interrupted band of willows along the northern boundary. Species known to occur within the Little Lake include bullfrog (*Lithobates catesbeianus*), Pacific chorus frog (*Pseudacris sierra*), great egret (*Ardea alba*), red-winged blackbird (*Agelaius phoeniceus*), mallard, and cinnamon teal. As a result of vegetation clearing and ongoing project activities, the Little Lake may provide marginal habitat for the western pond turtle (*Actinem*ys *marmorata*); furthermore, this species has been observed on the project site at the Northern Pond storm water detention basin. Several created stock ponds located within the adjacent Tier 1 Conservation Lands are maintained as livestock watering sources and provide known or potential breeding habitat for California tiger salamander, and support Colusa grass, and San Joaquin Valley Orcutt grass.

Seasonal Freshwater Marsh

Seasonal freshwater marshes (delineated on site as canal wetlands) are located adjacent to both the upgradient and the downgradient sides of both canals on the campus site (see **Table 4.2-3** and **Figure 4.2-4**). Seasonal water to these marshes is provided by precipitation and sheet flow, and perennial water is provided by canal leakage. The vegetation is dominated by Pacific rush, common spikerush (*Eleocharis macrostachya*), willow, cattail, and vernal pool buttercup (*Ranunculus bonariensis var. trisepalus*).

Marsh areas are valuable wildlife habitat and provide foraging, nesting, breeding, and resting grounds for many birds, small mammals, amphibians, and reptiles. Some typical species found in marshes include great blue heron (*Ardea herodias*), great egret, snowy egret (*Egretta thula*), mallard, cinnamon teal, red-winged blackbird, song sparrow (*Melospiza melodia*), marsh wren (*Cistothorus palustris*), Virginia opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), western pond turtle, valley garter snake (*Thamnophis sirtalis fitchi*), Pacific chorus frog-, and American bullfrog. In May 2018, tricolored blackbirds were observed nesting in a seasonal freshwater marsh on campus lands adjacent to Fairfield Canal just south of the North Bowl parking lot. Tricolored blackbird was listed as state threatened by CDFW on April 19, 2018.

Drainages

The southern portion of the project site contains one unnamed drainage that has an area of about 2.5 acres (see **Table 4.2-3** and **Figure 4.2-4**). The drainage is supplied with water from precipitation, sheet flow, and irrigation overflow.

The feature supports dense stands of Pacific rush. Drainages provide an important source of water to wildlife, including but not limited to Pacific chorus frog, gopher snake (*Pituophis catenifer catenifer*), striped skunk, raccoon, and cliff swallows (*Petrochelidon pyrrhonota*).

Riparian

As stated above, although there is little riparian area on the project site at this time, it is anticipated that some riparian habitat will be reestablished along the edges of Little Lake upon completion of the 2020 Project. It is also likely that over time, riparian habitat will establish along the sides of the canals and storm water detention basins.

Riparian communities typically contain a canopy tree layer, subcanopy tree layer, understory shrub layer, and dense ground cover. Vegetation comprising riparian communities often includes California sycamore (*Platanus racemosa*), Fremont cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*), willow (*Salix* spp.), and Himalayan blackberry (*Rubus armeniacus*). Blue elderberry (*Sambucus nigra* ssp. *caerulea*) can also often be found in these communities. Birds known to occur in riparian communities include Swainson's hawk, white-tailed kite, red-shouldered hawk (*B. lineatus*), Nuttall's woodpecker (*Picoides nuttallii*), western wood-pewee (*Contopus sordidulus*), tree swallow (*Tachycineta bicolor*), downy woodpecker (*Picoides pubescens*), Pacific-slope flycatcher (*Empidonax difficilis*), and house wren (*Troglodytes aedon*). Common amphibians and reptiles known to occur in riparian communities include Pacific chorus frog, American bullfrog, and valley garter snake.

Canals

Canals within the project site include Le Grand Canal and Fairfield Canal (see **Figure 4.2-4**). A third canal called the Yosemite Lateral occurs as an above ground canal adjacent to the western portion of the campus site. Although it previously traversed the campus site, it has been re-routed and does not pass through the campus. Though technically within the project site boundaries, Le Grand Canal and Fairfield Canal are located within 150-foot easements that, with the exception of bridges associated with the campus circulation system, will not be developed as part of the campus development under the 2020 LRDP. Therefore, though described here with regard to the project site setting, acreages for these canals are not included in **Table 4.2-3**. However, because fill of the seasonal wetlands located within these canal easements is included the UC Merced Section 404 permit, these wetlands are included in the acres of wetlands reported in this section. Further, the wetlands impact discussion below applies to these wetlands.

Within the project site, Le Grand Canal is bordered mainly by a portion of the existing campus, annual grassland, and irrigated pasture. Fairfield Canal is bordered by the existing campus, ongoing 2020 Project construction activities, annual grassland, and irrigated pasture. Both of the canals are also bordered by large areas of seasonal freshwater marsh (discussed above). These canals likely support various amphibians and reptiles, including Pacific tree frog, American bullfrog, western pond turtle, and valley garter snake.

Developed Areas

Developed areas within the project site occupy about 229 acres (see **Table 4.2-3** and **Figure 4.2-4**), and include the first phase of campus development; the 2020 Project, which is currently under construction; a barn and a corral located in the northeastern portion of the campus; a campus research site in the northern portion of the campus; and the campus photovoltaic array that occupies about 9.8 acres in the eastern portion of the campus.

Special-Status Species

Special-status species are plants and wildlife that are legally protected under the federal Endangered Species Act (FESA) and the California Endangered Species Act (CESA) or other regulations, and other plants and wildlife that are considered sufficiently rare to qualify for consideration under the California Environmental Quality Act (CEQA). The categories for special-status plants and animals are described below:

- Species that are listed, formally proposed, or designated as candidates for listing as threatened or endangered under the FESA;
- Species that are listed, or designated as candidates for listing, as rare, threatened, or endangered under CESA;
- Plant species given the California Rare Plant Ranking (CRPR) of 1A, 1B, 2, 3, and 4 as assigned by a collaborative group of over 300 botanists in government, academia, non-governmental organizations, and the private sector. This group is sanctioned by, and jointly managed by, the CDFW and the CNPS;
- Animal species designated as Species of Special Concern or Fully Protected by CDFW;
- Species that meet the definition of rare, threatened, or endangered under Section 15380 of the *State CEQA Guidelines*; or Species that are considered a taxa of special concern by local agencies.

Special-status plant and wildlife species that occur or have potential to occur in or near the project site are presented in **Table 4.2-4, Special-Status Plants Known to or with Potential to Occur on the Campus Site or its Vicinity,** and **Table 4.2-5, Wildlife Species Known to or with Potential to Occur on the Campus Site or its Vicinity.**

Table 4.2-4
Special-Status Plants Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ CRPR	Habitat Requirements	Potential to Occur
Agrostis hendersonii	Henderson's bentgrass	–/–/3.2	Moist places in grasslands and vernal pools (0 to 3,380 ft). Blooms April – July.	**Potential to Occur.** Grassland and vernal pool habitat is present within the project area. The nearest CNDDB occurrence of this species is from near Snelling Road just over 2 miles northwest of the project area.
Atriplex cordulata var. *cordulata*	Heartscale	–/–/1B.2	Chenopod scrub, valley and foothill alkali grassland, alkali meadows and seeps (0 to 900 ft). Blooms April – October.	**Not Expected to Occur.** Grassland habitat is present within the project area; however, the project site does not support alkaline soils. Furthermore, no CNDDB occurrences of this species are within 10 miles of the project area.
Atriplex depressa	Brittlescale	–/–/1B.2	Shadscale scrub, valley grassland, alkali sink, and playas (0 to 1,050 ft). Blooms April – October.	**Not Expected to Occur.** Grassland habitat is present within the project area; however, the project site does not support alkaline soils. Furthermore, no CNDDB occurrences of this species are within 10 miles of the project area.
Atriplex minuscula	Lesser saltscale	–/–/1B.1	Chenopod scrub, alkali playas, valley and foothill grassland (0 to 738 ft). Blooms April – October.	**Not Expected to Occur.** Grassland habitat is present within the project area; however, the project site does not support alkaline soils. Furthermore, no CNDDB occurrences of this species are within 10 miles of the project area.
Atriplex persistens	Vernal pool smallscale	–/–1B.2	Alkaline vernal pools (0 to 377 ft). Blooms June – October.	**Not Expected to Occur.** Vernal pool habitat is present within the project area; however, the project site does not support alkaline soils. Furthermore, the nearest CNDDB occurrence of this species is from near Merced Airport just over 7 miles southwest of the project area.
Atriplex subtilis	Subtle orache	–/–1B.2	Alkaline soils in valley and foothill grassland (0 to 328 ft). Blooms June – October.	**Not Expected to Occur**. Grassland habitat is present within the project area; however, the project site does not support alkaline soils. Furthermore, no CNDDB occurrences of this species are within 10 miles of the project area.
Calycadenia hooveri	Hoover's calycadenia	–/–1B.3	Rocky, barren areas in grasslands and foothills (200 to 1,300 ft). Blooms June – September.	**Potential to Occur.** Grassland habitat with rocky barren areas is present within the project area. The nearest CNDDB occurrence of this species is from near Burns Creek just over 7 miles east of the project area
Castilleja campestris var. succulenta	Succulent owl's clover	T/E/1B.2	Vernal pools (65 to 2,460 ft). Blooms April – June.	**Known to Occur.** Vernal pool habitat is present within the project area. There are multiple CNDDB occurrences of this species from the project area (EIP Associates surveys in 1999 and 2001), including a cluster of observations in the undeveloped northeastern most portion of the project area inside the large bend of Le Grand Canal. This species was not identified during focused surveys conducted by LSA in April and May 2016 in advance of grading for the campus expansion (2020 Project) (LSA 2016a).

Table 4.2-4
Special-Status Plants Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ CRPR	Habitat Requirements	Potential to Occur
Centromadia parryi ssp. rudis	Parry's rough tarplant	--/–/4.2	Grassland, edges of marshes and vernal pools, disturbed sites (0 to 1,640 ft). Blooms May – October.	**Not Expected to Occur.** Grassland, vernal pool, and disturbed habitats are present within the project area. However, no CNDDB occurrences of this species are within 10 miles of the project area.
Clarkia rostrata	Beaked clarkia	–/–/1B.3	Cismontane woodland, valley and foothill grassland (200 to 3,000 ft). Blooms April – May.	**Potential to Occur.** Grassland habitat is present within the project area. The nearest CNDDB occurrence of this species is from near Burns Creek just over 7 miles east of the project area.
Convolvulus simulans	Small-flowered morning-glory	–/–/4.2	Clay substrates, occasionally serpentine, annual grassland, coastal-sage scrub, chaparral (100 to 2,870 ft). Blooms March – July.	**Not Expected to Occur.** Grassland habitat is present within the project area. However, no CNDDB occurrences of this species are within 10 miles of the project area.
Delphinium hansenii ssp. ewanianum	Ewan's larkspur	–/–/4.2	Oak woodland and grassland (200 to 1,970 ft). Blooms March – May.	**Not Expected to Occur.** Grassland habitat is present within the project area. However, no CNDDB occurrences of this species are within 10 miles of the project area.
Delphinium recurvatum	Recurved larkspur	–/–/1B.2	Chenopod scrub, valley and foothill grassland, cismontane woodland (10 to 1,970 ft). Blooms March – June.	**Not Expected to Occur.** Grassland habitat is present within the project area. However, no CNDDB occurrences of this species are within 10 miles of the project area.
Downingia pusilla	Dwarf downingia	–/–/2.2	Valley and foothill grassland (mesic sites), vernal pools (0 to 1,600 ft). Blooms March – May.	**Known to Occur.** Vernal pool habitat is present within the project area. There is one CNDDB occurrence (EIP Associates surveys in 1999) of this species from the northernmost portion of the project area itself, north of the existing campus.
Eryngium racemosum	Delta button-celery	–/E/1B.1	Seasonally inundated floodplains with clay soils (10 to 100 ft). Blooms June – October.	**Not Expected to Occur.** Seasonal wetland and clay slope wetland habitat is present within the project area; however, the project area is located outside of the range for this species. Furthermore, there are no CNDDB occurrences of this species within 10 miles of the project area.
Eryngium spinosepalum	Spiny-sepaled button-celery	–/–/1B.2	Vernal pools, valley and foothill grassland (50 to 4,170 ft). Blooms April – July.	**Potential to Occur.** Grassland and vernal pool habitats are present within the project area. There are multiple CNDDB occurrences of this species within 1 mile east of the project area, southeast of UC Merced's Tier 1 conservation lands.

Table 4.2-4
Special-Status Plants Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ CRPR	Habitat Requirements	Potential to Occur
Gratiola heterosepala	Bogg's Lake hedge-hyssop	–/E/1B.2	Fresh marshes, lake margins, and vernal pools (0 to 7,900 ft). Blooms April – September.	**Potential to Occur.** Fresh marsh and vernal pool habitat is present within the project area. The nearest CNDDB occurrence of this species is from near Burns Creek just over 5 miles east of the project area.
Hesperevax caulescens	Hogwallow starfish	–/--/4.2	Vernal pools, flats, and steep slopes (sometimes serpentine) (0 to 1,640 ft). Blooms March – June.	**Potential to Occur.** Vernal pool habitat is present within the project area. Although there are no CNDDB occurrences of this species within 10 miles of the project area, this species was previously documented in the 2009 LRDP EIS/EIR as occurring in 0.33 acre of clay slope wetlands on the campus site.
Lagophylla dichotoma	Forked hare-leaf	–/--/1B.1	Cismontane woodland, valley and foothill grassland (sometimes clay) (620 to 1,100 ft). Blooms April – June.	**Not Expected to Occur.** Grassland habitat is present within the project area. However, the only CNDDB occurrence of this species is from over a century ago, and its exact location is unknown (listed only as Merced).
Navarretia myersii ssp. myersii	Pincushion navarretia	–/–/1B.1	Vernal pools on clay soils within non-native grassland (150 to 330 ft). Blooms April – May.	**Potential to Occur.** Vernal pool habitat is present within the project area. The nearest CNDDB occurrence of this species is from near Burns Creek just over 7 miles east of the project area.
Navarretia nigelliformis ssp. nigelliformis	Adobe navarretia	–/–/4.2	Vernal pools in clay depressions (30 to 3,280 ft). Blooms April – June.	**Not Expected to Occur.** Vernal pool habitat is present within the project area. However, there are no CNDDB occurrences of this species within 10 miles of the project area.
Navarretia nigelliformis ssp. radians	Shining navarretia	–/–/1B.2	Cismontane woodland, valley and foothill grassland, vernal pools (200 to 3,280 ft). Blooms April – July.	**Known to Occur.** Grassland and vernal pool habitat is present within the project area. There are multiple CNDDB occurrences (EIP Associates surveys in 1999) of this species from the project area, including a cluster of observations in the northernmost portion of the project area just north of the Le Grand Canal.
Neostapfia colusana	Colusa grass	T/E/1B.1	Large, deep vernal pools (0 to 410 ft). Blooms May – August.	**Potential to Occur.** Vernal pool habitat is present within the project area; however there are no large, deep pools within the project site that provide the typical habitat for this species. There are multiple occurrences within 1 mile east of the project area on UC Merced's Tier 1 conservation lands; one such occurrence overlaps the project area, but this species is not known from the project site.
Orcuttia inaequalis	San Joaquin Valley Orcutt grass	T/E/1B.1	Vernal pools (0 to 2,625 ft). Blooms April – September.	**Potential to Occur.** Vernal pool habitat is present within the project area; however, there are no large pools within the project site that provide the typical habitat for this species. The nearest CNDDB occurrence of this species is from within 1 mile east of the project area on UC Merced's Tier 1 conservation lands.

Table 4.2-4
Special-Status Plants Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ CRPR	Habitat Requirements	Potential to Occur
Orcuttia pilosa	Hairy Orcutt grass	E/E/1B.1	Vernal pools (0 to 650 ft). Blooms May – September.	**Not Expected to Occur.** Vernal pool habitat is present within the project area. However, there are only two CNDDB occurrences of this species within 10 miles of the project area. The nearest occurrence is from approximately 2 miles west of the project area. This occurrence is now extirpated because the site has been developed. The other CNDDB occurrence is located over 7 miles north of the project area and is also considered potentially extirpated.
Phacelia ciliata var. opaca	Merced phacelia	–/–/1B.2	Valley and foothill grassland in adobe or clay soils or alkaline flats (200 to 280 ft). Blooms February – May.	**Potential to Occur.** Grassland habitat and clay soils are present within the project area. One CNDDB occurrence (1929) of this species overlaps the project area, and there are two more modern records within 5 miles of the project area.
Pseudobahia bahiifolia	Hartweg's golden sunburst	E/E/1B.1	Cismontane woodland, valley and foothill grassland. Predominantly on the northern slopes of knolls, but also along shady creeks or near vernal pools (200 to 650 ft). Blooms March – May.	**Potential to Occur.** Grassland and vernal pool habitat is present within the project area. The nearest CNDDB occurrence of this species is from near Burns Creek within 8 miles northeast of the project area.
Puccinellia simplex	California alkali grass	–/–/1B.2	Meadows and seeps, chenopod scrub, valley and foothill grasslands, and vernal pools (0 to 3,000 ft) associated with alkaline soils. Blooms March – May.	**Not Expected to Occur.** Grassland and vernal pool habitat is present within the project area; however, the project site does not support alkaline soils. Furthermore, there are no CNDDB occurrences of this species within 10 miles of the project area.
Sagittaria sanfordii	Sanford's arrowhead	–/–/1B.2	Standing or slow-moving freshwater ponds, marshes, and ditches (0 to 1,985 ft). Blooms March – October.	**Potential to Occur.** Ponds, marshes, and ditches are present within the project area. The nearest CNDDB occurrence of this species is from within 2 miles southwest of the project area.
Sidalcea keckii	Keck's checkerbloom	E/–/1B.1	Grassy slopes on clay soils. Affinity to serpentine soils (250 to 2,130 ft). Blooms April – May.	**Potential to Occur.** Grassy slopes are present, and the project area is within the range for this species. The nearest CNDDB occurrence reflects an unconfirmed identification of this species from near the north shore of Yosemite Lake, approximately 1.5 miles north of the project area.

Table 4.2-4
Special-Status Plants Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ CRPR	Habitat Requirements	Potential to Occur
Tuctoria greenei	Greene's tuctoria	E/R/1B.1	Vernal pools in open grasslands (80 to 4,350 ft). Blooms May – July.	**Potential to Occur.** Vernal pool and grassland habitat is present within the project area. The nearest CNDDB occurrence of this species is from near Burns Creek just over 7 miles east of the project area.

Source: California Natural Diversity Database (CNDDB) 2018
**Status explanations:*
Federal:
– = No status
E = Listed as "endangered" under the federal Endangered Species Act.
T = Listed as "threatened" under the federal Endangered Species Act.
State:
– = No status
E = Listed as "endangered" under the California Endangered Species Act.
R = Listed as "rare" under the California Endangered Species Act.
California Rare Plant Rank:
1B = List 1B species: rare, threatened, or endangered in California and elsewhere.
2 = List 2 species: rare, threatened, or endangered in California, but more common elsewhere.
3 = List 3 species: plants about which we need more information.
4 = List 4 species: plants of limited distribution.
0.1 = Seriously endangered in California
0.2 = Fairly endangered in California
0.3 = Not very endangered in California

Table 4.2-5
Wildlife Species Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ Other	Habitat Requirements	Potential to Occur in the Project Area
Invertebrates				
Bombus crotchii	Crotch bumble bee	--/CE/--	Open grassland and scrub habitats. Primarily nests underground. Occurs primarily in California, from coastal California east to the Sierra-Cascade crest and south into Mexico.	**Potential to Occur.** There are no current (1999 – 2019) CNDDB occurrence records for this species within the San Joaquin Valley, and the only two records in Merced County (both located more than 10 miles from the project area) are associated with collections made in the 1950s. However, suitable nesting and foraging habitat for this species is present in the project area and the project site is located within the range for this species. Furthermore, the vernal pool-grassland complex in the project area, in particular associated with the adjacent Tier 1 conservation lands, provides a broad expanse of floral resources that may be utilized by this species.
Branchinecta conservatio	Conservancy fairy shrimp	E/--/IUCN-EN	Vernal pools and other seasonal wetland features in valley and foothill grassland communities. Inhabit astatic pools located in swales formed by old, braided alluvium; filled by winter/ spring rains, which last until June.	**Potential to Occur.** Not observed in vernal pools on site during protocol-level surveys. The nearest CNDDB occurrence of this species is from within 1 mile east of the project site on UC Merced's Tier 1 conservation lands.
Branchinecta lynchi	Vernal pool fairy shrimp	T/--/--	Vernal pools and other seasonal wetland features in valley and foothill grassland communities. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	**Known to Occur.** Species is known to occur in vernal pools throughout the project area.
Branchinecta mesovallensis	Midvalley fairy shrimp	--/SA/--	Vernal pools and other seasonal wetland features in valley and foothill grassland communities.	**Known to Occur.** Species is known to occur in vernal pools near the project area.
Lepidurus packardi	Vernal pool tadpole shrimp	E/--/--	Vernal pools and swales in the Sacramento Valley containing clear to highly turbid water.	**Known to Occur.** Species is known to occur in vernal pools within the project area.
Linderiella occidentalis	California linderiella	--/--/IUCN NT	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions.	**Known to Occur.** Species is known to occur in vernal pools within the project area.
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	T/--/--	Stream side habitats below 3,000 feet in California's Central Valley.	**Not Expected to Occur.** No elderberry shrubs occur in the project area.
Lytta molesta	Molestan blister beetle	--/SA/--	Vernal pools and other seasonal wetland features in California's Central Valley.	**Potential to Occur.** Not observed in vernal pools on site during surveys. The nearest CNDDB occurrence of this species is from near Snelling Road approximately 3 miles northwest of the project area.

Table 4.2-5
Wildlife Species Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ Other	Habitat Requirements	Potential to Occur in the Project Area
Fish				
Mylopharodon conocephalus	Hardhead	--/SSC/--	Clear, deep pools with sand-gravel-boulder bottoms and slow water velocity.	**Not Expected to Occur.** The aquatic habitat on the site is not appropriate for the species and there are no CNDDB occurrences within 10 miles of the project area.
Oncorhynchus mykiss irideus	Steelhead – Central Valley DPS	T/--/--	Sacramento and San Joaquin rivers and their tributaries.	**Not Expected to Occur.** There is no suitable habitat on the site is not appropriate for the species and there are no CNDDB occurrences within 10 miles of the project area.
Amphibians				
Ambystoma californiense	California tiger salamander	T/T/--	Require seasonal wetlands for breeding, and upland areas with small mammal burrows for estivation in dry season.	**Known to Occur.** Species is known to breed in the stock pond within the Phase 1.1 site and has been observed in vernal pools in the campus and Community North portions of the project area. Grasslands with burrows within 1.24 mile of breeding ponds are considered suitable upland habitat for the species.
Rana draytonii	California red-legged frog	T/SSC/--	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation.	**Not Expected to Occur.** There is no suitable aquatic breeding habitat on the site and there are no CNDDB occurrences within 10 miles of the project area.
Spea hammondii	Western spadefoot	--/SSC/--	Require vernal pools for breeding, primarily within grassland habitats, but can be found in valley-foothill hardwood woodlands.	**Potential to Occur.** The species has been documented in numerous locations throughout the project region but has not been documented in the project area (CNDDB 2018). Project site does not contain suitable breeding habitat for the species, but dispersing individuals could move through the project site.
Reptiles				
Gambelia silus	Blunt-nosed leopard lizard	E/E/--	Sparsely vegetated alkali and desert scrub habitats.	**Not Expected to Occur.** The project region is within blunt-nosed leopard lizard's range but contains no suitable habitat for the species. The species has not been documented in the project area (CNDDB 2018).
Phrynosoma blainvillii	Blainville's horned lizard	--/SSC/--	Grasslands, brushlands, woodlands, and open coniferous forest with sandy or loose soil; requires abundant ant colonies for foraging. Sacramento Valley, including foothills, south to southern California; Coast Ranges south of Sonoma County; below 4,000 feet in northern California	**Not Expected to Occur.** The project site is within the range for California horned lizard but the surrounding development and dense grasslands are not suitable habitat for the species. The species has not been documented in the project region (CNDDB 2018) or observed by biologists on or near the project site.

Table 4.2-5
Wildlife Species Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ Other	Habitat Requirements	Potential to Occur in the Project Area
Thamnophis gigas	Giant garter snake	T/T/--	Perennial, slow-moving waterways or marshes or rice fields with adjacent upland areas to avoid winter flooding. Found in the Central Valley from the vicinity of Burrel in Fresno County north to near Chico in Butte County.	**Not Expected to Occur.** There is one historical record from 1908 for this species in the project region but no recent occurrences (CNDDB 2018). There is very limited potential habitat on the project site and surrounding area.
Actinemys marmorata	Western pond turtle	--/SSC/--	Marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation. Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	**Known to Occur.** The species has been documented in numerous locations throughout the project region (CNDDB 2018), including stock ponds on the nearby Campus Reserve Lands. The canals and artificial ponds/storm water detention basins on the project site provide suitable habitat for the species. While extensive preconstruction surveys by biologists from 2016 through 2108 did not previously detect the species on the site, a western pond turtle was observed in April 2019 at the Northern Pond storm water detention basin within the project site.
Birds				
Agelaius tricolor	Tricolored blackbird	--/T/--	Breeds near fresh water, preferably in emergent vegetation with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, tall herbs. Feeds in grassland and cropland habitats.	**Known to Occur.** Fresh marsh and grassland habitat is present within the project area, and the species has been observed within the project area (in a small marsh adjacent to Fairfield Canal just south of the North Bowl parking lot).
Aquila chrysaetos	Golden eagle	--/FP/--	Nests on high cliffs in mountain canyons or sometimes on high man-made structures in high deserts and sage-juniper flats. Some descend to lower elevations in winter to forage in open grasslands.	**Potential to Occur.** This species has been documented foraging adjacent to the project site and likely forages on the site occasionally. (UC Merced 2001). The project site contains suitable foraging habitat but not nesting habitat for the species.
Asio flammeus	Short-eared owl	--/SSC/--	Freshwater and salt marshes, lowland meadows, and irrigated alfalfa fields; needs dense tules or tall grass for nesting and daytime roosts.	**Known to Occur**. This species has been documented foraging in the project site (UC Merced 2001 and 2014). Limited suitable nesting habitat occurs in the project site.
Athene cunicularia	Burrowing owl	--/SSC/--	Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	**Known to Occur.** This species has been documented to nest in the project site on the campus site (California Natural Diversity Database 2018, UC Merced 2014, Live Oak Associates 2012, LSA 2016b).

Table 4.2-5
Wildlife Species Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ Other	Habitat Requirements	Potential to Occur in the Project Area
Buteo swainsoni	Swainson's hawk	--/T/--	Nests in oaks or cottonwoods in or near riparian habitats. Forages in grasslands, irrigated pastures, and grain fields.	**Known to Occur.** The project site is within Swainson's hawk's breeding range and supports suitable foraging habitat for the species. This species is documented to nest in numerous locations throughout the project region (California Natural Diversity Database 2018). Project site contains suitable foraging and nesting habitat for the species.
Charadrius montanus	Mountain plover	--/SSC/--	Suitable wintering habitat for mountain plover includes open areas with short grasses, plowed fields, and scattered shrub or sagebrush. Species avoids areas with tall, dense vegetation.	**Known to Occur.** This species has been documented foraging in the project site (UC Merced 2001).
Circus cyaneus	Northern harrier	--/SSC/--	Grasslands, meadows, marshes, and seasonal and agricultural wetlands.	**Known to Occur.** This species has been documented nesting in the project site (UC Merced 2001) and foraging at the project site more recently (UC Merced 2014).
Elanus leucurus	White-tailed kite	--/FP/--	Low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands for foraging.	**Known to Occur.** White-tailed kites have been documented foraging in the project site (UC Merced 2014). Project site contains suitable foraging and nesting habitat for the species.
Haliaeetus leucocephalus	Bald eagle	--/E, FP/--	Nests in coniferous forests within 1 mile of a lake, reservoir, stream, or ocean. Forages over lakes, reservoirs, rivers, large creeks, and sometimes in the winter forages for carrion in open grassland habitats.	**Known to Occur.** This species has been documented foraging in the project area (UC Merced 2014). Project site contains limited suitable foraging but not nesting habitat for the species.
Lanius ludovicianus	Loggerhead shrike	--/SSC/--	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches.	**Known to Occur.** This species has been documented foraging in the project site and could nest in suitable habitat (UC Merced 2014).
Mammals				
Antrozous pallidus	Pallid bat	--/SSC/WBWG: High priority	Occurs in a variety of habitats from desert to coniferous forest. Most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California and oak woodland, grassland, and desert scrub in southern California. Relies heavily on trees for roosts.	**Potential to Occur.** This species has been documented just north of the project site (CNDDB 2018). Project site contains suitable foraging habitat.

Table 4.2-5
Wildlife Species Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ Other	Habitat Requirements	Potential to Occur in the Project Area
Dipodomys heermanni dixoni	Merced kangaroo rat	--/--/ G3G4T2T3 S2S3	Found in dry grassy plains with partly open gravelly ground on slopes with sparse chaparral. Breeding occurs from February through October, with peak activity in April.	**Potential to Occur.** This subspecies has been documented in numerous locations throughout the project region (CNDDB 2018) and was documented on an adjacent property to the northeast (VST property north of UC Merced Tier 1 conservation lands) during focused surveys (UC Merced 2001).
Eumops perotis californicus	Western mastiff bat	--/SSC/WBWG: High priority	Many open, semi-arid to arid habitats, including conifer & deciduous woodlands, coastal scrub, grasslands, chaparral, etc. Roosts in crevices in cliff faces, high buildings, trees and tunnels.	**Not Expected to Occur.** This species is only present where there are significant rock outcroppings or cliffs to provide roosts.
Lasiurus blossevillii	Western red bat	--/SSC/WBWG: High priority	Prefers habitat edges and mosaics with trees that are protected from above and open below with open areas for foraging.	**Potential to Occur.** This species has been documented near the project site (California Natural Diversity Database 2018). Project site contains suitable foraging habitat.
Lasiurus cinereus	Hoary bat	--/--/WBWG: Medium priority	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding.	**Potential to Occur.** This species has been documented near the project site (California Natural Diversity Database 2018). Project site contains suitable foraging habitat.
Myotis yumanensis	Yuma myotis	--/--/WBWG: Low-Medium priority	Optimal habitats are open forests and woodlands with sources of water over which to feed.	**Potential to Occur.** This species has been documented near the project site (California Natural Diversity Database 2018). Project site contains suitable foraging habitat.
Taxidea taxus	American badger	--/SSC/--	Badgers occur in a wide variety of open, arid habitats but are most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub; the principal habitat requirements for the species appear to be sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground.	**Potential to Occur.** The project site contains suitable denning and foraging habitat for this species. Species has not been documented in project region (California Natural Diversity Database 2018).

Table 4.2-5
Wildlife Species Known or with Potential to Occur on the Campus Site or Its Vicinity

Scientific Name	Common Name	Status* Federal/State/ Other	Habitat Requirements	Potential to Occur in the Project Area
Vulpes macrotis mutica	San Joaquin kit fox	E/T/--	Occurs in grasslands, scrublands, and oak woodlands in the San Joaquin Valley and adjacent foothills. Below 1,000 feet elevation.	**Potential to Occur.** The project site is within the range for this species, is identified as being within the linkages site for San Joaquin kit fox (SJKF) (USFWS 2007) and contains suitable denning and foraging habitat. This species was seen in 1999, documented approximately 2.5 miles east of the project site (California Natural Diversity Database 2018). Extensive subsequent surveys including camera traps have not detected the species near the project site (PES Environmental 2011; LSA 2015b; Padre Associates, Inc. 2016a; Padre Associates, Inc. 2016b).

Source: California Natural Diversity Database (CNDDB) 2018
**Status Explanations:*
Federal:
E = Listed as endangered under the Federal Endangered Species Act.
T = Listed as threatened under the Federal Endangered Species Act.
C = Species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded.
-- = No listing
State:
E = Listed as endangered under the California Endangered Species Act.
T = Listed as threatened under the California Endangered Species Act.
CE = Listed as Candidate Endangered under the California Endangered Species Act.
FP = Fully protected under the California Fish and Game Code.
SSC = species of special concern in California.
SA = CDFW Special Animal
-- = No listing
Other:
G3 = Vulnerable—At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
G4 = Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G3G4 = Rank is somewhere between G3 and G3.
T2T3: SUBSPECIES LEVEL Taxa which are subspecies or varieties receive a taxon rank (T-rank) attached to their G-rank. Where the G-rank reflects the condition of the entire species, the T-rank reflects the global situation of just the subspecies
S2 = Imperiled—Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the state.
S3 = Vulnerable—Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation from the state.
S2S3 = Rank is somewhere between S2 and S3.
-- = No listing.
Western Bat Working Group (WBWG) Available: http://www.wbwg.org/spp_matrix.html)
High priority = species are imperiled or at high risk of imperilment
Moderate priority = this designation indicates a level of concern that should warrant closer evaluation, more research, and conservation actions of both the species and possible threats. A lack of meaningful information is a major obstacle in adequately assessing these species' status and should be considered a threat
Low priority = While there may be localized concerns, the overall status of the species is believed to be secure.

Special-Status Plants

As summarized in **Table 4.2-4,** 31 special-status plant species were identified as having some potential to occur in the vicinity of the project site, based on a general review of species lists obtained from CNDDB (2018), CNPS (2018), and USFWS (2018), as well as previous studies, reports and plans for the project. Fourteen of these species are not known to occur in, or are thought to be extirpated from, the project region and/or suitable habitat for them is not present on the project site or the surrounding conservation lands; therefore, these species are not discussed further.

A total of 17 special-status plant species were identified as having potential to occur within the project site. Although potentially suitable habitat exists on the project site for the majority of these species, surveys conducted of the project site to date (including those conducted in advance of the 2009 LRDP EIS/EIR and for the 2020 Project; see **Table 4.2-4**) have not identified many of these species. However, five special-status plant species (succulent owl's clover, Colusa grass, San Joaquin Valley Orcutt grass, dwarf downingia [*Downingia pusilla*], and shining navarretia [*Navarretia nigelliformis* subsp. *radians*]) are known to occur within the project site and/or the adjacent Tier 1 Conservation Lands based on documented sightings. The following species descriptions summarize information for these five plant species.

Succulent Owl's Clover

Succulent owl's clover (aka fleshy owl's-clover) is a state endangered, federally threatened, and CRPR List 1B.2 species. Succulent owl's clover is endemic to vernal pool complexes along a 66-mile stretch of the eastern San Joaquin Valley and the adjacent foothills up to 2,500 feet. The species' range extends through northern Fresno, western Madera, southeastern San Joaquin, and Stanislaus Counties.

Succulent owl's clover is restricted to vernal pools. Beyond its restriction to vernal pools, the specific habitat requirements of succulent owl's clover are not known. It occurs in vernal pools with a wide range of area and depth, as well as on a variety of geologic formations and soils, although the specific microhabitat requirements have not been determined (EIP Associates 1999b; Dittes and Guardino 2002; California Natural Diversity Database 2018). A regional analysis based on the results of several surveys indicate that succulent owl's clover in eastern Merced County occurs primarily on Laguna, Riverbank, and North Merced Gravel geologic units. Commonly reported associates include Fremont's goldfields (*Lasthenia fremontii*), three-colored monkey-flower (*Mimulus tricolor*), vernal pool popcornflower (*Plagiobothrys stipitatus*), downingia (*Downingia* sp.), and coyote-thistle (*Eryngium* sp.) (EIP Associates 1999b; California Natural Diversity Database 2018).

Most of the known occurrences (62) of succulent owl's clover are located in the project region, and two occurrences are present within the project site (California Natural Diversity Database 2018). Ten occurrences are within the adjacent Tier 1 Conservation Lands. Additional surveys completed in advance of the 2009 LRDP EIR/EIS and subsequent to the 1999 and 2002 EIP Associates surveys further documented additional occurrences of the species in the study area (Jones & Stokes 2003; Vollmar Consulting 2008; Airola 2008a; LSA 2016d; UC Merced 2017c).

In 2016, in advance of grading activities associated with the 2020 Project, focused preconstruction surveys were conducted after visiting nearby reference populations during the normal blooming period for this species. The preconstruction surveys yielded negative findings (LSA 2016a). However, there are still some limited remaining vernal pools within the project area that coincide with previous documented occurrences, and UC Merced is currently monitoring extant populations of this species on the adjacent Tier 1(a) Conservation Lands.

Colusa Grass

Colusa grass is a state endangered, federally threatened, and CRPR List 1B.1 species. Colusa grass is endemic to the Sacramento and San Joaquin Valleys, where it grows in large or deep vernal pools at elevations of up to 410 feet (California Native Plant Society 2018; California Natural Diversity Database 2018). The species' historical distribution included Merced, Stanislaus, Solano, and Colusa Counties (California Natural Diversity Database 2018).

The species grows primarily in large pools retaining water until late spring (Crampton 1976; U.S. Fish and Wildlife Service 2002). These pools occur on a wide variety of soils. Within them, Colusa grass typically grows in monospecific patches; consequently, associated species may grow in very different microsites within a pool. San Joaquin Valley Orcutt grass, hairy Orcutt grass, Solano grass (*Tuctoria mucronata*), and Hoover's spurge (*Euphorbia hooveri*) occur in the same pools as Colusa grass at several sites (Stone et al. 1988; EIP 1999b; California Natural Diversity Database 2018). Given the rarity of all these species, this co-occurrence indicates similar habitat requirements at the scales of individual pools or pool complexes.

Colusa grass is known to occur at 32 locations within the project region but is not known to occur on the project site (California Natural Diversity Database 2018). However, UC Merced is currently monitoring extant populations of this species on the adjacent Tier 1(a) Conservation Lands, where there are 12 currently documented occurrences.

San Joaquin Valley Orcutt Grass

San Joaquin Valley Orcutt grass is a state endangered, federally threatened, and CRPR List 1B.1 species. San Joaquin Valley Orcutt grass is the only Orcutt grass restricted to the San Joaquin Valley. This grass was once relatively common in vernal pool complexes along the eastern margin of the valley in Stanislaus, Merced, Fresno, Madera, and Tulare Counties. The species grows at elevations of up to 2,625 feet (California Native Plant Society 2018).

The species grows primarily in large pools that retain water until late spring (Crampton 1976; Stone et al. 1988). Soils underlying these pools are typically acidic, varying in texture from clay to sandy loam (Stone et al. 1988). Interestingly, Colusa grass, hairy Orcutt grass, and Hoover's spurge occur at several of the same sites as San Joaquin Valley Orcutt grass (EIP 1999b; U.S. Fish and Wildlife Service 2002; California Natural Diversity Database 2018). Given the rarity of all of these species, this co-occurrence indicates similar habitat requirements at the scales of individual pools or pool complexes.

San Joaquin Valley Orcutt grass is known to occur at 24 locations in the project region but is not known to occur on the campus site (California Natural Diversity Database 2018). However, UC Merced is currently monitoring extant populations of this species on the adjacent Tier 1(a) Conservation Lands, where there are four currently documented occurrences.

Dwarf Downingia

Dwarf downingia is a CRPR List 2.2 species. It occurs in vernal pools in the interior North Coast Ranges, southern Sacramento Valley, and northern and central San Joaquin Valley.

The project site is within the geographic range of dwarf downingia and contains habitat that is potentially suitable for the species. The species has been documented at 13 locations within the project region (California Natural Diversity Database 2018). One occurrence has been documented at the northern undeveloped end of the project site as part of surveys conducted by EIP Associates in 1999. One additional CNDDB occurrence is also present within the adjacent Tier 1 Conservation Lands.

Shining Navarretia

Shining navarretia is a CRPR List 1B.2 species. It typically grows in clay flats in annual grasslands, although it also occurs in heavy clay soils on grassy slopes, vernal swales, and vernal pools (California Natural Diversity Database 2018).

The project site is within the geographic range of shining navarretia and contains habitat that is suitable for the species. The species has been documented at 37 occurrences within the project region (California Natural Diversity Database 2018). Portions of two occurrences of shining navarretia are located within the northernmost undeveloped portion of the project site, as documented by surveys conducted by EIP Associates in 1999. Ten occurrences are located within Tier 1 Conservation Lands within the study area.

Special-Status Wildlife

Specials-status wildlife species were identified as having the potential to occur in the project site based on a review of species lists obtained from CNDDB (2018 and 2019) and USFWS (2018); and previous studies, reports, and surveys of the project site and its vicinity.

As summarized in **Table 4.2-5**, 35 special-status wildlife species were identified as having potential to occur on or in the general vicinity of the project site. Upon further review, it was determined that eight (8) of these species are not expected to occur on the project site. Of the remaining 27 special-status wildlife species, 14 species are known to occur on the project site based on documented sightings and 13 species have the potential to occur on the project site based on the presence of suitable habitat. More detailed evaluation is provided below for the special-status species and/or species groups that are known from or may occur at the project site and could be affected by project implementation. Though Conservancy fairy shrimp has not been observed in the project site due to the lack of suitable habitat, this species is discussed further in this report due to its known occurrence within the adjacent Tier 1 Conservation Lands. With the exception of Conservancy fairy shrimp, all other special-status species that are not expected to occur are not discussed further in this section but are included in **Table 4.2-5**.

Invertebrates

<u>*Vernal Pool Fairy Shrimp*</u>

Vernal pool fairy shrimp is a federally listed threatened species. This species is the most widely distributed of the special-status vernal pool crustaceans occurring in the project region. The species is found from Shasta County in the north throughout the Central Valley and west to the central Coast Ranges, at elevations of 30 to 4,000 feet. Additional populations have been reported from the Agate Desert region of Oregon near Medford, and disjunct populations occur in San Luis Obispo, Santa Barbara, and Riverside Counties. However, most known locations are in the Sacramento and San Joaquin Valleys and along the eastern margin of the central Coast Ranges (Eng et al. 1990).

Vernal pool fairy shrimp inhabit vernal pools that form in depressions, usually in grassland habitats (Eng et al. 1990). Pools must remain inundated long enough for the species to complete its life cycle. Vernal pool fairy shrimp also occur in other wetlands that provide habitat similar to vernal pools, such as alkaline rain pools, ephemeral drainages, rock outcrop pools, ditches, stream oxbows, stock ponds, vernal swales, and some seasonal wetlands (Helm 1998). Occupied wetlands range in size from as small as several square feet to more than 10 acres. Vernal pool fairy shrimp and other fairy shrimp have been observed in artificial depressions and drainages where water ponds for a sufficient duration (Helm 1998). Examples of such areas include roadside ditches and ruts left behind by off-road vehicles or heavy equipment. Soil compaction from construction activity can sometimes create an artificial hardpan, or restrictive layer, which allows water to pond and form suitable habitat for vernal pool fairy shrimp.

Based on previous surveys conducted for the proposed project, there are two CNDDB occurrences within the project site associated with approximately 50 presumed extant point observations of this species and 10 occurrences of the species on Tier 1 Conservation Lands associated with approximately 920 point observations. Vernal pool fairy shrimp has been documented in vernal pools and swales throughout the project site and adjacent Tier 1 Conservation Lands (California Natural Diversity Database 2018; UC Merced 2001; LSA 2017a; and LSA 2017b).

Vernal Pool Tadpole Shrimp

Vernal pool tadpole shrimp is a federally listed endangered species. This species is a California Central Valley endemic species, with the majority of populations in the Sacramento Valley. This species has also been reported from the Sacramento River Delta east of San Francisco Bay and from scattered localities in the San Joaquin Valley from San Joaquin to Madera Counties (Rogers 2001).

Vernal pool tadpole shrimp occur in a wide variety of seasonal habitats including vernal pools, ponded clay flats, alkaline pools, ephemeral stock tanks, and roadside ditches (Helm 1998; Rogers 2001; California Natural Diversity Database 2018). Habitats where vernal pool tadpole shrimp have been observed range in size from small (<25 square feet), clear, vegetated vernal pools to highly turbid alkali scald pools to large (>100-acre) winter lakes (Helm 1998; Rogers 2001). These pools and other ephemeral wetlands must dry out and be inundated again for the vernal pool tadpole shrimp cysts to hatch. This species has not been reported in pools that contain high concentrations of sodium salts but may occur in pools with high concentrations of calcium salts (Helm 1998; Rogers 2001).

Vernal pool tadpole shrimp has been documented to occur in vernal pools and swales within the Community North portion of the project site reflected in the 2009 LRDP EIS/EIR (California Natural Diversity Database 2018). There are no recorded occurrences of vernal pool tadpole shrimp within the current project site. Four CNDDB occurrences of this species are located entirely or partially within the Tier 1(a) Conservation Lands.

Conservancy Fairy Shrimp

Conservancy fairy shrimp is a federally listed endangered species. The range of Conservancy fairy shrimp extends from the northern Sacramento Valley to the San Joaquin Valley, and includes Butte, Glenn, Tehama, Solano, and Yuba Counties in the Sacramento Valley and Stanislaus and Merced Counties in the San Joaquin Valley (California Natural Diversity Database 2018).

Conservancy fairy shrimp occur in alkaline pools and vernal lakes and pools (Helm 1998). Observations suggest this species is generally found in pools that are relatively large and turbid (King et al. 1996; Helm 1998; Eriksen and Belk 1999). These pools may exceed several acres in size. The species is known to occur in pools on the Anita, Pescadero, Riz, Solano, Edminster, San Joaquin, and Peters soil series.

Conservancy fairy shrimp occur with several other vernal pool crustaceans, including vernal pool fairy shrimp, California linderiella, and vernal pool tadpole shrimp (King et al. 1996; Helm 1998; Eriksen and Belk 1999). The species also occurs with several vernal pool plant species, including Colusa grass and the Orcutt grasses.

This species requires large, deep vernal pools that are not present within the project site. This species was not observed in vernal pools within the project site during protocol-level surveys (see **Table 4.2-1** for summary of these surveys). This species is discussed further in this document due to its known occurrence within Tier 1 Conservation Lands, specifically the CNR lands. There is one known occurrence of Conservancy fairy shrimp within the Tier 1(a) Conservation Lands associated with an approximately 1.6-acre playa pool.

Midvalley Fairy Shrimp

While it has no state or federal listing status, midvalley fairy shrimp is included on CDFW's Special Animal List; it is also a target species on the Tier 1 Conservation Lands (Airola 2008a). Midvalley fairy shrimp is endemic to California's Central Valley, occurring from Sacramento to Fresno Counties (Belk and Fugate 2000). In the project region, the vast majority of midvalley fairy shrimp occurrences have been recorded on the Riverbank Formation; a significant number have been recorded on North Merced Gravels (UC Merced 2009).

Midvalley fairy shrimp differ from vernal pool tadpole shrimp and, to a lesser degree, vernal pool fairy shrimp in that they are generally associated with smaller and more ephemeral pools than these other species (Helm 1998). Midvalley fairy shrimp can also occur in roadside ditches adjacent to occupied habitat (Belk and Fugate 2000).

Midvalley fairy shrimp has been documented in vernal pools and swales within the project site. There is one presumed extant CNDDB occurrence associated with nine point observations of this species remaining within the project site.

USFWS proposed to list this species, but then declined to list it because it was determined to be "well represented on protected lands and in areas with little or no current threat" (USFWS 2004). The 2002 BO for the UC Merced project (which was issued prior to the decision to decline the listing of the species) identified the need to provide protection for midvalley fairy shrimp due to its potential to be listed. Although the BO requirements no longer apply to this species (because it was not listed), the 2009 LRDP EIS/EIR determined that 24 acres of vernal pools occupied by this species would be removed by the Proposed Action and 325 acres of occupied midvalley fairy shrimp habitat was identified on Tier 1 Conservation Lands; as such, this species would therefore be protected (at a mitigation ratio of 12:1) as part of the project regardless of its listing status.

While midvalley fairy shrimp is not currently protected under the federal or state ESAs, it is considered a "species at risk" by CDFW. Consistent with the 2009 LRDP EIS/EIR, this species is not evaluated further, but it should be noted that as a result of the preservation and management of suitable habitat on the Conservation Lands, impacts to this species would not be considered significant under CEQA.

Crotch Bumble Bee

On June 12, 2019, the California Fish and Game Commission (Commission) voted to accept a petition from the Xerces Society (2018) to consider listing four subspecies of bumble bee, including the Crotch bumble bee (*Bombus crotchii*), under CESA. As a result of this decision, the Crotch bumble bee is a state candidate endangered species; as such, it is temporarily afforded the same protection as state-listed threatened or endangered species. The range of Crotch bumble bee historically extended throughout the southern two-thirds of California, from coastal California east to the Sierra-Cascade crest and south into Mexico, but recent data indicates that this species is absent from the center of its historical range due to extensive agricultural intensification and urbanization (Xerces Society 2018). There are no current (1999 – 2019) CNDDB records for this species within the San Joaquin Valley (California Natural Diversity Database 2019).

In California, Crotch bumble bees inhabit open grassland and scrub habitats. Suitable bee habitat is based on the availability of flowers on which to forage throughout the duration of the colony (spring through fall), colony nest sites, and overwintering sites for the queens (Xerces Society 2018). Bumble bees are generalist foragers (i.e., they do not depend on any one flower type). Documented food plants for Crotch bumble bees include *Asclepias* sp., *Chaenactis* sp., *Lupinus* sp., *Medicago* sp., *Phacelia* sp., and *Salvia* sp. (Williams et al. 2014). Crotch bumble bees, like most bumble bee species, nest underground (e.g., in abandoned rodent holes) (Xerces Society 2009). Very little is known about the hibernacula utilized by Crotch bumble bee queens in the winter (Xerces Society 2018). However, bumble bees generally overwinter in soft disturbed soil, leaf litter, or abandoned small mammal burrows (Williams et al. 2014; Xerces Society 2018). The flight period for Crotch bumble bee queens is from late February to late October, peaking in early April and again in July. The flight period for workers and males extends between late March and September (Xerces Society 2018).

There are no documented observations of Crotch bumble bee within the project site or the adjacent Tier 1(a) conservation lands, although no focused surveys have been conducted. CNDDB reports two occurrences of this species in Merced County, located over 10 miles to the northeast and over 25 miles to the southwest of the project area, but both are associated with collections made in the 1950s (California Natural Diversity Database 2019). However, annual grassland areas, in particular those areas with fossorial (burrowing) mammal activity, provide potential nest sites for this species within the project area. Furthermore, the remnant vernal pool-grassland complex within the Passive Open Space (POS) and the Research Open Space (ROS) areas of the campus, as well as the broad expanse of this habitat within the adjacent Tier 1 conservation lands, could potentially provide floral resources/foraging habitat for Crotch bumble bee.

Amphibians

<u>*California Tiger Salamander*</u>

California tiger salamander (CTS) is federally and state-listed as threatened. CTS is endemic to the San Joaquin–Sacramento River Valleys, bordering foothills, and coastal valleys of central California (Barry and Shaffer 1994). The species occurs from Sonoma County and the Colusa-Yolo County line south to Santa Barbara County in the Coast Ranges, and from southern Sacramento County south to Tulare County in the Central Valley (Jennings and Hayes 1994).

CTS is a lowland species restricted to grasslands and low foothill regions where suitable breeding habitat (vernal pools, ephemeral pools, or human-made ponds with a minimum inundation period of 3 to 4 months) occurs. Permanent aquatic sites are unlikely to be used for breeding unless they lack predatory fish or periodically dry out (Jennings and Hayes 1994). Though CTS develop in these aquatic sites, they spend most of their lives in underground retreats, typically burrows of small mammals, in upland areas usually within 1 mile of breeding sites (Shaffer et al. 2004; Trenham et al. 2001).

Although no CTS breeding locations are present on the project site, the species is known to breed in ponds and vernal pools off-site to the south and within the Tier 1 Conservation Lands to the east. Due to the proximity of the known breeding locations, the entire campus site (1,026 acres) is considered to be occupied by CTS. Approximately 180 acres of USFWS-designated critical habitat for this species is located on the project site. To compensate for the loss of CTS occupied habitat on the campus site (as well as the previously proposed Community North site), the University committed to and proceeded with protecting the Tier 1(a) and Tier 2 Conservation lands, as described in the 2009 LRDP EIS/EIR. In 2016, conservation easements were established on the Yosemite Lake Conservation Area (YLCA) property and at the Merced County Preserve. Excluding the Tier 1(b) Conservation Lands, which are currently owned and being managed by

The Nature Conservancy (TNC), the University has preserved approximately 17,800 acres of occupied habitat (9:1 mitigation ratio) and approximately 9,850 acres of critical habitat (43:1 mitigation ratio).

To date one occurrence of CTS has been recorded on the campus site. On September 12, 2018, one adult CTS was found within the 2020 Project site in a burrow that was being excavated in advance of construction. The animal was safely relocated in the adjacent Tier 1(a) Conservation Lands in compliance with a CTS relocation plan previously approved by CDFW and USFWS.

Studies in eastern Merced County found potential hybrid alleles of the introduced barred tiger salamander (*Ambystoma tigrinum mavortium*) and CTS in vernal pools (Fitzpatrick and Schaffer 2007). This finding may affect the management of occupied CTS habitats in the project region. This research suggests that permanent ponds have a higher representation of barred tiger salamander genes, while intermittent ponds support more genetically pure CTS. Therefore, pond management may be available as a technique to reduce hybridization. UC Merced has sampled known and potential breeding habitat on the adjacent Tier 1(a) Conservation Lands from 2016 through 2018 to document where CTS breeding occurs. In 2017, genetic samples from CTS were collected and sent them to the Shaffer Lab at UC Los Angeles for further analysis of potential hybridization.

Reptiles

Western Pond Turtle

The western pond turtle is a state species of special concern. Western pond turtle is a thoroughly aquatic turtle of water bodies such as ponds, marshes, rivers, streams, and irrigation ditches with rock or mud substrates that support aquatic vegetation (e.g., watercress, cattails, water lilies). Western pond turtles are often seen basking on logs, emergent vegetation, and mud banks (Stebbins 2003). They move to upland areas up to 0.25 mile from watercourses to deposit eggs and overwinter (Jennings and Hayes 1994). Their diet consists of aquatic plants, insects, worms, fish, amphibian eggs and larvae, crayfish, aquatic invertebrates, and carrion (Stebbins 2003).

The project site is within western pond turtle's range, and ponds and canals in the project site provide suitable habitat for this species. On October 17, 2016, a qualified biologist conducted a survey for western pond turtles in Little Lake and none were detected (Sequoia Ecological Consulting 2016a). Additional preconstruction surveys conducted by qualified biologists as required by the Final Construction Mitigation Plan for Biological Resources for the University of California, Merced Project (ICF Jones & Stokes 2009) through 2018 did not detect the species on the project site. However, in April 2019, a western pond turtle was observed at Northern Pond, a permanent storm water detention basin on the project site, during monitoring activities associated with the 2020 Project (UC Merced 2019b).

<u>*Birds*</u>

The project site contains suitable nesting and foraging habitat for numerous special-status raptors and other migratory birds. Special-status bird species known to forage in the project site and vicinity include white-tailed kite, northern harrier, bald eagle (*Haliaeetus leucocephalus*), golden eagle, Swainson's hawk, mountain plover, short-eared owl, burrowing owl, loggerhead shrike, and tricolored blackbird. Of these species, only Swainson's hawk, northern harrier, tricolored blackbird, and burrowing owl have been documented to nest on or near the project site based on CNDDB occurrences and input from UC Merced staff and biologists monitoring ongoing 2020 Project activities. The project site also contains some suitable nesting habitat for white-tailed kite, short-eared owl, and loggerhead shrike, and numerous non-special-status bird species, so there is potential for these species to nest on the site.

<u>*Swainson's Hawk*</u>

Swainson's hawk is a state-listed threatened species. Most Swainson's hawks migrate annually from wintering areas as far as South America to breeding locations in northwestern Canada, the western United States, and Mexico. In California, the breeding distribution includes the Central Valley, the Klamath Basin, the northeastern plateau, Lassen County, and the Mojave Desert (Zeiner et al. 1990a), and the California population winters in Mexico.

Swainson's hawk nests in the Central Valley in large trees in riparian corridors, oak savannah, and juniper-sage flats in open tree stands (Zeiner et al. 1990a). This species is also typically found nesting adjacent to agricultural fields. Swainson's hawks breed from late March to late August, with peak activity from late May through July. In the Central Valley, Swainson's hawks often forage in large, open agricultural habitats, including alfalfa and hay fields (California Department of Fish and Game 1994). Their diet consists of small mammals, invertebrates, amphibians, reptiles, birds and, less frequently, fish (Zeiner et al. 1990a).

The project site is within Swainson's hawk's breeding range and provides suitable foraging habitat and limited nesting habitat for the species. Several nest sites are reported to occur within 5 to 10 miles of the project site (California Natural Diversity Database 2018) and UC Merced staff have reported Swainson's hawk's nesting within the project site (UC Merced 2019a). Swainson's hawk has been observed foraging just south of the campus site and likely forages in grasslands and agricultural lands throughout the project site (UC Merced 2001).

Northern Harrier

Northern harrier is a state species of special concern. The breeding range includes most of the Central Valley, the Sacramento– San Joaquin Delta, the Suisun Marsh, and portions of San Francisco Bay (Zeiner et al. 1990a).

Tall grasses and forbs in wetlands and field borders provide cover for northern harriers. Northern harrier nests on the ground in thick grass, shrubbery, or other vegetation, often near marshes. Their nests typically consist of a pile of sticks and grass. The breeding season for this species is between April and September, with peak activity in June and July. Northern harriers feed on voles and other small mammals, birds, small reptiles, crustaceans, and insects (Zeiner et al. 1990a).

The project site is within northern harriers' breeding and wintering range and provides suitable nesting and foraging habitat for the species. This species has been documented nesting within the campus site (UC Merced 2001; County of Merced 2001).

Tricolored Blackbird

Tricolored blackbird is a state listed threatened species. Tricolored blackbird breeding colonies have been observed in all Central Valley counties (California Natural Diversity Database 2018). The vast majority of the population occurs in central California, with additional populations in coastal and inland southern California locations, as well as scattered sites in Oregon, western Nevada, and western coastal Baja California (Beedy and Hamilton 1997).

There are three basic criteria for selecting nest colony sites: open accessible water; a protected nesting substrate, characterized either by flooded areas or by thorny or spiny vegetation; and a suitable foraging space providing adequate insect prey within a few miles of the nesting colony. Nesting substrates used by tricolored blackbirds include freshwater marsh dominated by tules and cattails, willows, blackberries, thistles, and nettles (Beedy and Hamilton 1997).

The project site is within tricolored blackbird's winter and summer range and contains suitable nesting habitat along marshes on the project site and foraging habitat in grasslands and agricultural lands throughout the project site. The CNDDB lists eight extant occurrences for this species within the project region (California Natural Diversity Database 2018). A large flock of approximately 3,000 tricolored blackbirds was documented foraging in the Phase 1 campus site by a Jones & Stokes avian ecologist during environmental compliance monitoring on March 25, 2003. A focused tricolored blackbird nesting survey conducted on April 3, 2003 did not detect nesting. However, in May 2018, multiple tricolored blackbirds were observed in a marsh adjacent to Fairfield Canal about 300 feet south of the North Bowl parking lot during bird surveys being conducted by a qualified biologist.

Burrowing Owl

Burrowing owl is a state species of special concern. Burrowing owls are found throughout much of California in annual and perennial grassland, desert, and arid scrubland (California Department of Fish and Game 1995).

Burrowing owls primarily rely on burrows excavated by ground squirrels. Where the number and availability of natural burrows is limited (for example, where burrows have been destroyed or ground squirrels eradicated), burrowing owls may occupy drainage culverts, cavities under piles of rubble, discarded pipe, and other tunnel-like structures. The breeding season is March through August, peaking in April and May (Zeiner et al. 1990a).

The project site is within burrowing owl's breeding and wintering range and supports suitable breeding and foraging habitat for the species. This species has been documented throughout the project region and is known to nest on the campus site based on CNDDB occurrences and input from UC Merced staff and biologists monitoring ongoing 2020 Project activities (Live Oak Associates 2012; LSA 2016b; Sequoia Ecological Consulting 2016b).

Other Special-Status Species

Other special-status bird species that have potential to nest on or near the project site include white-tailed kite, short-eared owl, loggerhead shrike, and mountain plover.

Non-Special-Status Nesting Raptors and Other Migratory Birds

Non-special-status nesting raptors and other migratory birds are protected under the Migratory Bird Treaty Act (MBTA) (50 CFR 10 and 21) and California Fish and Game Code Sections 3503 and 3503.5. Numerous non-special-status raptors and other migratory birds, including but not limited to, red-tailed hawk, red-shouldered hawk, American kestrel, and red-winged blackbird, could breed on the project site on the basis of the presence of suitable nesting habitat. A variety of other migratory birds may nest in grasslands, shrubs, trees, buildings, and on the ground on or near the project site, including killdeer and mourning doves (*Zenaida macroura*).

Mammals

<u>San Joaquin Kit Fox</u>

The current known range of San Joaquin kit fox extends from central Contra Costa County south through Kern County and to the northeastern edge of Santa Barbara County. Three distinct core areas support the largest known extant populations: the Carrizo Plain Natural Area in San Luis Obispo County, natural lands in western Kern County, and the Ciervo-Panoche Natural Area of western Fresno and eastern San Benito Counties. Other areas that either support San Joaquin kit fox populations or have the potential to support them include the Salinas-Pajaro River watersheds (San Benito and Monterey Counties); Camp Roberts and Fort Hunter Liggett in Monterey County; western Madera County; western, central, and eastern Merced County; eastern Stanislaus County; northern Kings County; western Tulare County; and around the Bakersfield metropolitan area in Kern County (U.S. Fish and Wildlife Service 1998).

In the central portion of the range, San Joaquin kit fox is associated with the following natural vegetation communities: valley sink scrub, interior coast range saltbush scrub, upper Sonoran subshrub scrub, annual grassland, and the remaining native grasslands. Kit foxes in the central region also use grazed non-irrigated grasslands, tilled or fallow fields, irrigated row crops, orchards, and vineyards because of the predominance of these cover types in the region (U.S. Fish and Wildlife Service 1998).

Kit foxes prefer loose-textured and deeper soils but have been found on a wide range of soil types. Kit foxes may construct their own dens, but where soils make digging difficult, foxes frequently use and modify burrows built by other animals, particularly those of California ground squirrels. Structures such as culverts, abandoned pipelines, and well casings may also be used as den sites. The breeding season begins during September and October when adult females begin to clean and enlarge natal or pupping dens. Mating and conception occur between late December and March. Gestation is 48–52 days, and litters of two to six pups are born sometime between late February and late March (U.S. Fish and Wildlife Service 1998).

A review of the distribution of San Joaquin kit fox in the project vicinity revealed a total of four CNDDB records within a 10-mile radius of the project site. Three of these occurrences are for foraging individuals, and only one of these records involved juveniles; this observation of two juveniles and a single adult, reported from Atwater in the early 1980s, is the only evidence of reproduction within 10 miles of the project site. The closest recorded occurrence for this species is a 1999 observation of a foraging adult located 1.45 miles north of the intersection of Yosemite Avenue and Arboleda Drive along Black Rascal Creek (California Native Diversity Database 2018).

As reflected in **Table 4.2-1**, San Joaquin kit fox preconstruction surveys were conducted in anticipation of the North Bowl parking lot construction in 2011, with negative findings. UC Merced has also conducted annual camera trapping within the Tier 1(a) Conservation Lands between 2014 and 2017 in an attempt to detect the presence of San Joaquin kit fox. In 2016, Padre Associates, Inc. conducted focused surveys for San Joaquin kit fox in the planned development areas of the campus. Despite this extensive effort over a continual 4-year period, no San Joaquin kit foxes have been observed on or in the vicinity of the project site.

Critical Habitat

Critical habitat is a term defined and used in the FESA as a specific geographic area(s) that contain features essential for the conservation of a federally-listed threatened or endangered species and that may require special management and protection. Critical habitat may include an area that is not currently occupied by the species but that will be needed for its recovery. An area is designated as "critical habitat" after USFWS publishes a proposed federal regulation in the Federal Register and then receive and consider public comments on the proposal. The final boundaries of the critical habitat area are also published in the Federal Register. Critical habitats considered with respect to the proposed project include vernal pool species critical habitat and California tiger salamander critical habitat, as described below.

Vernal Pool Invertebrates and Plants

Critical habitat for vernal pool invertebrate and plant species was originally designated in a final rule published on August 6, 2003 (68 FR 46683). Critical habitat was designated for the following species that occur on the project site and within the project region: Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, Hoover's spurge, succulent owl's clover, Colusa grass, San Joaquin Orcutt grass, hairy Orcutt Grass, and Greene's tuctoria (*Tuctoria greenei*) (FR 68 46684–46867). A revised final rule for critical habitat, with a re-evaluation of non-economic exclusions, was published in 70 FR 11140 on March 8, 2005. Economic exclusions from the 2003 final rule were evaluated and published on August 11, 2005 (70 FR 46923). Administrative revisions with species-by-unit designations were published on February 10, 2006 (71 FR 7117). On May 31, 2007, USFWS clarified its designation of critical habitat (FR 72 30279–30297), which resulted in the addition of 147,638 acres of critical habitat in Merced County. With respect to the project site, the designated area of critical habitat is primarily located east of Lake Yosemite and north of Paloma Road and does not include land within the campus site. Up to approximately 16,250 acres of critical habitat for vernal pool species lies within the Tier 1 Conservation Lands.

California Tiger Salamander

In August 2005, the USFWS designated 199,109 acres of critical habitat for California tiger salamander in 19 counties (FR 70 49379–49458). Critical Habitat Unit 9 is located in eastern Merced County and includes approximately 180 acres within the project site. Nearly 13,000 acres of Critical Habitat Units 9 and 10 are located within the Tier 1 and 2 Conservation Lands.

4.2.3 Regulatory Considerations

Federal Laws and Regulations

Clean Water Act: Section 404

The USACE and the United States Environmental Protection Agency (U.S. EPA) regulate the discharge of dredged or fill material into waters of the U.S., including wetlands, under Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344). Waters of the U.S. are defined in Title 33 CFR Part 328.3(a) and include a range of wet environments such as lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds. The lateral limits of jurisdiction in those waters may be divided into three categories – territorial seas, tidal waters, and non-tidal waters – and is determined depending on which type of waters is present (Title 33 CFR Parts 328.4(a),(b),(c)). Activities in waters of the U.S. regulated under Section 404 include fill for development, water resource projects (such as dams and levees), infrastructure developments (such as highways and airports), and mining projects. Section 404 of the CWA requires a federal license or permit before dredged or fill material may be discharged into waters of the U.S., unless the activity is exempt from Section 404 regulation (e.g., certain farming and forestry activities).

As the development of the campus required the fill of waters of the United States considered jurisdictional under Section 404 of the CWA, on November 9, 2001, the University submitted an application to the USACE for a permit under Section 404 of the CWA to fill approximately 79.35 acres of jurisdictional waters in connection with the full development of the campus. However, because the location of the campus changed between 2001 and 2008, on February 20, 2008, the University and University Community Land Company (UCLC) submitted a Revised Section 404 Permit Application for the proposed UC Merced campus and the northern portion of University Community. In 2009, following the preparation and approval of an EIS, completion of a 404 (b)(1) analysis, as well as other requirements, including Section 106 and Section 7 consultations, the USACE issued a Department of Army permit to the University and UCLC, authorizing the filling of all 77.79 acres of jurisdictional waters on the UC Merced campus and University Community North sites, including 40.08 acres of vernal pools and swales, 0.33 acre of clay slope wetlands, 12.23 acres of irrigated wetlands, and 25.15 acres of canal wetlands.

Clean Water Act: Section 401

Section 401 of the CWA (33 U.S.C. 1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the U. S. to obtain a certification from the state in which the discharge originates or would originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the affected waters. At the point where the discharge originates or would originate, the discharge would have to comply with the applicable effluent limitations and water quality standards. A certification obtained for the construction of any facility must also pertain to the subsequent operation of the facility. In California, the responsibility for the protection of water quality under the CWA rests with the State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards (RWQCBs). The University and UCLC obtained water quality certification from the RWQCB in compliance with CWA Section 401 on April 20, 2009.

Federal Endangered Species Act

The federal Endangered Species Act (FESA) of 1973, as amended, provides the regulatory framework for the protection of plant and animal species (and their associated critical habitats), which are formally listed, proposed for listing, or candidates for listing as endangered or threatened under the FESA. The FESA has four major components: provisions for listing species, requirements for consultation with the USFWS and the National Oceanic and Atmospheric Administration (NOAA) Fisheries, prohibitions against "taking" of listed species, and provisions for permits that allow incidental "take." Key provisions of Section 7 of the FESA are summarized below.

Section 7 provides a means for authorizing take of threatened and endangered species by federal agencies. "Take" is defined by the F ESA as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Section 7 applies to actions that are conducted, permitted, or funded by a federal agency. Under Section 7, the federal agency conducting, funding, or permitting an action (the federal lead agency) must consult with the USFWS, as appropriate, to ensure that the proposed action will not jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat. If a proposed action "may affect" a listed species or designated critical habitat, the lead agency is required to prepare a biological assessment evaluating the nature and severity of the expected effect. In response, the USFWS issues a biological opinion, with a determination that the proposed action either:

- may jeopardize the continued existence of one or more listed species (jeopardy finding) or result in the destruction or adverse modification of critical habitat (adverse modification finding); or
- will not jeopardize the continued existence of any listed species (no jeopardy finding) or result in adverse modification of critical habitat (no adverse modification finding).

The biological opinion may stipulate discretionary "reasonable and prudent" alternatives. If the proposed action would not jeopardize a listed species, the USFWS issues an incidental take statement to authorize the proposed action.

Pursuant to Section 7 of the FESA, UC Merced submitted a biological assessment (2002 BA) to the USACE in February 2002 to address the effects of the development of the campus and the infrastructure components on succulent owl's clover, Colusa grass, San Joaquin Valley Orcutt grass, hairy Orcutt grass, Hoover's spurge, Green's Tuctoria, Hartweg's golden sunburst (*Pseudobahia bahiifolia*), vernal pool fairy shrimp, vernal pool tadpole shrimp, Conservancy fairy shrimp, valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) bald eagle, , and San Joaquin kit fox. On February 22, 2002, the USACE requested formal consultation with USFWS under Section 7 of the FESA. In July 2002, the *Supplement to the Biological Assessment for the UC Merced Campus Project and County of Merced Infrastructure in Support of UC Merced Project* (2002 Supplemental BA), which addressed an expanded project area, was submitted to USFWS. USFWS completed consultation on August 19, 2002, with the issuance of the *Final Biological Opinion on the Proposed University of California Merced Campus, Phase 1.1 and Campus Buildout and Infrastructure Project* (1-1-02-I-2926), hereinafter referred to as the 2002 BO. In its 2002 BO, USFWS concluded that, contingent upon implementation of and compliance with conservation measures and parameters set forth in the 2002 BO, the UC Merced project would not result in jeopardy to federally-listed threatened and endangered species covered by the 2002 BO (U.S. Fish and Wildlife Service 2002). In fall 2008, after the University and UCLC submitted a revised DA application to the USACE for the UC Merced campus and University Community North, the *2008 Supplement to the BA for the University of California, Merced Campus and University Community North* was submitted to the USACE and USFWS. Based on the prior BA and the 2008 Supplement, the USFWS issued a revised Biological Opinion for the revised campus and Community North sites on April 28, 2009. This revised BO removed the bald eagle and mountain plover from the species list and added CTS. The BO was further amended on February 11, 2016 to account for an expansion of the action area to include two off-site mitigation properties (Lazy K Ranch and the Yosemite Lake Conservation Area), as well as a request from the USACE to modify existing CTS avoidance measures described in the 2002 BO and 2009 BO Amendment. Formal consultation was reinitiated on February 23, 2016 to reflect minor changes to the CTS avoidance measures that were revised in the February 11, 2016 amendment.

Migratory Bird Treaty Act

The Federal Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 et seq.), Title 50 Code of Federal Regulations (CFR) Part 10, prohibits taking, killing, possessing, transporting, and importing of migratory birds, parts of migratory birds, and their eggs and nests, except when specifically authorized by the Department of the Interior (DOI). As used in the act, the term "take" is defined as meaning "to pursue, hunt, capture, collect, kill or attempt to pursue, hunt, shoot, capture, collect or kill, unless the context otherwise requires." With a few exceptions, most birds are considered migratory under the MBTA. Disturbances that causes nest abandonment and/or loss of reproductive effort or loss of habitat upon which these birds depend could be in violation of the MBTA.

A December 2017 opinion from the Office of the Solicitor for the U.S. Department of the Interior (M-opinion) concluded the MBTA restrictions apply only to affirmative and purposeful actions, such as hunting and poaching that reduce migratory birds and their nests and eggs, by killing or capturing, to human control and not incidental taking (U.S. Department of the Interior 2017). April 2018 guidance from the Principal Deputy Director of the USFWS provides further guidance on revisions to past policies and guidance regarding the MBTA (USFWS 2018a). This guidance concludes the MBTA's prohibitions on take of migratory birds apply only when the purpose of the action is to take migratory birds, their eggs, or their nests.

Federal Bald and Golden Eagle Protection Act

The Bald Eagle Protection Act (16 U.S.C. 668) was passed in 1940 to protect bald eagles and was later amended to include golden eagles. Under the Act, it is unlawful to import, export, take, sell, purchase, or barter any bald eagle or golden eagle, their parts, products, nests, or eggs. Take includes pursuing, shooting, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing eagles.

State Laws and Regulations

California Endangered Species Act

The California Endangered Species Act (CESA) (California Fish and Game Code Section 2050 et seq.) establishes state policy to conserve, protect, restore, and enhance threatened or endangered species and their habitats. CESA mandates that state agencies should not approve projects that jeopardize the continued existence of threatened or endangered species if reasonable and prudent alternatives are available that would avoid jeopardy. For projects that would affect a species that is both federally and state-listed, compliance with FESA satisfies CESA if CDFW determines that the federal incidental take authorization is consistent with CESA under California Fish and Game Code Section 2080.1. CDFW administers CESA and authorizes take through Section 2081 agreements (except for species designated as fully protected).

As the development of the campus had the potential to result in the take of state-listed species, the University submitted an application to the CDFW for an incidental take permit (ITP) under Section 2080.1 of the California Fish and Game Code Section. The ITP was issued on March 30, 2011, and covers the following species: CTS, Swainson's hawk, succulent owl's clover, Colusa grass, San Joaquin Orcutt grass, and San Joaquin kit fox. The ITP was subsequently amended on September 30, 2011 to primarily reflect modifications to one of the conditions associated with CTS. The second ITP amendment was issued on October 30, 2015 to primarily expand take coverage to two off-site mitigation properties (Lazy K Ranch and the Yosemite Lake Conservation Area).

California Fish and Game Code

Lake and Streambed Alteration Agreements (Section 1600 et seq.)

Under Section 1602 of the CDFG code, agencies are required to notify CDFW before implementing any project that would divert, obstruct, or change the natural flow, bed, channel, or bank of any river, stream, or lake. Preliminary notification and project review generally occur during the environmental review process. When an existing fish or wildlife resource may be substantially adversely affected, CDFW is required to propose reasonable changes to the project to protect the resources. These modifications are formalized in a Lake or Streambed Alteration Agreement that becomes part of the plans, specifications, and bid documents for the project.

UC Merced obtained a Lake Alteration Maintenance Agreement on July 21, 2008 for routine maintenance activities at Little Lake and Lower Pond. On May 9, 2017, a Lake Alteration Agreement was issued by CDFW to the 2020 Project developer for modifications occurring in and adjacent to Little Lake and Lower Pond as part of the 2020 Project.

Unlawful Destruction of Nests or Eggs and Birds-of-Prey or their Eggs (Sections 3503 and 3513)

According to Section 3503 of the California Fish and Game Code it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird (except birds that do not naturally occur in California as a resident, regular migrant or occasional migrant species, such as house sparrows (*Passer domesticus*) and European starlings (*Sturnus vulgaris*). Section 3503.5 specifically protects birds in the orders Falconiformes and Strigiformes (birds-of-prey). Section 3513 essentially overlaps with the MTBA, prohibiting the take or possession of any migratory non-game bird. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "take" by CDFW.

California Fully Protected Species

The California Fish and Game Code provides protection from take for a variety of species, referred to as "fully protected species." Section 5050 lists fully protected amphibians and reptiles; Section 3515 lists fully protected fish; Section 3511 lists fully protected birds; and Section 4700 lists fully protected mammals.

The California Fish and Game Code defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Except for take related to scientific research, all take of fully protected species is prohibited. Three fully protected bird species - bald eagle, golden eagle, and white-tailed kite, have potential to forage on the project site. White-tailed kite also has potential to nest along drainages on the project site.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act authorizes the State Water Resources Control Board (SWRCB) to regulate state water quality and protect beneficial uses. As noted above, the SWRCB certifies that activities subject to CWA Section 404 permits.

California Native Plant Protection Act

The California Native Plant Protection Act (CNPPA) preserves, protects and enhances endangered native plants in California. The act gave the California Fish and Game Commission the power to designate native plants as endangered, threatened, or rare, and to require permits for collecting, transporting, or selling such plants. Three special-status plant species afforded protection under the CNPPA are known to occur within the project site and adjacent Tier 1 Conservation Lands.

California Native Plant Society Rare Plant Ranking System

The CNPS has been involved in assembling, evaluating, and distributing information on special-status plant species in the state, as listed in the *Inventory of Rare and Endangered Plants of California* (CNPS 2001 and electronic inventory update). CNPS has recently updated their rating system for the rarity of special-status plants, and now include both a California Rare Plant Rank and a Threat Rank. Species are ranked according to their rarity status.[1] CEQA requires government agencies to consider environmental impacts of discretionary projects and to avoid or mitigate them where possible. Under Section 15380, CEQA provides protection for both State-listed species and for any other species which can be shown to meet the criteria for State listing. CDFW recognizes that special-status plants with a California Rare Plant Rank (CRPR) of 1A (Presumed extinct in California), 1B (Rare, threatened, or endangered in California and elsewhere), and 2 (Rare and endangered in California, but are more common elsewhere) in the CNPS Inventory consist of

[1] The CNPS Inventory contains the following listings:
1A = Plants Presumed Extirpated in California and Ether Rare or Extinct Elsewhere
1B = Plants Rare, Threatened, or Endangered in California and Elsewhere
2A = Plants Presumed Extirpated in California, But More Common Elsewhere
2B = Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere
3 = Plants About Which More Information is Needed – A Review List
4 = Plants of Limited Distribution – A Watch List

plants that, in a majority of cases, would qualify for listing and these species should be addressed under CEQA review. In addition, CDFW recommends, and local governments may require, protection of species which are regionally significant, such as locally rare species, disjunct populations, essential nesting and roosting habitat for more common wildlife species, or plants with a CRPR of 3 (Plant species for which additional data is needed – a review list) and 4 (Plant species of limited distribution - a watch list).

Sensitive Vegetation Natural Communities

Sensitive vegetation natural communities are natural communities and habitats that are either unique, of relatively limited distribution in the region, or of particularly high wildlife value. These resources have been defined by federal, state, and local conservation plans, policies or regulations. The CDFW ranks sensitive communities as "threatened" or "very threatened" and keeps records of their occurrences in its CNDDB. Sensitive vegetation natural communities are also identified by the CDFW on its List of California Natural Communities Recognized by the CNDDB. Impacts to sensitive natural communities and habitats identified in local or regional plans, policies, regulations or by federal or state agencies must be considered and evaluated under CEQA (CCR: Title 14, Div. 6, Chap. 3, Appendix G).

Although sensitive natural communities have no legal protective status under FESA and CESA, they are provided some level of protection under CEQA. *State CEQA Guidelines* identify potential impacts on a sensitive natural community as one of six significance criteria. As an example, a discretionary project that has a substantial adverse effect on any riparian habitat, native grassland, valley oak woodland, or other sensitive natural community would normally be considered to have a significant effect on the environment. Further loss of a sensitive natural community could be interpreted as substantially diminishing habitat, depending on its relative abundance, quality and degree of past disturbance, and the anticipated impacts to the specific community type. Where determined to be a significant impact under CEQA, the potential impact would require mitigation through avoidance, minimization of disturbance or loss, or some type of compensatory mitigation when unavoidable.

Local Plans and Policies

The University is constitutionally exempt from local land use laws and regulations under Article IX, Section 9 of the California Constitution. This exemption applies to all city and county general plans, as well as community plans and zoning regulations. However, the University has and will continue to work cooperatively with adjacent local communities to pursue cooperative planning, land use compatibility and consistency with local plans and policies, whenever feasible. There are no local City or County plans and policies related to biological resources that are applicable to the proposed project.

The land use plan applicable to the campus is the proposed 2020 LRDP. Although the 2020 LRDP does not set forth policies focused on the protection of biological resources, the plan designates 283 acres of land within the campus site as Passive Open Space (POS) which would not be developed with facilities. The plan also identifies about 135 acres of Research Open Space (ROS) which would also not be used for development but may be used by UC Merced to conduct field research. Finally, the plan designates 306 acres of land as Campus Building Reserve and Support Land (CBRSL), which would not be developed under the 2020 LRDP but may be developed with campus facilities at some point in time after 2030. While the 2020 LRDP allows for the siting of small facilities (less than 10,000 square feet each) on ROS or CBRSL lands, such projects would be small scale and would be sited carefully to avoid or minimize disturbance of sensitive biological resources. Therefore, about 725 acres of the 1,026-acre campus would not be developed and biological resources within those lands would remain largely undisturbed.

4.2.4 Impacts and Mitigation Measures

Significance Criteria

The impacts of the proposed project on biological resources would be considered significant if they would exceed the following significance criteria, in accordance with Appendix G of the *State CEQA Guidelines*:

- 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 CDFW or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS;
- Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means; or
- 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.

Issues Not Discussed Further

- Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

The proposed project would not result in an impact related to conflicts with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan because no habitat conservation plans or natural community conservation plans have been adopted that encompass the project area.

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

The proposed project would not result in an impact related to a conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, as there are no local ordinances that are applicable to the campus.

Methodology

All of the campus facilities under the 2020 LRDP would be located within 274 acres of land designated Campus Mixed Use (CMU) on the land use diagram. About 171 acres of the CMU lands are either already developed with campus facilities or will be under campus facilities once the 2020 Project is constructed. Therefore, about 103 acres of CMU lands could be developed under the proposed 2020 LRDP. This impact analysis assumes full buildout of those 103 acres, resulting in loss of all habitats located within those lands.

With respect to the rest of the campus site, as explained above, about 800 acres of the 1,026-acre campus would not be developed under the proposed 2020 LRDP and biological resources within those lands would remain undisturbed. Therefore, the proposed 2020 LRDP would generally result in a reduced impact on biological resources when compared to the project evaluated in the 2009 LRDP EIS/EIR. However, the 2020 LRDP would allow the siting of small facilities, such as a field station, solar array, or a research project, on lands designated CBRSL or ROS. As noted earlier, those projects would be small scale and sited carefully to avoid or minimize impacts to sensitive biological resources. Nonetheless, the potential for these small projects to result in biological impacts is analyzed below.

The following activities would have the potential to affect biological resources. These types of direct and indirect impacts were used to assess project-related impacts on biological resources.

Direct Impacts

- Vegetation clearing (including trees), grading, excavating/trenching, and paving activities during construction;
- Destroying breeding, feeding and sheltering habitat and movement/migration corridors for special-status species;
- Permanently removing wetlands;

- Temporary stockpiling and side-casting of soil, construction materials, or other construction wastes;
- Soil compaction, dust, and water runoff from the construction site;
- Short-term construction-related noise (from equipment); and
- Degradation of water quality in drainages and wetlands, resulting from construction runoff containing petroleum products.

Indirect Impacts

- Altering light and noise levels;
- Altering hydrology;
- Causing damage through toxicity associated with herbicides, pesticides, and rodenticides;
- Introducing pet and human disturbance (including trash dumping);
- Increasing habitat for native competitors or predators; and
- Introducing invasive nonnative species.

4.2.5 LRDP Impacts and Mitigation Measures

LRDP Impact BIO-1: Implementation of the 2020 LRDP would not have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. ***(Less than Significant)***

In 2002, following the completion of environmental review and approval of a new UC campus on a 910-acre site near Lake Yosemite in Merced County, construction of the first campus facilities was commenced on an approximately 100-acre portion of the 910-acre campus site, in an area that was occupied by a former golf course and did not contain any wetlands. Concurrently with commencement of campus development, in 2002, the University and Virginia Smith Trust (VST) formed a limited liability corporation (LLC) called University Community Land Company (UCLC) for the development of an approximately 1,111-acre parcel to the south of the campus (University Community North). Following the establishment of the very first facilities on the campus, the University continued to work with the U.S. EPA, USACE, and other state and federal agencies to adjust the location of the proposed campus. Once agreement on the exact location of the campus was achieved, the University prepared a revised LRDP (2009 LRDP) for the campus. In March 2009, the Regents certified the EIR and approved the 2009 LRDP. That EIR evaluated and disclosed the direct and indirect impacts of campus development and University Community North on wetlands and other waters of the U.S. present on the campus and University Community North sites.

Also in 2009, the USACE approved the EIS and in April 2009 issued a Department of the Army (DA) Permit No. SPK-1999-00203 to the University and UCLC, authorizing the filling of 77.79 acres of waters of the U.S., in conjunction with the development of the campus and the adjacent University Community North. The 77.79 acres of fill that is authorized by the permit includes 15.03 acres of vernal pools, 25.05 acres of swale wetlands, 0.33 acres of clay slope wetlands, 12.23 acres of irrigated wetlands, and 25.15 acres of canal wetlands. The permit also identifies the requirements with respect to compensatory mitigation for the approved fill, and notes that UC Merced and UCLC must comply with the mitigation requirements outlined in the Compensatory Wetlands Mitigation and Monitoring Plan (CWMMP). It should be noted that the wetland classification reflected in the DA permit does not align perfectly with the classification used in **Table 4.2-3**. However, because both the classification and the acreage included in the DA permit have been verified and approved by the federal and state agencies, those acreages and wetland types are used in the discussion of impacts below.

Wetland Impacts of Campus and University Community North Development

In 2011, UC Merced initiated the construction of the Phase 6 Project. This project included site preparation for future campus development to properly maintain the existing campus and to readily expand outside the Phase 1 campus development. The Phase 6 Project provided critically needed campus site development and infrastructure directly associated with expansion of the initial campus footprint for new instruction and research facilities. In total, the grading activities involved the discharge of fill materials into approximately 26.52 acres of wetlands, including 21.93 acres of vernal pools and swales and 4.58 acres of other seasonal wetlands.

In fall 2016, UC Merced commenced site preparation and grading for the 2020 Project which encompasses the next phase of campus development over an area of approximately 150 acres to the south of the existing campus. The 2020 Project site is within the area covered by the UC Merced DA permit. Grading and construction associated with the 2020 Project resulted in the fill of additional wetlands that were present within the footprint of that project.

Table 4.2-6 presents a summary of the authorized fill and the fill to date by wetland type.

Table 4.2-6
Permitted Wetland Fill and Fill to Date (acres)

Type	Authorized Fill Per DA Permit	Acres Filled under Phase 6 Project	Acres Filled under 2020 Project	Balance
Vernal pools	15.03	14.60	0.06	0.37
Swale wetlands	25.05	7.33	1.73	15.99
Clay slope wetlands	0.33	0.11	0	0.22
Irrigated wetlands	12.23	2.51	0	9.72
Canal wetlands	25.15	1.97	4.92	18.26
Total	**77.79**	**26.52**	**6.71**	**44.56**

Source: University of California, Merced 2019

Compensatory Wetland Mitigation to Date

The CWMMP requires UC Merced and UCLC to provide compensatory wetlands for the wetlands filled in conjunction with the development of the campus and University Community North. Based on the CWMMP and for ease of reference, the five wetland types in **Table 4.2-6** above are consolidated into two broad categories: the category "vernal pools" is used to refer to all vernal pools, swale wetlands, and clay slope wetlands, and the category "non-vernal pool seasonal wetlands" is used to collectively refer to irrigated wetlands and canal wetlands in the discussion and table that follows.

In 2012, UC Merced commenced the process of providing compensatory wetlands mitigation for the wetlands fill to date and was successful in completing two compensatory mitigation projects in 2016. UC Merced also purchased vernal pool credits to compensate for a portion of the vernal pool wetlands impact. The three completed mitigation projects are briefly described below.

- **Wetlands Creation.** The 5G's Corporation Yosemite Lake Conservation Area (YLCA) is located in Merced County to the northwest of the campus. The 392-acre mitigation site will accommodate the re-establishment of about 31 acres of vernal pool, swale, and clay flat wetlands, including 25 acres of restored vernal pool wetlands and 50 acres of protected uplands for UC Merced. The construction of 25 acres of vernal pool wetlands at YLCA has been completed and on October 4, 2016, the USACE conducted a site visit to inspect the pools that have been constructed. Pursuant to the Interim and Long Term Management Plan submitted to the USACE by 5G's Corporation, the constructed wetlands will be monitored for success, and if needed remedial activities will be implemented to ensure that the wetlands are successfully established.

- **In Lieu Fees.** Due to problems encountered by UC Merced in commencing the construction of a compensatory vernal pool creation/restoration project in Madera County that would have provided 10.5 acres of compensatory vernal pool wetlands, UC Merced requested and the USACE approved that UC Merced could purchase vernal pool credits for up to 10.5 acres under the Sacramento District California In-Lieu Fee Program (ILF Program). UC Merced completed the purchase on May 27, 2016.

- **Merced County Preserve.** Merced County owns an approximately 167-acre property located between the campus and Lake Yosemite Regional Park. This property contains a large complex of highly valuable vernal pools and other seasonal wetlands embedded within an annual grassland landscape. The University worked with Merced County to place a conservation easement on this land to permanently preserve 30.74 acres of wetlands present on the site. Due to the high quality of wetlands on this property and the relatively poor quality of some of the seasonal wetlands that would be filled on the campus and Community North sites, the USACE, U.S. EPA, and the RWQCB concluded that the conservation of 30.74 acres of wetlands present on this property provides adequate compensation for the filling of up to 37.38 acres of non-vernal pool seasonal wetlands authorized under the Section 404 permit. The conservation easement for this property was put in place on August 4, 2016.

Table 4.2-7 presents an accounting of the compensatory wetland mitigation completed to date.

Table 4.2-7
Compensatory Wetland Mitigation to Date

Wetland Category	Permitted Acreage	Fill Through Completion of the 2020 Project	Remaining Acreage	YLCA Mitigation (acres)	In Lieu Fee (acres)	County Conservation Lands (acres)	Total Mitigation Credits to Date
Vernal Pools	40.41	23.83	16.58	25.10	10.50	--	35.60
Non Vernal Pool Seasonal Wetlands	37.38	9.40	27.98	--	--	30.74	37.38
Total	**77.79**	**33.23**	**44.56**	**25.10**	**10.50**	**30.74**	**72.98**

Source: University of California, Merced 2019

As the table shows, although UC Merced has filled less than half of the permitted wetlands acreage on the campus and University Community North sites, it has provided compensatory mitigation for all of the seasonal wetland acreage that is allowed to be filled under the DA permit. With respect to vernal pool wetlands, UC Merced has provided compensatory mitigation for 35.60 acres of fill, although only 25.83 acres have been filled to date.

Remaining Compensatory Wetland Mitigation

As **Table 4.2-7** above shows, while UC Merced has provided 35.60 acres of compensatory vernal pool mitigation, in the event that UC Merced fills all of the remaining vernal pool wetlands such that the total fill equals the permitted fill of 40.41 acres, it will need to provide an additional 4.81 acres of compensatory vernal pool mitigation. UC Merced has discussed this with the USACE, and the USACE has agreed that this small acreage can be mitigated via the purchase of vernal pool credits under the ILF Program. Note that under the 2008 Mitigation Rule, the USACE recommends that impacts to waters be compensated via an in-lieu fee program (or a mitigation bank), rather than through permittee-responsible mitigation projects.

In summary, the impacts of campus development on wetlands were fully evaluated in the 2009 LRDP EIS/EIR, and in compliance with the DA permit, have been fully mitigated for filling all except about 4.81 acres of vernal pools and swales. As there is very limited acreage of unfilled vernal pools and swales within the CMU area that would be developed under the proposed 2020 LRDP, campus development under the 2020 LRDP is not expected to affect any wetlands for which adequate compensatory mitigation has not been provided. Nonetheless, if a project is proposed which requires filling of the remaining permitted vernal pool and swale acreage, UC Merced will mitigate the loss via purchase of vernal pool credits under the ILF Program. The impact on wetlands would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, those projects will be sited to avoid fill of wetlands. Furthermore, due to the small size of these projects, they would be unlikely to substantially affect wetlands. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact BIO-2: Implementation of the 2020 LRDP would not result in adverse impacts on special-status plant species. ***(Less than Significant)***

The 2009 LRDP EIS/EIR analyzed potential impacts of the development of the campus and University Community North on special-status plant species and concluded that the proposed development would result in the removal of eight vernal pools containing succulent owl's clover, one vernal pool containing an unreported number of dwarf downingia plants, and the removal of 14 stands of shining navarretia. The loss of these plants and their habitat would constitute both a reduction in numbers of individuals and a loss of occupied habitat for these species and would be a significant impact.

As noted above in **Section 4.2.2.2**, to compensate for losses of vernal pool plants (and invertebrates) that were considered unavoidable, the University committed and proceeded to protect nearly 24,000 acres of Tier 1 and Tier 2 Conservation Lands that support suitable habitat for the affected species. As reported in the 2009 LRDP EIS/EIR, approximately 527.77 acres of vernal pools and vernal pool/swale complexes, potential habitat for succulent owl's clover and dwarf downingia, were committed to preservation on the Tier 1 Conservation Lands. Excluding the Tier 1(b) Conservation Lands, which are currently owned and being managed by TNC, the University has preserved approximately 460 acres of vernal pools and swale complexes on the Tier 1(a) Conservation Lands, and approximately 792.87 acres of vernal pools and vernal pool/swale complexes have been preserved on Tier 2 properties. Similarly, approximately 75 acres of clay flats, habitat for shining navarretia, were preserved on Tier 1(a) Conservation Lands, and approximately 305.46 acres of clay flats were preserved on Tier 2 properties. Although the preservation of vernal pools would not compensate for the loss of plants and individuals caused by campus development, the preservation and management of a substantial proportion of the occurrences of these special-status plant species in the project region, would benefit the species by reducing the risk of extinction and by providing for opportunities to enhance the preserved occurrences. Therefore, the 2009 LRDP EIS/EIR concluded that the development of the campus and University Community North sites would not result in a substantial adverse effect on special-status plant species.

In 2011, UC Merced initiated the construction of the Phase 6 Project, which involved grading activities that filled about 21.93 acres of vernal pools and swales and 4.59 acres of other seasonal wetlands. All of the previously documented occurrences of succulent owl's clover, shining navarretia, and dwarf downingia were located outside of the Phase 6 Project footprint.

In 2016, UC Merced initiated grading activities associated with the 2020 Project. In advance of project construction and consistent with the conditions of the University's ITP, focused surveys were conducted during the normal blooming periods for succulent owl's clover, Colusa grass, and San Joaquin Valley Orcutt grass (LSA 2016a). Local reference populations were visited to verify that the surveys were conducted during the appropriate timeframe. No occurrences of these three species were detected on the 2020 Project site during any of the surveys, although two CNDDB occurrences of succulent owl's clover partially overlapped the survey area. While Colusa grass and San Joaquin Valley Orcutt grass were not anticipated to occur within the 2020 Project site, had succulent owl's clover been identified, the plant(s) would have been salvaged consistent with the 2016 salvage plan for succulent owl's clover that was approved by the USFWS and CDFW.

The presumed extant occurrences of succulent owl's clover, shining navarretia, and dwarf downingia are primarily located within portions of the campus site that will remain undeveloped or designated as open space. However, as noted above, portions of two CNDDB occurrences of succulent owl's clover overlap the 2020 Project area and development lands to the south. Subsequent development activities within the CMU lands would be subject to the preconstruction surveys for succulent owl's clover, Colusa grass, and San Joaquin Valley Orcutt grass, consistent with the University's ITP. As required by ITP Condition 7.26, if any of these species are identified within the development area, a designated biologist shall salvage and transplant them in accordance with an agency-approved salvage plan.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, those projects will be sited to avoid fill of wetlands, including areas that may contain the special-status plants which are associated with vernal pools and have a potential to occur on the campus site (the known occurrences of shining navarretia and dwarf downingia are associated with wetlands located north of the proposed CMU development area and within the POS lands). Furthermore, due to the small size of these projects (less than 2 acres of ground disturbance), they would be unlikely to substantially affect the plant species.

In summary, based on the preservation of existing occurrences and suitable habitat for succulent owl's clover, shining navarretia, and dwarf downingia, as well as compliance with the University's ITP and resource-sensitive design of future small-scale projects, the proposed project's impacts on special-status plant species would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact BIO-3: Implementation of the 2020 LRDP would not result in a substantial adverse impact on special-status invertebrate species due to the loss of vernal pool ecosystems or designated critical habitat for the species. ***(Less than Significant)***

The designated critical habitat boundary for vernal pool invertebrate species is located adjacent to the campus site but does not overlap with the campus site boundary. Therefore, no critical habitat would be directly affected by campus development under the 2020 LRDP.

The 2009 LRDP EIS/EIR analyzed the potential effects of the development of the campus and Community North sites on special-status invertebrates, and noted that the proposed development of the two sites would result direct impacts to 54 acres of occupied vernal pool fairy shrimp habitat and indirect impacts to 7 acres of the species' habitat, and the development of the campus and Community North would also result in a direct impact on about 2 acres of occupied vernal pool tadpole shrimp habitat and an indirect impact on approximately 2 acres of the species' habitat. The 2009 LRDP EIS/EIR noted that campus and University North development would therefore affect 2.6 percent of the 2,294 acres of known occupied vernal pool fairy shrimp habitat and 1.2 percent of the 318 acres of known occupied tadpole shrimp habitat within the project region. The 2009 LRDP EIS/EIR further noted that more than 26,000 acres of Conservation Lands would be preserved by the University. Excluding the Tier 1(b) Conservation Lands, which are currently owned and being managed by TNC, the University has acquired nearly 24,000 acres of Conservation Lands that would protect 1,006 acres of occupied habitat for vernal pool fairy shrimp, representing approximately 50 percent of the known habitat in the study region. Of the 1,006 acres of protected occupied habitat, 490 acres are located within Tier 1(a) Conservation Lands (21 percent of the total known habitat) and 516 acres are located within Tier 2 Conservation Lands (22 percent of the total known habitat). Mitigation ratios achieved for direct and indirect impacts are 8:1 for Tier 1(a) Conservation lands and 16:1 with the addition of the Tier 2 Conservation Lands, substantially above the 3:1 minimum target specified in the 2002 BO. For vernal pool tadpole shrimp, acquired Conservation Lands (per the 2009 LRDP EIS/EIR, the Tier 1(b) Conservation Lands provide no occupied habitat for vernal pool tadpole shrimp) would protect 14 acres of occupied habitat for the tadpole shrimp, representing 4 percent of the known habitat in the region, nearly all of which is within Tier 1(a) Conservation Lands. Tier 2 Conservation Lands would protect less than 1 acre of occupied habitat for the tadpole shrimp. The achieved mitigation ratio of 3.5:1 is above the 3:1 minimum target specified in the Conservation Measures in the 2002 BO. Therefore, the impact of the campus and University Community North development on special-status invertebrates would be less than significant.

In addition to the preservation of suitable habitat within Conservation Lands, potentially suitable habitat has been created as part of the CWMMP. As noted above under **LRDP Impact BIO-1**, UC Merced has completed three mitigation projects to compensate for the filling of waters of the U.S. It has developed the YLCA mitigation site where 25 acres of vernal pools have been created successfully and 50 acres of upland have been preserved through a conservation easement as compensatory mitigation for campus impacts. The University has also placed a conservation easement on a large land area owned by Merced County that contains more than 30 acres of wetlands, including more than 25 acres of vernal pools and swales. Furthermore, the University has paid into an in lieu fee program for 10.5 acres of vernal pool credits. All of these mitigation actions by the University have also resulted in the creation and preservation of additional compensatory habitat for vernal pool invertebrates.

As noted above, in 2011, UC Merced initiated the construction of the Phase 6 Project, which involved grading activities that filled about 21.93 acres of vernal pools and swales and 4.59 acres of other seasonal wetlands. The 2020 Project, initiated in 2016, has resulted in the fill of 1.73 acres of vernal pools and swales and 4.92 acres of other seasonal wetlands. As a result, at this time only about 11.6 acres of vernal pool and swale habitat remains on the campus site. While some of this habitat is located within the area that may be developed under the 2020 LRDP, should any of this remaining habitat be developed, its removal would not represent a significant impact because UC Merced has preserved a substantial amount of suitable habitat on the Conservation Lands and in compliance with the DA permit, UC Merced will also compensate in kind for the fill of the remaining vernal pools and swales for which it has not provided already provided compensatory mitigation. Therefore, the impact on vernal pool invertebrates from the development of campus facilities on the CMU lands would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, those projects will be sited to avoid fill of wetlands, including areas that may be habitat for listed invertebrates. Furthermore, due to the small size of these projects (less than 2 acres of ground disturbance), they would be unlikely to substantially affect the species. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact BIO-4: Implementation of the 2020 LRDP would result in a potentially significant adverse impact on nesting and overwintering habitat for Crotch bumble bee. *(Potentially Significant; Less than Significant)*

As noted earlier in this section, Crotch bubble bee has been recently listed as a candidate endangered species by the California Fish and Game Commission. While there have been no documented observations of Crotch bumble bee within the project site or the adjacent Tier 1(a) conservation lands, no focused surveys have been conducted to date, the campus is within the range for this species, and the annual grassland areas with small mammal burrows provide potentially suitable underground nesting habitat. Furthermore, the vernal pool-grassland complex within the POS and the ROS areas of the campus and the adjacent Tier 1 conservation lands, as well as the campus landscaping, could potentially provide floral resources/ foraging habitat for Crotch bumble bee.

Campus development under the 2020 LRDP would occur primarily within an approximately 103-acre area that is designated CMU on the land use diagram (**Figure 3.0-5**). Some smaller projects may also be located within lands with other land use designations (i.e., CBRSL and ROS). Should Crotch bumble bee colonies or overwintering queens be present in underground nests on future construction sites, construction activities could adversely affect this species and its habitat. This is considered a potentially significant impact.

To address this impact, **LRDP Mitigation Measure BIO-4** is set forth below.

Mitigation Measures:

LRDP MM BIO-4: A qualified wildlife biologist shall conduct visual surveys of the development area during the flight season for the Crotch bumble bee (late February through late October). Between two and four evenly spaced surveys shall be conducted for the highest detection probability, including surveys in early spring (late March/early April) and early summer (late June/July). Surveys shall take place when temperatures are above 60°F, preferably on sunny days with low wind speeds (e.g., less than 8 miles per hour) and at least 2 hours after sunrise and 3 hours before sunset. On warm days (e.g., over 85°F), bumble bees will be more active in the mornings and evenings. Surveyors shall conduct transect surveys focusing on detection of foraging bumble bees and underground nests using visual aids such as butterfly binoculars. If no Crotch bumble bees or potential Crotch bumble bees are detected, no further mitigation is required.

If Crotch bumble bees or potential Crotch bumble bees are observed within the development area, a plan to protect Crotch bumble bee nests and individuals shall be developed and implemented in consultation with CDFW. The plan shall include, but not be limited to, the following measures:

- Specifications for construction timing and sequencing requirements (e.g., avoidance of raking, mowing, tilling, or other ground disturbance until late March to protect overwintering queens);
- Preconstruction surveys conducted within 30 days and consistent with any current available CDFW standards prior to the start of ground disturbing activities to identify active nests;
- Establishment of appropriate no-disturbance buffers for nest sites and construction monitoring by a qualified biologist to ensure compliance;
- Restrictions associated with construction practices, equipment, or materials that may harm bumble bees (e.g., avoidance of pesticides/herbicides, BMPs to minimize the spread of invasive plant species);
- Provisions to avoid Crotch bumble bees or potential Crotch bumble bees if observed away from a nest during project activity (e.g., ceasing of project activities until the animal has left the work area on its own volition); and
- Prescription of an appropriate restoration seed mix targeted for the Crotch bumble bee, including native plant species known to be visited by native bumble bee species and containing a mix of flowering plant species with continual floral availability through the entire active season of the Crotch bumble bee (March to October).

Significance after Mitigation: Less than significant

LRDP Impact BIO-5: Implementation of the 2020 LRDP would not result in a substantial adverse impact on special-status amphibians (California tiger salamanders and western spadefoot) dependent on vernal pool ecosystems, annual grasslands, and stock ponds due to the loss of these habitats and would not result in mortality of individual amphibians during construction of campus facilities due to compliance with permits. ***(Less than Significant)***

California tiger salamander

California tiger salamander (CTS) and its habitat occur on the project site. As analyzed in the 2009 LRDP EIS/EIR, the development of the campus and Community North sites would eliminate approximately 178 acres of critical habitat for the CTS on the project site and indirectly impact an additional 51 acres of critical habitat. However, as noted in the 2009 LRDP EIS/EIR, approximately 5,900 acres of critical habitat would be protected on Tier 1(a) Conservation Lands achieving a mitigation ratio of 26:1 for direct and indirect impacts. Tier 2 Conservation Lands would protect an additional 3,954 acres of critical habitat, for a total of approximately 9,850 acres protected on the Conservation Lands, representing an overall mitigation ratio of 43:1 for direct and indirect impacts on critical habitat.

The 2009 LRDP EIS/EIR also noted that the development of the campus and Community North sites would eliminate one known breeding site for the CTS (representing an unknown number of individuals and no longer located within the current campus site [i.e., within the Community North site near Lake Road]) and occupied upland habitat (i.e., within 1.75 miles of this and other breeding ponds) equating to the loss of 1,648 acres of occupied habitat and indirect impacts to an additional 236 acres of adjacent occupied habitat. The 2009 LRDP EIS/EIR noted that the development of the campus and Community North would affect less than 3 percent of the 70,988 acres (includes aquatic and associated upland habitat) of known occupied habitat within the project region. The 2009 LRDP EIS/EIR further noted that the Tier 1(a) Conservation Lands would protect and manage for conservation approximately 6,250 acres of occupied habitat (3:1 ratio). Tier 2 Conservation Lands would protect an additional 11,349 acres of upland habitat, resulting in the protection of approximately 17,600 acres, representing an overall mitigation ratio of 9:1. Though CTS was discussed in the 2002 BO, this species was not listed at that time and therefore no minimum compensation ratio was required by USFWS. Typical USFWS-approved mitigation ratio for replacement of occupied CTS habitat (upland and aquatic breeding habitat) is 3:1.

In addition to the preservation of Tier 1(a) and Tier 2 Conservation Lands, as noted above under **LRDP Impact BIO-1**, UC Merced has completed three mitigation projects to compensate for the filling of waters of the U.S. These mitigation projects also provide suitable upland and potentially breeding habitat for CTS that has been preserved. Specifically, the YLCA mitigation site provides 50 acres of upland habitat for CTS and the Merced County Preserve provide 167 acres of upland habitat for the species.

Although the entire 1,026-acre campus site is considered occupied habitat for CTS, so far about 171 acres have been developed and another 103 acres of CMU lands would be developed with campus facilities under the proposed 2020 LRDP. Although UC Merced has mitigated for the loss of 1,648 acres of CTS upland habitat, to date it has developed only 171 acres and only another 103 acres would likely be developed under the proposed LRDP. Due to the mitigation that has already put in place, the impact related to loss of CTS upland habitat would be less than significant.

The development of the CMU lands could, however, result in injury or mortality to individual CTS. Take could result from ground and vegetation disturbance, construction, operation of heavy equipment, vehicle traffic, and other project activities. The University's ITP and BO contain a number of measures to avoid and minimize take of CTS. These measures include having a USFWS and CDFW-approved Designated Biologist conduct preconstruction surveys and monitor construction activities. UC Merced also provides an education program for all workers on the site that describes CTS and measures that must be implemented to protect it. A CTS relocation plan has been developed and approved to salvage individual CTS found within the project site. The ITP also requires the installation of a CTS exclusion fence around construction sites. UC Merced has installed CTS exclusion fencing between the known or potential breeding ponds to the north and east and much of the 2020 Project site and anticipated CMU development area. The University has been implementing all of the requirements of the ITP and BO. On September 12, 2018, one adult CTS was found within the 2020 Project site in a burrow that was being excavated in advance of construction. The CTS was uninjured and relocated to suitable habitat in accordance with the approved 2015 relocation plan (LSA 2015a).

Western Spadefoot

Habitats suitable for CTS and fairy shrimp are often also suitable for western spadefoot. However, hand excavation of burrows on the 2020 Project site and extensive dip net surveys of aquatic features on the adjacent Tier 1(a) Conservation Lands have not resulted in the detection of western spadefoot. Therefore, it is not expected that western spadefoot will be affected either directly or indirectly by the proposed project. Furthermore, the avoidance and protection measures for CTS will also help protect the species, should an individual enter a work site. Additionally, Conservation Lands containing suitable habitat for CTS and fairy shrimp will also serve to preserve habitat for western spadefoot and therefore could benefit the species within the project region. The impact on western spadefoot would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, those projects will be sited to avoid areas with burrows that may harbor CTS and areas that contain habitat for western spadefoot. Furthermore, due to the small size and nature of these projects, they would be unlikely to substantially affect both species. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact BIO-6: Implementation of the 2020 LRDP would not result in a substantial adverse impact on western pond turtle from the loss or disturbance of ponds and seasonal freshwater marsh communities. *(Less than Significant)*

The 2009 LRDP EIS/EIR analyzed the potential for the development of the campus and Community North sites to affect western pond turtle, a state species of special concern. The 2009 LRDP EIS/EIR noted that the proposed development would remove ponds, marshes, wetlands, and drainages that provide suitable aquatic habitat for western pond turtle. Suitable wetland habitats for this species do not include vernal pool ecosystems, vernal swales, or seasonal wetlands. Western pond turtle is known to occur in the region and within the project site, and therefore, the removal of these habitats has potential to impact western pond turtle. The 2009 LRDP EIS/EIR noted that about 40 acres of suitable habitat would be lost with the development of both the campus and University Community North sites. However, the loss would be more than adequately compensated by at least approximately 175 acres of suitable habitat that would be protected on Tier 1(a) and Tier 2 Conservation Lands.

Although compared to the 815-acre campus analyzed in the 2009 LRDP EIS/EIR, the campus site is larger and includes 1,026 acres, the proposed 2020 LRDP envisions the development of only an additional 103 acres of CMU lands. Furthermore, although UC Merced has filled some of the suitable wetland habitats for this species, it is proposing to preserve many of the marsh areas along the canals by placing the lands under POS designation. Therefore, the proposed 2020 LRDP will result in a reduced impact on habitat for this species than previously disclosed.

With respect to the potential for campus construction activities to result in injury or mortality of the species, the University's Construction Mitigation Plan (CMP) (ICF Jones & Stokes 2009) requires that a biologist conduct preconstruction surveys for western pond turtle prior to initial ground-disturbing activities in all suitable aquatic habitats within 100 feet of the work area. If pond turtles are not observed, no additional mitigation is required. If pond turtles are observed, they will be allowed to move out of the way on their own. If active nests are found, they will be fenced with an appropriate buffer and avoided until the young have hatched and are able to move out of the work area on their own. Implementation of this CMP measure reduces potential impacts to western pond turtle to a less than significant level.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, those projects will be sited to avoid areas that provide western pond turtle habitat. Furthermore, due to the small size and nature of these projects, they would be unlikely to substantially affect the species. The projects would also comply with the University's CMP. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact BIO-7: Implementation of the 2020 LRDP would not result in a substantial adverse impact on Swainson's hawk from the loss of suitable foraging or nesting habitat. *(Less than Significant)*

Loss of Foraging Habitat

The 2009 EIS/EIR analyzed the potential for the development of the campus and Community North sites to affect Swainson's hawk foraging habitat. Swainson's hawks are known to nest within the campus site, and the 2009 LRDP EIS/EIR noted that the development of the campus and Community North sites would result in the removal of approximately 1,514 acres of annual grassland and irrigated pasture communities which provide suitable foraging habitat for the species. Loss of a substantial amount of foraging habitat within 1 mile of a known Swainson's hawk nest was determined to be a potentially significant impact. However, the 2009 LRDP EIS/EIR noted that Conservation Lands acquired by UC Merced contain 8,455 acres of comparable habitats within Tier 1 Conservation Lands and 15,830 acres within Tier 2 Conservation Lands, for a total of 24,285 acres. Excluding the Tier 1(b) Conservation Lands, which are currently owned and being managed by The Nature Conservancy (TNC), the University has preserved Conservation Lands to offset the loss of this habitat in the campus and Community North sites at a ratio of 3.5:1 considering Tier 1(a) Conservation Lands only and 14:1 considering both Tier 1(a) and 2 Conservation Lands, and additional compensation is provided by the preservation of grassland habitats in the YLCA and the Merced County Preserve. These ratios exceed CDFW's recommended replacement ratios for loss of foraging habitat. CDFW requires that loss of foraging habitat for the species be replaced at a ratio of 1:1 for projects where nesting Swainson's hawks are known to occur within a 1-mile radius (California Department of Fish and Game 1994). Therefore, due to the mitigation included in the project, the 2009 LRDP EIS/EIR concluded that there would be a less than significant impact related to foraging habitat.

Development of new facilities on the campus under the 2020 LRDP would take place within the area identified as CMU on the campus land use diagram. As more than half of the CMU land is already developed, approximately 103 acres of CMU land remain to be developed under the proposed 2020 LRDP and represent potential Swainson's hawk foraging habitat that would be removed under the 2020 LRDP. This acreage is a part of the 1,514 acres previously identified in the 2009 LRDP EIS/EIR as foraging habitat that would be lost, and its loss has been adequately mitigated by the conservation of Tier 1 and 2 lands described above. Furthermore, the 2020 LRDP sets aside more land than before as passive open space which would continue to provide foraging habitat for all avian species, and both CBRSL and ROS lands would not be developed and would continue to provide foraging habitat. The impact on foraging habitat of special-status avian species would be less than significant.

Loss of Nesting Habitat

Although no known Swainson's hawk nest sites were present on the campus or Community North sites when the 2009 LRDP EIS/EIR was prepared, a Swainson's hawk nest was established on a Fremont cottonwood (*Populus fremontii*) tree that was located within the campus site adjacent to Fairfield Canal after the certification of the EIR. As the removal of this tree was anticipated at the time that the permits for the campus were issued, the ITP issued to UC Merced by CDFW allowed for the removal of a Swainson's hawk nest tree and stipulated certain conditions related to its removal. In January 2016, in anticipation of the upcoming 2020 Project, UC Merced determined that it would remove the former nest tree and proceeded to do so in compliance with the conditions set forth in the ITP. The tree was removed on February 6, 2016, prior to the start of the Swainson's hawk nesting season. The University's ITP includes Condition No. 7.18, which requires the planting of four replacement trees for every nest tree removed. To comply with this measure, UC Merced planted four trees near stock ponds on the Tier 1(a) Conservation Lands in 2017, including two cottonwoods and two valley oaks (*Quercus lobata*). UC Merced is currently monitoring and reporting on the success of the replacement plantings.

In April 2018, a new Swainson's hawk nest was established in a tree located within the CMU area east of Fairfield Canal, and west of the campus solar array. To ensure that the nesting birds were not adversely affected by construction activities associated with the 2020 Project, in compliance with the ITP, a 700-foot buffer was established around the nest tree, and biologists monitored it daily from April through July. At least one chick successfully fledged from the nest.

As the ITP sets forth a series of conditions that UC Merced must comply with to avoid any indirect impacts on nesting Swainson's hawk and also sets forth conditions that UC Merced must comply with in the event that it decides that it will remove a tree formerly used by Swainson's hawk for nesting, as a result of compliance with the ITP, implementation of the 2020 LRDP would result in a less than significant impact on nesting Swainson's hawks.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, those projects would likely not be near a Swainson's hawk nest site. However, if the project site is near a nest site, construction activities will comply with the ITP, and the impact would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact BIO-8: Implementation of the 2020 LRDP would not result in a substantial adverse impact on special-status avian species from the loss of foraging habitat. ***(Less than Significant)***

The 2009 LRDP EIS/EIR analyzed the potential for the development of the campus and Community North sites to adversely affect foraging habitat for special-status avian species. The EIS/EIR noted that the campus and Community North sites are used for foraging by numerous special-status birds, including white-tailed kite, northern harrier, bald eagle, merlin, prairie falcon, short-eared owl, burrowing owl, loggerhead shrike, California horned lark, tricolored blackbird, and mountain plover. Though not reported to forage on site, golden eagle and ferruginous hawk are known to occur in the project vicinity and have potential to use the site for foraging. The 2009 LRDP EIS/EIR noted that the development of the campus and Community North sites would result in the removal of about 1,514 acres of annual grassland and irrigated pasture communities that provide suitable foraging habitat for special-status avian species. As discussed under **LRDP Impact BIO-7** above, Conservation Lands acquired or conserved by UC Merced contain more than 5,385 acres of comparable foraging habitats in Tier 1(a) Conservation Lands and 15,830 acres in Tier 2 Conservation Lands. These lands offset the loss of this habitat on the campus and Community North sites at a ratio of 3.5:1 considering Tier 1 Conservation Lands only and 14:1 overall. In addition, UC Merced has placed a conservation easement on 167 acres that make up the Merced County Preserve and 50 acres within the YLCA. CDFW requires that the loss of foraging habitat (and burrowing habitat) be offset by acquiring and permanently protecting a minimum of 6.5 acres of foraging habitat per occupied burrow identified on the project site as recommended by the 1995 Staff Report on Burrowing Owl Mitigation (California Department of Fish and Game 1995). The updated 2012 Staff Report on Burrowing Owl Mitigation (California Department of Fish and Game 2012), which replaced the 1995 Staff report, does not establish a number of acres to be protected. Regardless, Conservation Lands containing annual grasslands and irrigated pasturelands, preserved as part of the project, well exceed this foraging habitat mitigation requirement. Therefore, the 2009 LRDP EIS/EIR concluded that although the removal of 1,514 acres of foraging habitat for special-status birds, including burrowing owl and tricolored blackbird, would be a potentially significant impact, it would be reduced to a less than significant level through the protection of comparable habitats within Conservation Lands.

As described above, campus development under the 2020 LRDP would occur primarily within an approximately 103-acre area that is designated CMU on the land use diagram, and only some limited small projects may be located within lands with CBRSL and ROS designations. All the acreage that would be developed is a part of the 1,514 acres previously identified in the 2009 LRDP EIS/EIR as foraging habitat that would be lost, and its loss has been adequately mitigated by the conservation of Tier 1(a) and Tier 2 Conservation Lands, Merced County Preserve, and YLCA properties, as described above. The impact on foraging habitat of special-status avian species would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact BIO-9: Implementation of the 2020 LRDP would result in potentially significant adverse impacts on special-status bird species and non-special-status migratory birds and raptors. ***(Potentially Significant; Less than Significant)***

The 2009 LRDP EIS/EIR analyzed the potential for the development of the campus and Community North sites to adversely affect nesting special-status bird species and non-special status migratory birds and raptors. The EIS/EIR noted that the development of the campus and Community North sites would result in the direct loss of suitable ground and tree/shrub nesting habitat through the removal of annual grassland, irrigated pasture, vernal pools, and seasonal freshwater marsh communities, and the removal of individual trees and shrubs that occur mainly along the canals and the boundary of the project site. Additionally, site development has the potential to disturb active special-status and non-special-status migratory bird nests if ground-disturbing activities and/or construction occurs during the breeding season (generally February 15 through August 15). Special-status birds known to nest on or near the campus and Community North sites include western burrowing owl, Swainson's hawk (discussed above under **LRDP Impact BIO-7**), and tricolored blackbird. Other special-status birds for which there is suitable nesting habitat on and adjacent to the campus and Community North sites include California horned lark, white-tailed kite, short-eared owl, and loggerhead shrike. The campus and Community North sites and adjacent lands also contain suitable nesting habitat for numerous non-special-status migratory birds, including red-tailed hawk, red-winged blackbird, killdeer, mourning dove, northern mockingbird, and cliff swallow, whose nests are protected under the MBTA and CDFG Code Sections 3503 and 3503.5. As the destruction or disturbance of active nests resulting in nest failure or loss of individuals would be a potentially significant impact, the 2009 LRDP EIS/EIR set forth Mitigation Measures BIO-9a and -9b which would reduce impact to a less than significant level. Following the certification of the 2009 LRDP EIS/EIR, UC Merced proceeded with the construction of new facilities, and since 2016, with the construction of the 2020 Project, and has been implementing Mitigation Measures BIO-9a and 9b to avoid and minimize impacts.

As described above, campus development under the 2020 LRDP would occur primarily within an approximately 103-acre area that is designated CMU on the land use diagram. Some smaller projects may also be located within lands with other land use designations. Should nesting birds be present on or near future construction sites, construction activities could adversely affect nesting birds. This is considered a potentially significant impact.

To address this impact, **LRDP Mitigation Measure BIO-9a** is set forth below. This mitigation measure is substantially revised from the prior Mitigation Measures BIO-9a and 9b in that it includes revisions made to align the mitigation measure with the conditions set forth in the ITP and it has also been updated based on CDFW's 2012 Staff Report related to burrowing owl mitigation. It replaces the prior mitigation measures.

Bird injury and mortality resulting from collisions with buildings and other man-made structures is a common occurrence in urban and suburban settings. Approximately 100 million to 1 billion birds die in North America as a result of collisions each year (Loss et al. 2014). Daytime collisions occur most often when birds fail to recognize window glass because it reflects clouds, sky, or vegetation. At night, during spring and fall bird migrations when inclement weather occurs, birds can be attracted to lighted structures resulting in collisions, entrapment, excess energy expenditure, and exhaustion (Manville 2009). The frequency of bird collisions in any particular area depends on many factors, including local and migratory avian populations, densities and species composition, migration characteristics, resting and feeding patterns, habitat preferences, time of year, prevailing winds, and weather conditions. UC Merced's location along the Pacific Flyway migratory route and its setting within a diverse environment that provides habitat for many resident bird species increases the potential for bird collisions on campus.

Resident and migratory birds could die or be injured by striking reflective and plate glass windows or other features such as breezeways associated with the new buildings that are constructed on the campus under the 2020 LRDP. The 2020 LRDP includes an implementation strategy under GOAL CD-1 (*Design Buildings to Respond to Site Conditions and the Natural Environment*) to help ensure that future development prevents and reduces bird collisions with campus structures: "Design buildings to respond to natural environment conditions on the site by incorporating wall and fenestration design features that will prevent and reduce wildlife (i.e. bird) fatalities." While the design provision would ensure that buildings are designed to minimize bird injury and mortality, the impact would still be potentially significant. **LRDP Mitigation**

Measure BIO-9b shall be implemented to ensure that specific building projects proposed under the 2020 LRDP include appropriate bird safety designs. With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the small size and nature of these projects, they would be unlikely to substantially affect nesting birds or birds in flight. However, these small-scale projects would be required to implement **LRDP Mitigation Measures BIO-9a and BIO-9b** below. With mitigation, the impact would be less than significant.

Mitigation Measures:

LRDP MM BIO-9a: Avoid and minimize impacts on native birds protected under the MBTA, including listed species, fully protected species, special-status species of concern, and raptors and passerines.

(a) Limit ground disturbance activities to the non-breeding season and remove potential unoccupied breeding habitat during the non-breeding season if possible. If breeding season work is required, conduct take avoidance (tree, shrub, and ground) nest surveys to identify and avoid active nests.

- If feasible, UC Merced shall conduct all project-related activities including (but not limited to) tree and shrub removal, other vegetation clearing, grading, or other ground disturbing activities during the non-breeding season (typically between September 16 and February 14).

- If activities are scheduled to occur during the breeding season (typically between February 15 through September 15), applicable CDFW and/or USFWS permit conditions in the permits issued to the University related to bird surveys must be followed. In addition, a UC Merced-approved qualified avian biologist, with knowledge of the species to be surveyed, shall conduct focused nesting surveys within 15 days prior to the start of project or ground-disturbing activities and within the appropriate habitat. The qualified avian biologist shall determine the exact survey duration and location (typically 500 feet around the work area) based on the work conditions and shall take into account existing applicable CDFW or USFWS permit conditions.

- If an unoccupied nest (without birds or eggs) of a non-listed or fully protected species (as determined by the qualified avian biologist) is found, the nest shall be removed under the direction of the qualified avian biologist.

- If an active nest is located, the qualified avian biologist shall establish an appropriate no-disturbance buffer around the nest making sure that any buffer width required by the University's permit obligations is followed. A 500-foot buffer is recommended for listed or fully protected nesting birds (or another buffer determined in consultation with CDFW and/or

USFWS), a 250-foot buffer around raptors, and a 75-foot buffer around passerines. If work activities cause or contribute to a bird being flushed from a nest, the buffer width shall be adjusted to avoid and minimize impacts to nesting birds.

- A qualified avian biologist shall monitor the nest site regularly during work activities to ensure that the nest site is not disturbed, the buffer is maintained and the success or failure of the nest is documented.
- If UC Merced elects to remove a nest tree, nest trees may only be removed after the qualified avian biologist has determined that the nests are unoccupied.
- If an active nest is causing a safety hazard, CDFW shall be contacted to determine if the nest can be removed.

(b) Minimize impacts to burrowing owl and compensate for habitat loss.

CDFW (2012) recommends that take-avoidance (preconstruction) surveys be conducted to locate active burrowing owl burrows in the construction work area and within an approximately 500-foot buffer zone around the construction area. a qualified avian biologist shall conduct take avoidance surveys for active burrows according to the CDFW's Staff Report on Burrowing Owl Mitigation (2012 Staff Report). Surveys shall be conducted no less than 14 days prior to initiating ground disturbance activities and surveillance surveys should be conducted as frequently as recommended in the 2012 Staff Report. If ground-disturbing activities are delayed or suspended for than 30 days after the take avoidance survey, the area shall be resurveyed. If no burrowing owls are detected, no further mitigation is required.

If active burrowing owls are detected, the following additional measures are required:

- Project implementation shall seasonally and spatially avoid negative impacts and disturbances that could result in the take of burrowing owls, nest or eggs.
- If burrowing owls and their habitat can be protected in place or adjacent to a construction site, buffer zones, visual screens or other measures shall be used to minimize disturbance impacts while project activities are occurring. To use these minimization measures, a qualified avian biologist shall determine the exact measures following the guidance described in the 2012 Staff Report.

- If owls must be moved away from the project site during the nonbreeding season, passive relocation techniques (e.g., installing one- way doors at burrow entrances) shall be used instead of trapping, as described in CDFW guidelines. At least 1 week will be necessary to complete passive relocation and allow owls to acclimate to alternate burrows.

- When destruction of occupied burrows is unavoidable during the nonbreeding season (September 1 to January 31), unsuitable burrows shall be enhanced (enlarged or cleared of debris) or new burrows created (by installing artificial burrows) at a ratio of 2:1 on protected lands approved by the CDFW. Newly created burrows shall follow guidelines established by the CDFW.

LRDP MM BIO-9b: New buildings and structures proposed under the 2020 LRDP shall incorporate bird-safe design practices (for example, American Bird Conservancy's *Bird-Friendly Building Design* [2015] or San Francisco Planning Department's *Standards for Bird-Safe Buildings* [2011]). The UC Merced Physical and Environmental Planning Department shall review the final designs of the buildings and structures to determine that appropriate bird safety designs have been effectively incorporated to reduce potential impacts to birds. The following design strategies shall be considered in the design of buildings and structures:

- Create building facades with "visual noise" via cladding or other design features that make it easier for birds to identify buildings and not mistake windows for open sky or trees.

- Incorporate windows that are not clear or reflective into the building or structure designs.

- Use windows that incorporate glass types such as UV-A or fritted glass and windows that incorporate UV-absorbing and UV-reflecting stripe.

- Use grid patterns on windows in locations with the highest potential for bird-window collisions (e.g., windows at the anticipated height of adjacent vegetation at maturity).Reduce the proportion of glass to other building materials in new construction.

- Avoid placement of bird-friendly attractants (i.e. vegetated roofs, water features, tall trees) near glass whenever possible.

- Install motion-sensitive lighting in any area visible from the exterior that automatically turn lights off during after-work hours.

Significance after Mitigation: Less than significant

LRDP Impact BIO-10: Implementation of the 2020 LRDP would not result in substantial adverse impacts to San Joaquin kit fox due to the loss of suitable residence and dispersal habitat. ***(Less than Significant)***

The 2009 LRDP EIS/EIR analyzed the potential for the development of the campus and Community North sites to adversely affect San Joaquin kit fox due to loss of suitable residence and dispersal habitat. The 2009 LRDP EIS/EIR noted that the campus and Community North sites are located within the current range of San Joaquin kit fox (USFWS 1998, CNDDB 2018). Four San Joaquin kit fox sightings have been documented within a 10-mile radius of the project site (CNDDB 2018). The closest of these sightings was in 1999 of an adult foraging within approximately 1 mile of the project site along the Black Rascal Creek drainage. The remaining three records were of foraging or dispersing individuals with only one record involving juvenile kit fox. The nearest documented breeding population was observed in 1999 approximately 15 miles southwest of the project site near Chamberlain Road. It appears likely, based on these recorded occurrences, that individuals dispersing from populations within the region could use portions of the campus and Community North sites for dispersal to reach suitable habitats to the north and east.

A San Joaquin kit fox habitat suitability model was created as part of the preparation of the *Conservation Strategy* for the Proposed Action. This model facilitated the assessment of the quality and distribution of potential San Joaquin kit fox residence (i.e., breeding) and dispersal habitat in the project site and region. Habitat suitability was evaluated at a landscape scale to assign suitability values to lands for residence and dispersal, and ultimately to assess the potential impacts of the Proposed Action on suitable habitat. This model rated lands within the project site and the project region as primary habitat, secondary habitat, or unsuitable. The model identified primary habitat as habitat suitable for denning or residence, which is assumed to support dispersal as well; secondary habitat as habitat suitable for dispersal only (excludes primary habitat areas); and unsuitable habitat as unsuitable for both denning and dispersal. Based on this model, about 49 percent (180,431 acres) of the project region is suitable for San Joaquin kit fox residence and about 41 percent (150,644 acres) of the project region is suitable for San Joaquin kit fox dispersal only (ICF Jones & Stokes 2008).

The 2009 LRDP EIS/EIR determined that development of campus and Community North sites would result in the direct loss of 804 acres of residence habitat and potential indirect impacts (noise, increased traffic, and other human-related disturbance) to an additional 489 acres, and the loss of 610 acres of dispersal-only habitat and potential indirect impacts to an additional 66 acres of adjacent dispersal-only habitat. Therefore, the campus and Community North site development would affect 0.7 percent of the total amount of residence habitat and 0.5 percent of the total area suitable for dispersal in the approximately 371,000-acre eastern Merced County region (UC Merced 2009).

The 2009 LRDP EIS/EIR noted that through preservation and management of Tier 1 and Tier 2 Conservation Lands, more than 25,918 acres of habitat suitable for kit fox would be conserved, of which 94 percent (24,394 acres) is suitable for residence. As a condition of approval for the proposed development of the campus, the 2002 BO required a minimum 3:1 compensation ratio for the loss of suitable kit fox habitat. Project compensation ratios from Tier 1(a) Conservation Lands for the campus and Community North site development are 4:1 for residence habitat and 3:1 for all kit fox habitat. With incorporation of Tier 2 Conservation Lands, compensation ratios are 16:1 for residence habitat and 11:1 for all kit fox habitat. All these ratios are even higher if the preservation of the Merced County Preserve and YLCA are taken into account. These Conservation Land acquisitions contribute to the recovery plan objectives of conserving 90 percent of existing natural lands along the northeastern valley edge from San Joaquin to Madera Counties (U.S. Fish and Wildlife Service 1998) and establishing a corridor that maintains the potential for dispersal from valley floor habitats to and along the project region (i.e., the Sandy Mush Road Corridor) (U.S. Fish and Wildlife Service 1998). Additionally, the 2002 BO issued by USFWS required UC Merced to manage grazing to provide suitable grass height within the Conservation Lands for kit fox and to enhance kit fox habitat and provide protection for kit fox from free-roaming dogs by artificial den construction. According the 2009 BO, UC Merced agreed to prepare and implement a comprehensive strategy for conservation of the San Joaquin kit fox. The strategy included preserving a large area suitable for residence and a movement corridor east and north of the campus, as well as other actions, if feasible, such as enhanced passage over existing Merced Irrigation District (MID) canals. In compliance with the BO, in 2015 eight artificial dens were installed on the Tier 1(a) Conservation Lands. The artificial dens have been monitored with cameras and no kit foxes have been detected. As reflected in **Table 4.2-1**, UC Merced has conducted annual camera trapping within the Tier 1(a) Conservation Lands between 2014 and 2017 to detect the presence of San Joaquin kit fox. However, despite this effort over a 4-year period, no San Joaquin kit foxes have been observed to date on or near the project site.

There is low potential for kit foxes to occur on the campus site because kit foxes have not been observed on or near the campus since the establishment of the campus. Furthermore, as described above, campus development under the 2020 LRDP would occur within an approximately 103-acre area that is designated CMU on the land use diagram, and other lands within the campus site would not be developed, although some small projects may be located within lands with CBRSL and ROS designations. However, there is some potential for kit foxes to disperse through the campus site, and a potential for physical harm to a kit fox, should one be present within a construction site. Both the 2002 BO and the 2009 BO issued to UC Merced by the USFWS and the ITP issued by CDFW contain extensive requirements, including pre-construction surveys and compliance measures, that UC Merced must implement during construction of projects to avoid harm to kit fox. Compliance with the BO and ITP requirements would adequately avoid and minimize harm to kit fox. The impact related to injury or mortality of kit fox due to construction activities would be less than significant.

Mitigation Measures: No mitigation is required.

4.2.6 Cumulative Impacts and Mitigation Measures

Cumulative Impact C-BIO-1: **Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not result in the loss or adverse modification of vernal pool wetlands, clay slope wetlands, and other seasonal wetlands.** ***(Less than Significant)***

The study area for a potential cumulative impact on wetlands is eastern Merced County. Eastern Merced County is generally defined as the area bound by Highway 99 to the west, Stanislaus County to the north, Mariposa County to the east, and Madera County to the south. This area comprises about 365,450 acres, the majority of which consists of lands in grazing and agricultural uses, with urban and residential uses concentrated in the western portion of the study area along Highway 99. Eastern Merced County was defined as the study area for cumulative impacts because this portion of the County contains resources similar to those that would be affected by the proposed project.

As described in the 2009 LRDP EIS/EIR, annual grasslands are the predominant natural habitat occurring over vast tracts of land in the eastern portion of the study area. These grasslands in eastern Merced County are used as rangeland. A variety of vernal pool wetlands are interspersed in a complex web throughout the grassland habitat, especially in areas with mima mound topography and on low gradient terraces. This grassland-vernal pool landscape is the largest remaining block of pristine unfragmented vernal pool habitat in California (USFWS 2005). Freshwater marsh and riparian habitats are more limited in their distribution in the study area and are associated with creeks and streams and leaking irrigation canals.

Substantial amount of wetland acreage in eastern Merced County has already been filled in conjunction with past development associated with agricultural and water conveyance projects, as well as urbanization.

Population growth in the Central Valley, and in eastern Merced County in particular, would result in additional losses of vernal pool habitat within the study area.

As discussed in the 2009 LRDP EIS/EIR, development of the campus and University Community North sites would result in the loss of 85.05 acres of wetlands, including 17.51 acres of vernal pools, 25.19 acres of swale wetlands, 0.33 acre of clay slope wetlands, 12.24 acres of irrigation wetlands, 28.75 acres of canal wetlands, and 1.03 acres of intermittent channels. In addition, the Campus Parkway project was projected to result in the loss of approximately 0.24 acre of seasonal marsh and temporary impacts to approximately 0.41 acre of riparian and forest scrub. Other development in eastern Merced County under the City of Merced and Merced County general plans would also result in additional temporary and permanent impacts on the types of wetlands listed above.

All new development would be subject to the regulatory and permitting requirements imposed by the USACE, the USFWS, CDFW, and the RWQCB. Projects subject to these requirements must demonstrate that mitigation for loss of wetland habitats would result in no net loss of wetland function and values and that mitigation would be sufficient to ensure that adverse impacts would not occur to special-status species that might be affected by filling of wetland habitat. Because all development projects would comply with the no net loss policy and to the extent there are small losses of wetlands that fall under nationwide permits and are not compensated by replacement wetlands, such small losses would not represent a substantial cumulative loss of wetlands. Therefore, on a cumulative basis, the impact on wetlands would normally be expected to be less than significant. However, as noted in the 2009 LRDP EIS/EIR, a substantial amount of wetland acreage in eastern Merced County has already been filled in conjunction with past development. Based on the historical losses of wetlands and the potential that some future losses may not fully mitigated by creation/restoration of wetlands, the 2009 LRDP EIS/EIR concluded that the cumulative impact on wetlands within the study area would be significant. However, the 2009 LRDP EIS/EIR also concluded that the high compensatory mitigation ratios demonstrate that the project's contribution to the significant cumulative impact would not be cumulatively considerable.

As described above under **LRDP Impact BIO-1**, the impacts of campus development on wetlands were fully evaluated in the 2009 LRDP EIS/EIR, and in compliance with the DA permit, have been fully mitigated for filling all except about 4.81 acres of vernal pools and swales. In the event that UC Merced fills all of the remaining vernal pool wetlands such that the total fill equals the permitted fill of 40.41 acres, it will provide an additional 4.81 acres of compensatory vernal pool mitigation.

There is very limited acreage of unfilled vernal pools and swales within the CMU area that would be developed under the proposed 2020 LRDP, and campus development under the 2020 LRDP is not expected to affect any wetlands for which adequate compensatory mitigation has not been provided. As described above, if a project is proposed that requires filling of the remaining permitted vernal pool and swale acreage, UC Merced will mitigate the loss via purchase of vernal pool credits under the ILF Program. Any small-scale projects that may be located within lands designated CBRSL or ROS will be sited to avoid fill of wetlands. Furthermore, due to the small size of these projects (i.e., less than 1 acre of ground disturbance), they would be unlikely to substantially affect wetlands.

For these reasons, cumulative impacts on wetlands within the study area would be less than significant, and the 2020 LRDP would not result in a cumulatively considerable contribution to a significant impact related to vernal pool wetlands, clay slope wetlands, and other seasonal wetlands.

Mitigation Measures: No mitigation is required.

Cumulative Impact C-BIO-2: **Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not result in the loss or adverse modification of important special-status plant and wildlife habitat, including adverse effects to special-status plant and wildlife species that occupy or could potentially occupy these habitats.** ***(Less than Significant)***

As described in the 2009 LRDP EIS/EIR, the development of the campus and University Community North sites would result in the reduction in numbers of individuals and a loss of occupied habitat of three special-status plant species (succulent owl's clover, dwarf downingia, and shining navarretia) associated with vernal pools. The development of the campus and University Community North sites would also result in a direct and indirect impact on occupied vernal pool fairy shrimp habitat and vernal pool tadpole shrimp habitat. The project would also remove or otherwise affect the following sensitive biological resources: California tiger salamander habitat; Swainson's hawk foraging habitat; occupied burrowing owl nesting habitat; suitable nesting habitat for other special-status and non-special-status migratory birds; and kit fox residence and dispersal habitat. Because these species occur in various parts of eastern Merced County, the 2009 LRDP EIS/EIR noted that it was reasonable to expect that other future development in this part of the County under the City of Merced and Merced County general plans would similarly affect these resources in the study area. Although all projects would be required to reduce their individual impacts to a less than significant level as part of their environmental review process and permitting, however, some reduction in habitat would still occur. In addition, as discussed above, substantial amount of habitat in eastern Merced County has already been removed in conjunction with past development and other activities such as agricultural conversions. Therefore, the combined effect of past, current and future projects on special-status species habitat was considered a significant cumulative impact in the 2009 LRDP EIS/EIR. The 2009 LRDP EIS/EIR noted that the University had committed to placing more than 26,000 acres within the study area under conservation. These conservation lands contain comparable habitats to the habitats that would be lost as a result of project implementation. Furthermore, the high mitigation ratios that result from the University's conservation, restoration, and compensatory mitigation actions would more than compensate for the direct and indirect impacts of campus and Community North site development. Therefore, the 2009 LRDP EIS/EIR concluded that the project's incremental contribution to the cumulative loss of habitat for all of the species listed above would not be cumulatively considerable.

As discussed above, implementation of the 2020 LRDP would affect a much smaller area than previously analyzed in the 2009 LRDP EIS/EIR for species impacts. Furthermore, the University has proceeded with the conservation of substantial acreages of habitat (nearly 24,000 acres) for special-status species within Tier 1(a) Conservation Lands, Tier 2 Conservation Lands, Merced County Preserve, and YLCA. UC Merced also implements and will continue to implement the avoidance measures and requirements set forth in the BO and the ITP to avoid and minimize impacts on listed species. UC Merced has been and will continue to implement LRDP Mitigation Measure BIO-9a to minimize impacts on nesting birds and will implement LRDP Mitigation Measure BIO-9b to minimize bird mortality and injury. Therefore, campus development under the 2020 LRDP would result in an incremental contribution to the cumulative loss of habitat that would not be considerable, and the project's cumulative impact on special-status plant and wildlife species would be less than significant.

Mitigation Measures: No mitigation is required.

4.2.7 References

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4.3 GREENHOUSE GAS EMISSIONS

4.3.1 Introduction

This section of the Recirculated Draft SEIR (SEIR) discusses the existing global, national, and statewide conditions related to greenhouse gases (GHG) and global climate change and evaluates the potential impacts on global climate from the implementation of the proposed UC Merced 2020 LRDP (2020 LRDP or proposed project). In addition, the section provides a discussion of the applicable federal, state, regional, and local agencies that regulate, monitor, and control GHG emissions.

The project is located within the air basin that is under the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). Data used to prepare this section were taken from various sources, including the San Joaquin Valley Air Pollution Control District's *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA,* and *the District Policy for Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency* published in 2009, *Guide for Assessing and Mitigating Air Quality Impacts* (GAMAQI) published in 2015, and technical analyses conducted for the project. The technical documents are presented in **Appendix 4.1** of this SEIR.

4.3.2 Environmental Setting

Background

Global climate change refers to any significant change in climate measurements, such as temperature, precipitation, or wind, lasting for an extended period (i.e., decades or longer) (US EPA 2013). Climate change may result from:

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- Natural processes within the climate system (e.g., changes in ocean circulation, reduction in sunlight from the addition of GHG and other gases to the atmosphere from volcanic eruptions); and
- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification).

The primary effect of global climate change has been a rise in the average global tropospheric temperature of 0.2 degree Celsius (°C) per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling using 2000 emission rates shows that further warming is likely to occur, which would induce further changes in the global climate system during the current century (IPCC 2007). Changes to the global climate system and ecosystems, and to California, could include:

- Declining sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures (IPCC 2007);
- Rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets. Along most of the California coast, the average values for future sea level rise are projected to be approximately 6 inches by 2030, 12 inches by 2050, and 36 inches by 2100 (NRC 2012);
- Changing weather patterns, including changes to precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones (IPCC 2007);
- Declining Sierra snowpack levels, which account for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years (Cal EPA 2006);
- Increasing the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas located in the Southern California area and the San Joaquin Valley by the end of the 21st century (Cal EPA 2006);
- Increasing the potential for erosion of California's coastlines and sea water intrusion into the Sacramento and San Joaquin Delta and associated levee systems due to the rise in sea level (Cal EPA 2006);
- Increasing pest infestation, making California more susceptible to forest fires (Cal EPA 2006);
- Increasing the demand for electricity by 1 to 3 percent by 2020 due to rising temperatures resulting in hundreds of millions of dollars in extra expenditures (Cal EPA 2006); and
- Summer warming projections in the first 30 years of the 21st century ranging from about 0.5 to 2 °C (0.9 to 3.6 °F) and by the last 30 years of the 21st century, from about 1.5 to 5.8 °C (2.7 to 10.5 °F) (Cal EPA 2006).

The natural process through which heat is retained in the troposphere[1] is called the "greenhouse effect." Various gases in the Earth's atmosphere, classified as atmospheric GHGs, play a critical role in determining the Earth's surface temperature. Solar radiation enters Earth's atmosphere as short-wave radiation. It travels through the atmosphere without warming it and is absorbed by the Earth's surface. When the Earth re-emits this radiation back toward space, the radiation changes to long wave radiation. GHGs are transparent to incoming short-wave solar radiation but absorb outgoing long wave radiation.

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[1] The troposphere is the bottom layer of the atmosphere, which varies in height from the Earth's surface from 6 to 7 miles).

As a result, radiation that otherwise would escape back into space is now retained, warming the atmosphere. This phenomenon is known as the greenhouse effect.

Greenhouse Gases

State law defines GHGs to include the following six compounds:

- **Carbon Dioxide** (CO_2) is released to the atmosphere when solid waste, fossil fuels (oil, natural gas, and coal), and wood and wood products are burned. CO_2 emissions from motor vehicles occur during operation of vehicles and operation of air conditioning systems. CO_2 comprises over 80 percent of GHG emissions in California (Cal EPA 2014).

- **Methane** (CH_4) is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from the decomposition of organic waste in solid waste landfills, raising livestock, natural gas and petroleum systems, stationary and mobile combustion, and wastewater treatment. Methane makes up 8.3 percent of all GHGs, and mobile sources and general fuel combustion represent 0.69 percent of overall methane emissions (Cal EPA 2014).

- **Nitrous Oxide** (N_2O) is emitted during agricultural and industrial activities, as well as during combustion of solid waste and fossil fuels. Mobile sources represent about 12 percent of N_2O emissions (US EIA 2011). N_2O emissions from motor vehicles generally occur directly from operation of vehicles.

- **Hydrofluorocarbons** (HFCs) are one of several high global warning potential (GWP) gases that are not naturally occurring and are generated from industrial processes. HFC (refrigerant) emissions from vehicle air conditioning systems occur due to leakage, losses during recharging, or release from scrapping vehicles at end of their useful life.

- **Perfluorocarbons** (PFCs) are another high GWP gas that are not naturally occurring and are generated in a variety of industrial processes. Emissions of PFCs from motor vehicles are generally negligible.

- **Sulfur Hexafluoride** (SF_6) is another high GWP gas that is not naturally occurring and is generated in a variety of industrial processes. Emissions of SF_6 from motor vehicles are generally negligible.

While water vapor and carbon dioxide (CO_2) are the most abundant GHGs, other trace GHGs have a greater ability to absorb and re-radiate long-wave radiation. To gauge the potency of GHGs, scientists have established a Global Warming Potential (GWP) for each GHG based on its ability to absorb and re-emit long-wave radiation over a specific period. The GWP of a gas is determined using CO_2 as the reference gas, which has a GWP of 1 over 100 years (IPCC 2007).[2] For example, a gas with a GWP of 10 is 10 times more potent than CO_2 over 100 years. The use of GWP allows GHG emissions to be reported using CO_2 as a baseline. The sum of each GHG multiplied by its associated GWP is referred to as "carbon dioxide equivalents" (CO_2e). This essentially means that 1 metric ton of a GHG with a GWP of 10 has the

2 All Global Warming Potentials are given as 100-year values.

same climate change impacts as 10 metric tons of CO_2. As illustrated in **Table 4.3-1**, **Global Warming Potential of Greenhouse Gases,** the other GHGs are less abundant but have higher GWP than CO_2. To account for this higher potential, emissions of other GHGs are frequently expressed in the equivalent mass of CO_2, denoted as CO_2e. Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted. High GWP gases such as HFCs, PFCs, and SF_6 are the most heat-absorbent.

Table 4.3-1
Global Warming Potential of Greenhouse Gases

Greenhouse Gas	Global Warming Potential Factor (100-Year)
Carbon Dioxide (CO_2)	1
Methane (CH_4)	25
Nitrous Oxide (N_2O)	298
Perfluorocarbons (PFCs)	7,390-12,200
Hydrofluorocarbons (HFCs)	124-14,800
Sulfur Hexafluoride (SF_6)	22,800

Source: Southern California Association of Governments, Draft Program EIR for 2016 RTP/SCS. November 24, 2015.
Note: Global warming potential measures how much heat a GHG traps in the atmosphere, in this case, over a 100-year period.

GHG Emissions Classification

To achieve consistency in reporting across different geographies, the GHG Protocol established by the World Research Institute, developed a GHG emissions classification system that classifies GHG emissions into three categories based on the nature and source of the emissions. This classification system is listed in the University of California Sustainable Practices Policy and is used by the University to gather data on its annual GHG emissions for reporting to the California Climate Action Registry.

- Scope 1 GHG emissions include direct emissions that are emitted on the project site/facility and are associated with on-site combustion of natural gas, fuel use in vehicle fleets, and fugitive emissions of gases used for refrigeration and scientific research. Fugitive gases include hydrofluorocarbon gases, perfluorocarbon gases, and sulfur hexafluoride (SF_6).

- Scope 2 GHG emissions include indirect emissions associated with the consumption of purchased energy from off-site sources. Scope 2 electricity emissions reflect emissions from all energy used at the electricity-generating power plant, but exclude transmission and distribution losses, which are reported under Scope 3.

- Scope 3 GHG emissions include indirect emissions not covered in Scope 2, including GHG emissions from employee commuting, business air and ground travel, electricity transmission and distribution losses, off-site wastewater treatment, and off-site municipal solid waste disposal.

These definitions of Scope 1, 2 and 3 emissions are used at UC Merced to gather and report GHG emissions data annually.

Note that CEQA requires an evaluation of direct and indirect emissions. With the exception of business air and ground travel, all of the Scope 1, 2, and 3 emission sources listed above must be addressed in a CEQA document. In addition, CEQA requires that the estimate of a project's emissions include emissions from the supply, treatment, and distribution of water used by the project.

UC Merced GHG Emissions

As required by University policy, since 2009, UC Merced has been estimating and reporting its Scope 1, 2, and Scope 3 (commuting only) emissions to the California Climate Action Registry. **Table 4.3-2, UC Merced Reported GHG Emissions,** below presents the reported emissions through 2017. Although the campus has been growing in the number of buildings, and its population (students and employees) has more than doubled since 2009, as the table shows, the campus's GHG emissions have not been growing – the emissions have remained generally flat and have been declining since 2015 with the implementation of measures by UC Merced to reduce GHG emissions.

Table 4.3-2
UC Merced Reported GHG Emissions (in $MTCO_2e$)

Emission Type	2009	2010	2011	2012	2013	2014	2015	2016	2017
Scope 1	3,432	3,379	3,604	4,363	3,281	4,234	3,951	3,614	4,045
Scope 2	5,277	3,389	3,752	5,227	5,432	5,705	4,162	5,457	2,740
Scope 3	4,246	4,681	4,927	3,328	3,328	3,885	3,412	2,890	2,895
Total	12,955	11,449	12,283	12,918	12,041	13,824	11,525	11,961	9,680
Campus Population	4,345	5,397	6,402	6,976	7,420	7,590	8,052	8,715	9,417

Source: UC Merced 2018.

4.3.3 Regulatory Considerations

International Laws and Regulations

Kyoto Protocol

In 1988, the United Nations established the Intergovernmental Panel on Climate Change to evaluate the impacts of global warming and to develop strategies that nations could implement to curtail global climate change. In 1992, the United States (the "U.S.") joined other countries around the world in signing the United Nations' Framework Convention on Climate Change (UNFCCC) agreement with the goal of controlling greenhouse gas emissions. As a result, the Climate Change Action Plan was developed to address the reduction of GHG emissions in the U.S. The plan currently consists of more than 50 voluntary programs for member nations to adopt. The Kyoto Protocol (the "Protocol") is a treaty made under the UNFCCC and was the first international agreement to regulate GHG emissions. Notably, while the U.S. is a signatory to the Kyoto protocol, Congress has not ratified the Protocol and the U.S. is not bound by the Protocol's commitments. The major feature of the Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions. The major distinction between the Protocol and the UNFCCC is that while the UNFCCC encouraged industrialized countries to stabilize GHG emissions, the Protocol commits them to do so. Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

On December 12, 2015, a Conference of the Parties to the UNFCCC and the 11th session of the Kyoto Protocol negotiated an agreement in Paris that would keep the rise of temperature below 2 degrees Celsius. While 186 countries published their action plans detailing how they plan to reduce their GHG emissions, these reductions would still result in up to 3 degrees Celsius of global warming. The Paris agreement asks all countries to review their plans every five years from 2020, acknowledges that $100 billion is needed each year to enable countries to adapt to climate change. The agreement was signed into law on April 22, 2016. However, in May 2017, President Donald Trump announced that the U.S. would withdraw from the agreement.

The Western Regional Climate Action Initiative

The Western Regional Climate Action Initiative (WCI) is a partnership among seven states, including California, and four Canadian provinces to implement a regional, economy-wide cap-and-trade system to reduce global warming pollution. The WCI will cap GHG emissions from the region's electricity, industrial, and transportation sectors with the goal to reduce the heat trapping emissions that cause global warming to 15 percent below 2005 levels by 2020. When the WCI adopted this goal in 2007, it estimated that this would require 2007 levels to be reduced worldwide between 50 percent and 85 percent by 2050. California is working closely with the other states and provinces to design a regional GHG reduction program that includes a cap-and-trade approach. The California Air Resources Board's (CARB) planned cap and-trade program, discussed below, is also intended to link California and the other member states and provinces.

Federal Rules and Regulations

The U.S. EPA has historically not regulated GHG emissions because it determined the Clean Air Act did not authorize it to regulate emissions that addressed climate change. In 2007, the U.S Supreme Court found that GHG emissions could be considered within the Clean Air Act's definition of a pollutant (*Massachusetts v. EPA et al*, 2007). In December 2009, U.S.EPA issued an endangerment finding for GHG emissions under the Clean Air Act, setting the stage for future regulation. In September 2009, the National Highway Traffic Safety Administration (NHTSA) and U.S. EPA announced a joint rule that would tie fuel economy to GHG emission reduction requirements.

In June 2013, President Obama announced a Climate Action Plan that calls for a number of initiatives, including funding $8 billion in advanced fossil energy efficiency projects, calls for federal agencies to develop new emission standards for power plants, invests in renewable energy sources, calling for adaptation programs, and leading international efforts to address climate change. There have been numerous executive actions, proposed and finalized agency regulations, investment strategies, budget requests, and international bilateral agreements. This includes a final rule for the Clean Power Plan issued in August 2015, which has been challenged in court and the current administration has proposed rolling the rule back.

Vehicle Standards

Other regulations have been adopted to address vehicle standards, including the U.S. EPA and the NHTSA joint rulemaking for vehicle standards.

- On March 30, 2009, the NHTSA issued a final rule for model year 2011 (NHSTA 2009).
- On May 7, 2010, the U.S. EPA and the NHTSA issued a final rule regulating fuel efficiency and GHG emissions pollution from motor vehicles for cars and light-duty trucks for model years 2012–2016 (US EPA 2010).
- On August 9, 2011, U.S. EPA and NHTSA issued a Supplemental Notice of Intent announcing plans to propose stringent, coordinated federal GHG emissions and fuel economy standards for model year 2017-2025 light-duty vehicles (US EPA and NHTSA 2011).
- NHSTA intends to set standards for model years 2022-2025 in a future rulemaking (NHSTA 2012).

Energy Independence and Security Act

Among other key measures, the Energy Independence and Security Act (EISA) would do the following, which would aid in the reduction of national GHG emissions, both mobile and non-mobile:

- Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
- Prescribe or revise standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

While superseded by NHTSA and U.S. EPA actions described above, EISA also set miles per gallon targets for cars and light trucks and directed the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.

Additional provisions of the EISA address energy savings in government and public institutions, promoting research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."

State Rules and Regulations

Assembly Bill 1493

In September 2002, AB 1493 (Chapter 200, Statutes of 2002) (referred to as Pavley I) was enacted, requiring the development and adoption of regulations to achieve "the maximum feasible reduction of greenhouse gases" emitted by noncommercial passenger vehicles, light-duty trucks, and other vehicles used primarily for personal transportation in the state by January 1, 2005. Pavley I took effect for model years starting in 2009 to 2016 and Pavley II, which is now referred to as "LEV (Low Emission Vehicle) III GHG" will cover 2017 to 2025 (13 Cal. Code Regs. Section 1900 *et seq*.). Fleet average emission standards were to reach a 22 percent reduction by 2012 and 30 percent by 2016.

Executive Order S-3-05

On June 1, 2005, Governor Schwarzenegger issued Executive Order S-3-05, which set the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels. The California Environmental Protection Agency (Cal EPA) formed a Climate Action Team (CAT) that recommended strategies that can be implemented by state agencies to meet GHG emissions targets. The Team reported several recommendations and strategies for reducing GHG emissions and reaching the targets established in the Executive Order (CAT 2006). Furthermore, the report provided to Governor Schwarzenegger in 2006 indicated that smart land use and increased transit availability should be a priority in the State of California (CAT 2006). According to the California Climate Action Team, smart land use is an umbrella term for strategies that integrate transportation and land-use decisions. Such strategies generally encourage jobs/housing proximity, promote transit-oriented development (TOD), and encourage high-density residential/commercial development along transit corridors. These strategies develop more efficient land-use patterns within each jurisdiction or region to match population increases, workforce, and socioeconomic needs for the full spectrum of the population.

Executive Order B-30-15

On April 29, 2015, Governor Brown issued an executive order setting a Statewide GHG reduction target of 40 percent below 1990 levels by 2030. This action aligns the State's GHG targets with those set in October 2014 by the European Union and is intended to help the State meets its target of reducing GHG emissions 80 percent below 1990 levels by 2050. The measure calls on State agencies to implement measures accordingly and directs the CARB to update the Climate Change Scoping Plan.

Assembly Bill 32

In September 2006, AB 32 was signed into law by Governor Arnold Schwarzenegger, focusing on achieving GHG emissions equivalent to statewide levels in 1990 by 2020. It mandates that the CARB establish a quantified emissions cap, institute a schedule to meet the cap, implement regulations to reduce statewide GHG emissions from stationary sources, and develop tracking, reporting, and enforcement mechanisms to ensure that reductions are achieved.

CARB developed an AB 32 Scoping Plan that contains strategies to achieve the 2020 emissions cap. This Scoping Plan, which was developed by CARB in coordination with the CAT, was first published in October 2008 (2008 Scoping Plan). The 2008 Scoping Plan proposed a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce the state's dependence on oil, diversify the state's energy sources, save energy, create new jobs, and enhance public health. It accommodated the State's projected population growth. Moreover, it expressly encouraged called for coordinated planning of growth, including the location of dense residential projects near transportation infrastructure, including public transit.

On May 22, 2014, CARB approved its first update to the AB 32 Scoping Plan, recalculating 1990 GHG emissions using IPCC Fourth Assessment Report (AR4) released in 2007. It states that based on the AR4 global warming potentials, the 427 million metric tons of CO_2e ($MMTCO_2e$) 1990 emissions level would be slightly higher than identified in the original Scoping Plan, at 431 $MMTCO_2e$. Based on the revised estimates of expected 2020 emissions identified in the 2011 supplement to the FED and updated 1990 emissions levels identified in the draft first update to the Scoping Plan, achieving the 1990 emission level would require a reduction of 76 $MMTCO_2e$ or a reduction by approximately 15.3 percent (down from 28.4 percent) to achieve in 2020 emissions levels in the BAU condition. CARB's First Update "lays the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050," and many of the emission reduction strategies recommended by CARB would serve to reduce the project's post-2020 emissions level to the extent applicable by law by focusing on reductions from several sectors (CARB 2014).

On December 14, 2017, CARB approved the final version of *California's 2017 Climate Change Scoping Plan* (2017 Scoping Plan), which outlines the proposed framework of action for achieving the SB 32 2030 GHG target of 40 percent reduction in GHG emissions relative to 1990 levels (CARB 2017a). See further discussion below.

Cap-and-Trade Program

CARB adopted a California Cap-and-Trade Program pursuant to its authority under AB 32. The Cap-and-Trade Program is designed to reduce GHG emissions from major sources (deemed "covered entities") by setting a firm cap on statewide GHG emissions and employing market mechanisms to achieve AB 32's emission-reduction mandate of returning to 1990 levels of emissions by 2020. The statewide cap for GHG emissions from the capped sectors (e.g., electricity generation, petroleum refining, and cement production) commenced in 2013 and declines over time, achieving GHG emission reductions throughout the program's duration.

As of January 1, 2015, the Cap-and-Trade Program covered approximately 85 percent of California's GHG emissions. The Cap-and-Trade Program covers the GHG emissions associated with electricity consumed in California, whether generated in-state or imported. Accordingly, GHG emissions associated with CEQA projects' electricity usage are covered by the Cap-and-Trade Program.

On July 25, 2017, the Governor signed AB 398 into law, extending the Cap-and-Trade Program to 2030. AB 398 calls for half of emissions offsets to be generated in California and prohibits CARB and air districts from regulating CO_2 from sources under the Cap-and-Trade program.

Senate Bill 1368

Senate Bill (SB) 1368 requires the California Public Utilities Commission and the California Energy Commission to establish GHG emissions performance standards for the generation of electricity. These standards will also apply to power that is generated outside of California and imported into the state.

SB 97 & CEQA Guidelines

In August 2007, the California State Legislature adopted Senate Bill 97 (SB 97), requiring the Governor's Office of Planning and Research (OPR) to prepare and transmit new *State CEQA Guidelines* for the mitigation of GHG emissions or the effects of GHG emissions. In response to SB 97, the California Natural Resources Agency (CNRA) adopted amendments to the *State CEQA Guidelines* that require evaluation of GHG emissions or the effects of GHG emissions. The amendments, in Section 15064.4, provide that:

> (a) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in Section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate, or estimate the amount of greenhouse gas emissions resulting from a project.
>
> (b) A lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:
>
> (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;
>
> (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;
>
> (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions.

The amendments also add Section 15126.4(c), Mitigation Measures Related to Greenhouse Gas Emissions. Generally, this *State CEQA Guidelines* section requires lead agencies to consider feasible means, supported by substantial evidence and subject to monitoring or reporting, of mitigating the significant effects of GHG emissions. Potential measures to mitigate the significant effects of GHG emissions are identified, including those outlined in Appendix F, Energy Conservation, of the *State CEQA Guidelines*.

State Bill 375

On September 30, 2008, SB 375 was instituted to help achieve AB 32 goals through regulation of cars and light trucks. SB 375 aligns three policy areas of importance to local government: (1) regional long-range transportation plans and investments; (2) regional allocation of the obligation for cities and counties to zone for housing; and (3) a process to achieve GHG emissions reductions targets for the transportation sector. It establishes a process for CARB to develop GHG emissions reductions targets for each region (as opposed to individual local governments or households). SB 375 also requires Metropolitan Planning Organizations (MPOs) to prepare a Sustainable Communities Strategy (SCS) within the Regional Transportation Plan (RTP) that guides growth while taking into account the transportation, housing, environmental, and economic needs of the region. SB 375 uses CEQA streamlining as an incentive to encourage residential projects, which help achieve AB 32 goals to reduce GHG emissions.

Executive Order B-30-15

In April 2015, Governor Brown signed Executive Order B-30-15 that provides the state a mid-term target. The executive order establishes a target for the state to reduce its GHG emissions such that the state's 2030 emissions are 40 percent of the 1990 emissions. According to the state, California is on track to meet or exceed the current target of reducing GHG emissions to 1990 levels by 2020, as established in AB 32. The new emission reduction target of 40 percent below 1990 levels by 2030 will make it possible to reach the ultimate goal of reducing emissions 80 percent under 1990 levels by 2050, established by Executive Order S-3-05.

Executive Order S-13-08

On April 29, 2015, Governor Brown issued Executive Order B-30-15. Therein, the governor directed the following:

- Established a new interim statewide reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030 (subsequently codified in SB 32).
- Ordered all state agencies with jurisdiction over sources of GHG emissions to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 reduction targets.
- Directed CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of CO2 equivalent.

Senate Bill 350

On October 7, 2015, Senate Bill 350: Clean Energy and Pollution Reduction Act (SB 350) was signed into law, establishing new clean energy, clean air and greenhouse gas reduction goals for 2030 and beyond. Building off of AB 32, SB 350 established California's 2030 greenhouse gas reduction target of 40 percent below 1990 levels. To achieve this goal, SB 350 set ambitious 2030 targets for energy efficiency and renewable electricity, among other actions aimed at reducing greenhouse gas emissions. SB 350 increases California's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030. This will increase the use of Renewables Portfolio Standard (RPS) eligible resources, including solar, wind, biomass, geothermal, and others. In addition, SB 350 requires the state to double statewide energy efficiency savings in electricity and natural gas end uses by 2030.

Senate Bill 32 (SB 32) and AB 197

On September 8, 2016, California signed into law Senate Bill 32 (SB 32), which adds Section 38566 to the Health and Safety Code and requires a commitment to reducing statewide GHG emissions by 2020 to 1990 levels and by 2030 to 40 percent less than 1990 levels. SB 32 was passed with companion legislation

AB 197, which provides greater legislative oversight of CARB's GHG regulatory programs, requires CARB to account for the social costs of GHG emissions, and establishes a legislative preference for direct reductions of GHG emissions.

As noted above, in November 2017, CARB adopted the 2017 Scoping Plan, which outlines the proposed framework of action for achieving California's SB 32 2030 GHG target: a 40 percent reduction in GHG emissions by 2030 relative to 1990 levels.[3] The 2030 target is intended to ensure that California remains on track to achieve the goal set forth by E.O. B-30-15 to reduce statewide GHG emissions by 2050 to 80 percent below 1990 levels.

The 2017 Scoping Plan identifies key sectors of the implementation strategy, which includes improvements in low carbon energy, industry, transportation sustainability, natural and working lands, waste management, and water. Through a combination of data synthesis and modeling, CARB determined that the target statewide 2030 emissions limit is 260 $MMTCO_2e$, and that further commitments will need to be made to achieve an additional reduction of 50 $MMTCO_2e$ beyond current policies and programs. Key elements of the 2017 Scoping Plan include a proposed 20 percent reduction in GHG emissions from refineries and an expansion of the Cap-and-Trade program to meet the aggressive 2030 GHG emissions goal and ensure achievement of the 2050 limit set forth by E.O. B-30-15. For the transportations sector, the 2017 Scoping Plan indicates that while most of the GHG reductions will come from technologies and low carbon fuels, a reduction in the growth of vehicle miles traveled (VMT) is also needed. The 2017 Scoping Plan indicates that stronger SB 375 GHG reduction targets will enable the State to make significant progress toward this goal, but alone will not provide all of the VMT growth reductions that will be needed. It notes that here is a gap between what SB 375 can provide and what is needed to meet the State's 2030 and 2050 goals. The 2017 Scoping Plan recommends that local governments consider policies to reduce VMT, including: "land use and community design that reduces VMT; transit-oriented development; street design policies that prioritize transit, biking, and walking; and increasing low carbon mobility choices, including improved access to viable and affordable public transportation and active transportation opportunities."

Title 24 Energy Efficiency Standards

California's Energy Efficiency Standards for Residential and Nonresidential Buildings, located at Title 24, Part 6 of the California Code of Regulations and commonly referred to as "Title 24," were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods.

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[3] CARB, *California's 2017 Climate Change Scoping Plan*, November 2017.

California Green Building Standards

The California Green Building Standards Code, which is Part 11 of the California Code of Regulations, is commonly referred to as the *CALGreen* Code. *CALGreen* was added to Title 24 to represent base standards for reducing water use, recycling construction waste, and reducing polluting materials in new buildings. In contrast, Title 24 focuses on promoting more energy-efficient buildings and considers the building envelope, heating and cooling, water heating, and lighting restrictions. The current 2016 *CALGreen* Code became effective January 1, 2017.

Regional Plans and Policies

San Joaquin Valley Air Pollution Control District (SJVAPCD)

The SJVAPCD is a public health agency that was developed to manage air quality for the eight counties in California's Central Valley. The counties include: San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and a portion of Kern. The SJVAPCD is comprised of one representative from each county, one governor-appointed Health and Science member and one Physician, and five Valley city representatives. Plans and policies set forth by SJVAPCD are summarized below.

SJVAPCD Climate Change Action Plan

In November 2008, the SJVAPCD adopted the Climate Change Action Plan (CCAP). The CCAP contains the following goals and actions:

- Develop GHG significance thresholds to address CEQA projects with GHG emission increases.
- Develop the San Joaquin Valley Carbon Exchange for banking and trading GHG reductions.
- Authorize use of the SJVAPCD's existing inventory reporting system to allow use for GHG reporting required by AB 32 regulations.
- Develop and administer GHG reduction agreements to mitigate proposed emission increases from new projects.
- Support climate protection measures that reduce GHG emissions as well as toxic and criteria pollutants. Oppose measures that result in a significant increase in toxic or criteria pollutant emissions in already impacted areas.

In an attempt to minimize GHG emissions within the air district, the CCAP directed the Air Pollution Control Officer (APCO) to develop guidance documents regarding GHG emissions under CEQA. Other items designated to the APCO include exploring the potential of developing a GHG banking program, enhancing the current emissions inventory, and administering voluntary GHG reduction agreements.

The CCAP discusses current regulations regarding GHGs and presents multiple methodologies for addressing GHG impacts.

Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA

In late 2009, the SJVAPCD adopted the "Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA," and the policy "District Policy—Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency," providing further direction to CEQA analysis within the jurisdiction of SJVAPCD. As GHG quantification was still relatively new and inadequate, the policy was an early step in tying project-specific GHG emissions to global climatic change. It surmised that project-specific emissions do have a cumulative effect on global climate change and mitigation is necessary to minimize a project's contributions to climate change.

The SJVAPCD's guidance allows for a fairly streamlined process of determining if project-specific GHG emissions would have a significant effect. Projects exempt from the requirements of CEQA, and projects complying with an approved plan or mitigation program would be determined to have a less than significant cumulative impact. Such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources and must have a certified final CEQA document.

When CEQA does apply to a project, the lead agency must evaluate the project against performance-based standards and would require the adoption of design elements, known as a Best Performance Standard (BPS), to reduce GHG emissions.

According to SJVAPCD guidance, quantification of GHG emissions would be required for all projects for which the lead agency has determined that an environmental impact report is required, regardless of whether the project incorporates BPS.

For stationary source permitting projects, BPS means, "The most stringent of the identified alternatives for control of GHG emissions, including type of equipment, design of equipment and operational and maintenance practices, which are achieved-in-practice for the identified service, operation, or emissions unit class." The SJVAPCD has identified BPS for the following sources: boilers; dryers and dehydrators; oil and gas extraction, storage, transportation, and refining operations; cogeneration; gasoline dispensing facilities; volatile organic compound control technology; and steam generators. For development projects, BPS means, "Any combination of identified GHG emission reduction measures, including project design elements and land use decisions that reduce project-specific GHG emission reductions by at least 29 percent."

SJVAPCD's Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI)

The GAMAQI was first developed in 2002 to provide technical guidance for the review of air quality impacts resulting from projects within the SJVAPCD. The GAMAQI serves as an advisory document for agencies preparing air quality sections of environmental documents and allows for the uniform analysis of project impacts. The document was later revised in 2012 and 2014, and most recently, in March 2015, to reflect changes in regulations and methodologies. Chapter 4 of the newest version provides an introduction to common GHGs and the importance of evaluating them as air pollutants. The GAMAQI also details how to evaluate potential GHG impacts, despite no one project being large enough to generate emissions substantial enough to change the global climate. The GAMAQI notes that the *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA, and the District Policy for Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency*, adopted in December 2009 continue to be the relevant policy document to address GHG emissions under CEQA.

San Joaquin Valley Carbon Exchange

The CCAP authorized the APCO to develop procedures for a voluntary GHG reduction banking system. The system, the San Joaquin Valley Carbon Exchange, allowed the SJVAPCD to quantify, verify, and track voluntary GHG emissions reductions within the Valley. A team of representatives from land use, agricultural and industry agencies, as well as environmental groups and other interested parties met with the public to create a mechanism to register and quantify GHG emissions reductions.

Rule 2301

Despite the creation of the San Joaquin Valley Carbon Exchange, the SJVAPCD also incorporated a method to register voluntary GHG emission reductions into its existing Rule 2301 - Emission Reduction Credit Banking. In 2012, the rule was amended to include the following:

- Provide an administrative mechanism for sources to bank voluntary GHG emission reductions for later use.
- Provide an administrative mechanism for sources to transfer banked GHG emission reductions to others for any use.
- Define eligibility standards, quantitative procedures, and administrative practices to ensure that banked GHG emission reductions are real, permanent, quantifiable, surplus, and enforceable.

Local Plans and Policies

University of California Sustainable Practices Policy

The University of California Sustainable Practices Policy (Sustainability Policy), most recently updated in January 30, 2018, is a system-wide commitment to minimize the University's impact on the environment and reduce its dependence on non-renewable energy sources. The Sustainability Policy states that "The University of California is committed to responsible stewardship of resources and to demonstrating leadership in sustainable business practices. The University's locations should be living laboratories for sustainability, contributing to the research and educational mission of the University, consistent with available funding and safe operational practices."

The Sustainability Policy establishes goals in nine areas of sustainable practices: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice, sustainable water systems. Portions of the policy applicable to the proposed project are listed below:

Green Building Design

- All new building projects shall be designed, constructed, and commissioned to outperform the CBC energy-efficiency standards by at least 20 percent or meet the whole-building energy performance targets listed in the Sustainability Policy, Table 1 of Section V.A.3. The University will strive to design, construct, and commission buildings that outperform CBC energy efficiency standards by 30 percent or more, or meet the stretch whole-building energy performance targets listed in Table 1 of Section V.A.3, whenever possible within the constraints of program needs and standard budget parameters.

- No new building or major renovation that is approved after June 30, 2019 shall use onsite fossil fuel combustion (e.g. natural gas) for space and water heating (except those projects connected to an existing campus central thermal infrastructure). Projects unable to meet this requirement shall provide a justification as described in Section V.A.4.

Clean Energy

In support of the climate neutrality goals outlined in Section C of this policy, the University of California is committed to reducing its GHG emissions by reducing energy use and switching to clean energy supplies.[4]

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[4] Although the UC system is anticipated to have 100% renewable electricity by 2025, UC Merced is expected to have 100% renewable electricity by 2020. https://www.solarreviews.com/news/uc-merced-to-power-campus-with-50-percent-solar-plans-for-100-percent-renewable-energy-by-2020-062717/

- **Energy Efficiency:** Each campus and medical center will implement energy efficiency actions in buildings and infrastructure systems to reduce their energy use intensity by at least 2 percent year over year.
- **On-campus Electricity:** Campuses will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of campus carbon goals.
- **Off-campus Electricity:** By 2025, the University will rely on 100 percent clean electricity supplies. Locations served directly by UC's own Electricity Services Provider will implement clean-electricity supplies starting in 2017 and transition to clean-electricity supplies by 2021.
- **On-site Combustion:** By 2025, at least 40 percent of the fuel used for on-site combustion will be low-carbon biogas.

Climate Protection

Each campus and the UC Office of the President will develop strategies for meeting the following UC goals:

- Climate neutrality from Scope 1 and 2 sources by 2025[5]
- Climate neutrality from specific Scope 3 sources (as defined by the American College and University Presidents' Climate Commitment (ACUPCC) by 2050 or sooner

And at minimum, meet the following intermediate goal in pursuit of climate neutrality:

- Reducing GHG emissions to 1990 levels by 2020, pursuant to the California Global Warming Solutions Act of 2006

Sustainable Transportation

Each location will reduce GHG emissions from its fleet and report annually on its progress. Locations shall implement strategies to reduce fleet emissions and improve fuel efficiency of all university-owned or operated fleet vehicles and equipment where practical options exist through acquisition and fleet operation protocols.

- By 2025, zero emission vehicles or hybrid vehicles shall account for at least 50% of all new light-duty vehicle acquisitions.

The University recognizes that single-occupant vehicle (SOV) commuting is a primary contributor to commute GHG emissions and localized transportation impacts.

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5 For definitions of Scopes 1, 2 and 3 emissions, see GHG Emissions Classification under **Section 4.3.2** above.

- By 2025, each location shall strive to reduce its percentage of employees and students commuting by SOV by 10% relative to its 2015 SOV commute rates;
- By 2050, each location shall strive to have no more 40% of its employees and no more than 30% of all employees and students commuting to the location by SOV.

Consistent with the State of California goal of increasing alternative fuel – specifically electric – vehicle usage, the University shall promote purchases and support investment in alternative fuel infrastructure at each location.

- By 2025, each location shall strive to have at least 4.5% of commuter vehicles be ZEV.
- By 2050, each location shall strive to have at least 30% of commuter vehicles be ZEV.

Each location will develop a business-case analysis for any proposed parking structures serving University affiliates or visitors to campus to document how a capital investment in parking aligns with each campus' Climate Action Plans and/or sustainable transportation policies.

Recycling and Waste Management

The University's goal for diverting municipal solid waste from landfills is as follows:

- 50 percent as of June 30, 2008
- 75 percent as of June 30, 2012
- Ultimate goal of zero waste by 2020

UC Carbon Neutrality Initiative

In November 2013, the UC President announced the UC Carbon Neutrality Initiative, which commits the University to achieving climate neutrality from Scope 1 and 2 sources by 2025 and climate neutrality from specific Scope 3 sources by 2050 or sooner. Scope 1 emission sources include direct emissions from sources owned or controlled by the University, while Scope 2 sources include indirect emissions from purchased electricity and purchased cogeneration for heating or cooling. The specific Scope 3 sources include emissions from campus commutes and business air travel. These goals have been incorporated into the updated Sustainability Policy presented above.

American College and University Presidents Climate Commitment

The University of California has also signed the American College and University Presidents Climate Commitment (ACUPCC). Each signatory commits to completing an inventory of GHG emissions within one year, and to developing, within two years, an institutional plan to achieve climate neutrality as soon as possible. The commitment also includes specific interim actions, including requiring that new campus construction will be built to at least the U.S. Green Building Council's LEED Silver standard or equivalent; purchasing Energy Star appliances; offsetting greenhouse gas emissions generated by institutional air travel; encouraging and providing access to public transportation; purchasing or producing at least 15 percent of the institution's electricity consumption from renewable sources; supporting climate and sustainability shareholder proposals at companies where the institution's endowment is invested; and adopting measures to reduce waste.

UC Merced Sustainability Strategic Plan 2017-2022

In 2017, UC Merced released a Sustainability Strategic Plan to describe its approach to achieving its sustainability goals. The ambitious central focus of the plan is the achievement of zero net energy usage, zero landfill waste, and zero net greenhouse gas emissions by 2020. Not only does the plan provide campus principles related to sustainability, but it also provides insight about the specific actions that will allow UC Merced to maintain its principles and meet its goals, even as the campus rapidly expands. Many of the actions laid out in the plan indirectly benefit GHG reduction efforts but the action items listed below focus specifically on GHG reduction on the campus.

Goal Transportation:	Increase alternative modes of transportation usage among campus constituency and reduce the carbon footprint of transportation, parking, and fleet services.
Action 3	Greenhouse Gas (GHG) Reduction: Develop GHG emission reduction goals for campus fleet.
Goal Climate Protection:	Achieve carbon neutrality by 2020.
Action 2	Renewables: Utilize renewable power options to mitigate and reduce greenhouse gas impact.

UC Merced Climate Action Plan

The first UC Merced Climate Action Plan (CAP) was adopted in 2009 to promote two long-term campus goals: (1) to reach zero net energy by 2020; and (2) to be climate neutral, with respect to on- and off-campus emissions. In 2018, UC Merced developed an updated CAP which builds on the previous CAP and extends out to 2025. The 2018 CAP notes that UC Merced's' approach to mitigating its climate effects is to:

- Save as much energy as is economically feasible
- Generate from on-site renewable sources as much energy as is consumed annually (net zero energy)
- Continue participating in the University's Wholesale Power Program which will bring the campus 97 percent clean energy through the grid by 2020
- Offset remaining GHG emissions, prioritizing on-site and regional offsets (climate neutrality)

The 2018 CAP describes the current energy saving infrastructure at the campus, which consists of central cooling, thermal energy storage, and central heating for primary academic buildings, and notes that UC Merced intends to continue this basic strategy to provide heating and cooling to future campus development. Regarding new building design, the 2018 CAP notes that UC Merced has committed to energy efficient design (that all new buildings will be designed to consume half the energy and demand of other University buildings in California, surpass Title 24 by 20 percent, and achieve all LEED credits for optimizing energy efficiency). UC Merced also implements a number of programs to inform and sensitize building occupants to energy consumption and conservation and implements a building maintenance program to optimize building operations. UC Merced is also pursuing a small number of building energy efficiency projects to further reduce energy use.

In view of its goal to achieve Net Zero Energy by 2020 for on-campus facilities, UC Merced developed a 1 megawatt (MW) solar photovoltaic array. The array produces about 12 percent of the total annual campus electricity consumed and 22 percent of the peak load. A second 4.2 MW solar array project was completed and became operational in January 2019. UC Merced is also pursuing a landfill gas-to-energy project with Merced County Regional Waste Management Authority whereby landfill gas that is currently burnt off at the Highway 59 landfill would be piped to the campus and used in microturbines to generate electricity and for hot water generation that would serve a portion of the campus; the project would allow UC Merced to discontinue its use of three hot water boilers that operate on natural gas. UC Merced is one of 10 campuses that is provided electricity by the University under its Wholesale Power Program (WPP).[6] In furtherance of its commitment to be net zero by 2020, by 2021, 100 percent of the electricity provided to the campus via the grid under the WPP will be clean renewable energy. Finally, the Campus is implementing a number of transportation demand management (TDM) programs to minimize transportation-related emissions. The existing and future TDM programs are described below.

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[6] University of California. January 26, 2018. *Sustainability wins for UC, California in 2017.* Available online at: https://www.universityofcalifornia.edu/news/sustainability-wins-uc-california-2017.

UC Merced Transportation Demand Management Program

The Campus implements a number of TDM measures to minimize vehicle trips and associated air emissions, including GHG emissions. Existing and future TDM measures are listed below.

Existing TDM programs

- Subsidized transit
- Ridesharing and Carsharing opportunities
- Carpool and vanpool incentives
- Emergency Ride Home Program (for employees)
- Bicycle incentives
- Marketing/Educational campaigns focused on alternative transportation options
- Increased the number of clean air commuter permits for eligible carpools to promote ridesharing
- Secured grants to fund purchase of fuel efficient and low emission fleet vehicles
- Electric charging stations in the North Bowl, LeGrand and Library Lots
- Annual surveying of campus community commuting patterns
- Information table at both New Student Orientations (NSO) and New Employee Orientations (NEO)
- ZipCar self-service, on-demand car sharing & Zimride rideshare and commute programs

Programs under development

- Bicycle program
- Refinement of marketing and advertising campaign of "UC Merced Commuter Club" to increase participation in alternative transportation initiatives
- Increase the number of electric charging stations for electric carts

Future Goals

- Expansion of hybrid and/or battery-operated fleet
- Reduction of Single Occupancy Vehicle (SOC) Vehicle Miles Traveled (VMT) rates through aggressive marketing and development of incentives to participate in alternative transportation programs (i.e. message boards, departmental competitions)

- Adapt a clean-fleet procurement policy
- Standardize fleet ordering cycles
- Zero-emission vehicle incentives

4.3.4 Impacts and Mitigation Measures

Significance Criteria

This SEIR uses significance criteria derived from Appendix G of the *State CEQA Guidelines*. For the purposes of this SEIR, impacts related to GHG emissions would be significant if implementation of the 2020 LRDP would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The *State CEQA Guidelines* include Section 15064.4, which states that, when making a determination with respect to the significance of a project's GHG emissions, a lead agency shall have discretion to determine whether to: (1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use; and/or (2) Rely on a qualitative analysis or performance-based standards. Section 15064.4 also states that a lead agency should consider the following factors when assessing the significance of the impact of GHG emissions on the environment: (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting; (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

As discussed above, the SJVAPCD's *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA* sets forth the approach and thresholds that may be used by lead agencies to evaluate a project's GHG impact. The Guidance notes that "Projects not implementing BPS would require quantification of project specific GHG emissions and demonstration that project specific GHG emissions would be reduced or mitigated by at least 29 percent compared to Business as Usual (BAU), including GHG emission reductions achieved since the 2002-2004 baseline period, consistent with GHG emission reduction targets established in ARB's AB 32 Scoping Plan. Projects achieving at least a 29 percent GHG emission reduction compared to BAU would be determined to have a less than significant individual and cumulative impact for GHG. In light of the *Center for Biological Diversity et al. v California Department of Fish and Wildlife, the Newhall Land and Farming Company* (Newhall Ranch) court ruling[7] and the more recent *Golden Door Properties v County of San Diego* court ruling,[8] the SJVAPCD thresholds of significance cannot be justifiably used to evaluate the proposed project's impacts, because the 29 percent below (BAU threshold is based on the ARB's statewide assessment and does not include project- or area-specific criteria. Consequently, the threshold set forth by the SJVAPCD is not used in this analysis.

Instead, using emission reduction goals set forth in AB 32 and SB 32 and UC Merced's 2005 GHG emissions as baseline, campus-specific thresholds were developed. Two approaches were used: the first one involving a total emissions threshold, and the second one involving an efficiency threshold based on per capita emissions.

Total Emissions Threshold

As set forth in **Table 4.3-3** below, according to AB 32 and SB 32, the state's 2020 emissions must be reduced to be equal to 1990 emissions, and by 2030 to be 40 percent below 1990 emissions. These cannot be applied directly to UC Merced as the campus did not become operational until 2005. To estimate the 2020 target emissions for UC Merced, the campus' 2005 emissions were reduced by 15 percent. This was done based on the statewide guidance that in order to ensure that 2020 emissions equal 1990 emissions, between 1990 and 2020, the state's emissions must be reduced by about 30 percent. From that it follows that between 2005 and 2020, a 15 percent reduction must be achieved to attain the 2020 target.

Table 4.3-3
State GHG Reduction Targets and Campus Thresholds

	1990	2005	2020	2030
State Targets from AB 32 and SB 32	NA	NA	Equal to 1990 emissions	40 percent less than 2020 emissions
Campus Total Emissions Targets	NA	6,469 $MTCO_2e$/year	5,498 $MTCO_2e$/year	3,299 $MTCO_2e$/year

Source: Impact Sciences and Barati Consulting 2019.

[7] Center for Biological Diversity et al. vs. California Department of Fish and Wildlife, the Newhall Land and Farming Company (November 30, 2015, Case No. S217763)

[8] In *Golden Door Properties v. County of San Diego*, the court ruled that the efficiency threshold developed by the San Diego Air Pollution Control District (SDAPCD) is not an appropriate threshold because SDAPCD used only state data to develop its efficiency threshold of 4.9 $MTCO_2e$ per service person per year. Instead SDAPCD should use local data from the air district to determine the San Diego specific efficiency threshold. Therefore, the SDAPCD efficiency threshold cannot be used to determine if projects would meet state GHG reduction targets.

Having calculated the 2020 target for the campus, that number was reduced by 40 percent to arrive at the 2030 target for the campus, which is 3,299 $MTCO_2e$/year. This target level, rounded to 3,300 $MTCO_2e$/year, is used as a threshold in this SEIR to evaluate whether the increased campus emissions with the implementation of the 2020 LRDP would result in a significant GHG impact.

Per Capita Threshold

Similarly, a per capita rate or efficiency factor was calculated for the campus. Using the campus' 2005 GHG emissions and the campus population at that time, a per capita emissions rate or efficiency factor of 4.78 $MTCO_2e$ per capita/year was calculated for 2005. Next, the calculated 2005 efficiency factor was reduced by 15 percent to obtain the 2020 efficiency factor. Finally, an efficiency factor for 2030 was calculated by reducing the calculated 2020 efficiency factor by 40 percent. A target rate of 2.44 $MTCO_2e$ per capita/year was developed for 2030.

Issues Not Discussed Further

All of the CEQA checklist items listed above are addressed in the analysis below.

Methodology

As noted above, *State CEQA Guidelines* require that the impact from a project's GHG emissions, emitted directly or indirectly, be evaluated. Direct emissions are those that are emitted on a project site whereas indirect emissions are those that are emitted off-site, such as those associated with vehicular traffic, electricity generation, etc. The Office of Planning and Research has noted that lead agencies "should make a good-faith effort, based on available information, to calculate, model, or estimate… GHG emissions from a project, including the emissions associated with vehicular traffic, energy consumption, water usage and construction activities" (OPR 2017). Therefore, direct and indirect emissions were calculated for full development of the campus by 2030 under the 2020 LRDP. Construction emissions were also calculated. The methodology used to estimate operational and construction emissions is described below.

Operational Emissions

The 2020 LRDP is a comprehensive land use plan to guide physical development at UC Merced through 2030. The 2020 LRDP describes a development program of approximately 1.83 million gross square feet of new building space through 2030. The 2020 LRDP also estimates and reports the daily population that is expected to be present on the campus in 2030. According to the 2020 LRDP, a daily population of 11,280 persons is projected for the campus in 2030. Implementation of the 2020 LRDP would result in the construction of new buildings, a growth in campus programs and population, and an associated increase in GHG emissions.

Since 2009, UC Merced has been routinely estimating and reporting Scope 1, Scope 2, and Scope 3 (commuting only) emissions to the California Climate Action Registry each year. These reported emissions were obtained from UC Merced and used to estimate the historical (2005) and the future 2020 and 2030 GHG emissions that would result from UC Merced operations. Year 2005 emissions were estimated as this was the first year of campus operation and is the baseline that is used in the analysis to establish future GHG emissions targets for the campus that are consistent with AB 32 and SB 32 goals. Year 2020 emissions were estimated to show the campus's progress towards the AB 32 and SB 32 targets, and year 2030 emissions were estimated as they represent the campus's total emissions at full development of the campus under the 2020 LRDP.

Scope 1 Emissions (Area Sources, Fleet Vehicles, and Fugitive Emissions)

Scope 1 emissions include emissions that are emitted on the site of a project or property and result from combustion of fossil fuels in on-site equipment and vehicles, as well as fugitive emissions. At UC Merced, on-site emissions are mostly the result of natural gas combustion in the campus central plant and the campus dining center, and from combustion of fuel in campus fleet vehicles (note that there could be negligible emissions from other area sources that were not included in this assessment).

UC Merced's total Scope 1 emissions for the years 2009 through 2017 were obtained from the UC Merced Energy, Engineering & Sustainability Office (Campus Sustainability Office). Scope 1 GHG emissions from natural gas combustion were computed by the Campus Sustainability Office based on the amount of natural gas used on the campus each year and an emission factor of 0.00530 $MTCO_2e$ /therm. The campus' fleet emissions were calculated by inputting gallons of gas equivalent used by fuel type. For each year of analysis, i.e., 2005, 2020, and 2030, Scope 1 emissions were estimated by deriving a per capita rate for the study year based on the average growth in per capita emissions obtained from the reported Scope 1 emissions for years 2009 through 2017 and multiplying the rate with the total population for that year.

Scope 2 Emissions (Electricity)

Scope 2 emissions for the years 2009 through 2017 were obtained from the Sustainability Office. Historically, the Sustainability Office computed GHG emissions that would result from the campus' use of electricity by multiplying the campus' average annual electricity consumption with an emissions factors from U.S. EPA and/or PG&E. Because all of the purchased electricity that is used on the campus is purchased under the University's WPP and contains a high percentage of renewables, to estimate year

2017 Scope 2 emissions, the Sustainability Office used an emission factor of 0.000224 MTCO2e/kWh provided by the University.

For each year of analysis, i.e., 2005, 2020, and 2030, Scope 2 emissions were estimated by deriving a per capita rate for the study year based on the average growth in per capita emissions obtained from the reported Scope 2 emissions for years 2009 through 2017 and multiplying the rate with the total population for that year.

Scope 3 Emissions

Commuting

Scope 3 commuting emissions for the year 2009 through 2017 were obtained from the Sustainability Office. The Sustainability Office computes Scope 3 emissions associated with student, faculty and staff travel by estimating the miles driven based on zip code data of campus population with registered parking permits and an emission factor of 0.000420 MTCO2e/mile. Similar to Scopes 1 and 2, Scope 3 emissions were estimated by applying the average growth in per capita emissions obtained from the reported Scope 3 emissions for years 2009 through 2017 and interpolating emissions for 2005. However, commuting emissions for 2020 and 2030 were calculated using the per capita emissions rate derived from 2017 commuting emissions. This is conservative as per capita commuting emissions will continue to decrease due to fuel efficiency, ZEV vehicles, and other improvements.

Water

Historic water use data was provided by UC Merced for the years 2012 to 2015. The average growth in water use was derived from this data. Using the campus populations for years 2005, 2020 and 2030 and the average growth in water use, the water use for 2005, 2020, and 2030 was calculated. Emissions were then estimated by applying the U.S. EPA eGRID emission factor for water to the water use estimates.[9]

Wastewater and Solid Waste

Existing wastewater GHG emissions were calculated using existing wastewater generation data for the campus for 2016 and the formulas provided by the California Air Resources Board Local Government Operations Protocol for quantifying GHG emissions. As UC Merced was able to provide only one year of wastewater data (2016), an average growth in wastewater generation could not be derived. So, the per capita rate for 2016 was applied to the other years of analysis as a static factor to an increasing

[9] U.S. EPA. 2012. *eGRID 2012 Version 1.0.* May.

population, which results in increased emissions. This provides a conservative estimate of wastewater emissions.

Solid waste emissions were calculated by applying per capita rates of solid waste and using the solid waste calculation methodology provided by the United Nations Framework Convention on Climate Change Clean Development Mechanism.

Construction Emissions

GHG emissions due to construction under the 2020 LRDP were quantified using the California Emissions Estimator Model (CalEEMod). CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions associated with both construction and operations from a variety of land use projects. The model is considered by the SJVAPCD to be an accurate and comprehensive tool for quantifying air quality and GHG impacts from development projects throughout California (CalEEMod 2018). As set forth in greater detail in **Section 4.1, Air Quality**, land use types and size, construction schedule, assumptions of construction equipment usage and truck trips, were input to CalEEMod. As construction of the ongoing UC Merced 2020 project would be completed in 2020, it is anticipated that new facilities under the 2020 LRDP would be constructed after 2020. Therefore, for purposes of estimating construction GHG emissions, it was assumed that campus facilities under the 2020 LRDP would be constructed between January 2021 and December 2030.

4.3.5 LRDP Impacts and Mitigation Measures

LRDP Impact GHG-1: Implementation of the 2020 LRDP would generate greenhouse gas emissions, either directly or indirectly, that would have a significant impact on the environment. (*Significant; Less than Significant with Mitigation*)

Construction GHG Emissions

Emissions associated with construction would occur throughout the timeframe of the 2020 LRDP from January 2021 to December 2030. Project construction activities would include site preparation, grading, building construction, pavement and asphalt installation, landscaping and hardscaping, and architectural coatings. Based on the results of CalEEMod modeling, approximately 6,118 $MTCO_2e$ of GHG emissions would be emitted during the approximately 10-year project construction period, which is about 612 $MTCO_2e$/year. With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the small size and nature of these projects, they would be unlikely to result in substantial GHG emissions during construction.

Neither the University nor any of the air districts, including SJVAPCD, has set forth quantitative thresholds for the evaluation of construction-phase GHG emissions. Construction GHG estimates are presented for informational purposes only.

Operational GHG Emissions

2020 LRDP Implementation of the 2020 LRDP would contribute to long-term cumulative increases in GHG emissions as a result of additional buildings and people on the campus. Sources of new emissions would include building heating, cooling and lighting systems, water use, wastewater generation, solid waste generation, as well as increases in traffic to the campus. These sources would represent the great majority of GHG emissions that would be produced in association with the proposed project, because the campus does not, and would not as part of the implementation of the 2020 LRDP, emit industrial or agricultural gases. Thus, the campus would generate little in the way of GHGs other than carbon dioxide. While certain research activities on the campus may involve the emission of other GHGs, these activities typically result in minimal GHG emissions.

Table 4.3-3, Estimated UC Merced Operational GHG Emissions, presents the historical (2005), existing (2017), and projected 2020 and 2030 GHG emissions for the campus. The 2020 and 2030 emissions reflect BAU growth of the campus under the 2020 LRDP and exclude measures that may be implemented to comply with the Sustainability Policy. The one exception is emissions from the use of electricity which are reported as zero emissions. This is accurate because after 2020, UC Merced's total electricity needs will be met by on-site generation of renewable energy and purchase of electricity from the grid that is 100 percent from renewable sources. As shown in **Table 4.3-4,** area sources and commuting are the top two sources of GHG emissions at the campus.

Compliance with the Sustainability Policy will have the effect of reducing UC Merced's total emissions. Further, the Campus' Sustainability Strategic Plan and the CAP, which are aligned with the Sustainability Policy, include numerous provisions that will substantially reduce the increase in the campus' GHG emissions, as the campus grows.

- The plans encourage use of transit and alternative transportation modes, which has helped and will continue to reduce transportation-related GHG emissions, relative to the emissions that would occur without these plans.

- Individual projects under the 2020 LRDP would implement GHG emission reduction strategies consistent with the applicable provisions of the Sustainability Policy, which include green building design, sustainable building operations, sustainable transportation, and sustainable water systems.[10]

- UC Merced will also implement other campus-wide energy saving programs.

Therefore, it is reasonable to assume that the increase in annual emissions due to LRDP implementation would be much lower than the numbers reported in **Table 4.3-4.**

Table 4.3-4
Estimated UC Merced Operational GHG Emissions (in $MTCO_2e$)

GHG Emissions Source	Historical 2005 Emissions	Existing 2017 Emissions	Future 2020 Emissions	Future 2030 Emissions
Direct Sources				
Scope 1 Area Sources [a] and Campus Fleet	1,341	4,045	4,044	3,160
Total Direct	1,341	4,045	4,044	3,160
Indirect Sources				
Scope 2 Electricity	2,519	2,740	0 [c]	0
Scope 3 Commuting	2,131	2,895	3,497	4,994
Scope 3 Water Supply [b]	349	53	34	8
Scope 3 Wastewater [b]	4	26	31	44
Scope 3 Solid Waste	126	721	817	944
Total Indirect	5,129	6,435	4,379	5,990
All Sources				
Total (direct and indirect)	6,469	10,479	10,712	10,137

Source: Impact Sciences and Barati Consulting 2019.
Notes:
a. Area source emissions based on natural gas combustion on the campus.
b. UC Merced also reports Scope 3 business air travel and Scope 3 business ground travel emissions, which are not included in this table as those emissions sources are not typically analyzed under CEQA. In contrast, the Campus does not report Scope 3 water supply wastewater and solid waste emissions; however, those emissions are included in this table since guidance put forth by the CARB states that GHG emissions from these sources should be included in the estimated GHG emissions under CEQA.
c. By 2020, UC Merced and MCRWMA anticipate to complete a landfill gas to energy project that would involve the conveyance of treated landfill gas (methane) to the campus to operate three to four microturbines to generate electricity and hot water, while also allowing UC Merced to discontinue the use of three natural gas fired hot water boilers. Although combustion of methane in the microturbines would result in GHG emissions, overall the project would result in less GHG emissions than are currently produced at the landfill from the flaring of landfill gas (MCRWMA 2019).

Table 4.3-5, Comparison of Projected Emissions to Thresholds, below reports UC Merced historic, existing and projected 2020 and 2030 emissions both in terms of both total emissions as well as per capita emissions. It also reports UC Merced's 2030 targets both in terms of a total emissions target and a per capita target; these targets are used in this SEIR as thresholds of significance. As the table shows, the campus' per capita emissions in 2030 would be well below the per capita target for 2030. Note that the 2017 Scoping Plan encourages the use of per capita targets for purposes of planning for GHG reductions

[10] The UC Policy on Sustainable Practices is periodically updated and expanded. The current full text can be viewed on-line at http://www.ucop.cdu/ucophomc/coordrev/policy/PP032207ltr.pdf or obtained through the University-wide Policy Office, Office of the President, 1111 Franklin Street, 12th Floor, Oakland, CA 94607.

and provides a per capita rate of 6.0 $MTCO_2e$/capita for year 2030 (along with 2.0 $MTCO_2e$/capita for 2050). The campus' per capita emissions in 2030 would be well below the Scoping Plan 2030 per capita rate as well as the UC Merced 2030 per capita target.

However, if the campus' total emissions in 2030 are compared to the corresponding total emissions target, the emissions would exceed the target. As **Table 4.3-5** shows, the campus' total emissions in 2030 would be about 10,137 $MTCO_2e$/year. To be compliant with SB 32, the campus' 2030 emissions would need to be about 3,300 $MTCO_2e$/year. As the campus' emissions would exceed this target, this represents a significant impact.

Table 4.3-5
Comparison of Projected Emissions to Thresholds

GHG Emissions Source	Historic 2005 Emissions	Existing 2017 Emissions	2020 Emissions	Future 2030 Emissions
Comparison to 2030 Threshold Based on Total Emissions ($MTCO_2e$/year)				
Total Emissions	6,469	10,479	10,712	10,137
UC Merced 2030 Total Emissions Target (based on AB 32 and SB 32)	–	–	–	3,300
Total Emissions Target Met?	–	–	–	NO
Comparison to Thresholds Based on Per Capita Emissions (MTCO2e/service person/year)				
Total Emissions	6,469	10,479	10,712	10,137
Total Campus Population	1,352	9,417	11,280	16,111
Per Capita Emissions	4.78	1.11	0.95	0.63
UC Merced 2030 Per Capita Target (based on AB 32 and SB 32)	–	–	–	2.44
Per Capita Target Met?	–	–	–	YES

Source: Impact Sciences and Barati Consulting 2019.

As discussed above, the Sustainability Policy requires every campus to achieve Climate neutrality from Scope 1 sources (such as campus heating and cooling systems and campus fleet) and 2 sources (purchased electricity) by 2025. Further, it states that campuses will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of campus carbon goals. With respect to off-campus electricity, the policy states that by 2025, the University will rely on 100 percent clean electricity supplies. Campuses served directly by the University's WPP began implementing clean-electricity supplies starting in 2017 and will transition to clean-electricity supplies by 2021. With regard to on-site combustion, the policy states that by 2025, at least 40 percent of the fuel used for on-site combustion will be low-carbon biogas. UC Merced will comply with the policy and is planning to install additional on-site renewable power generation sources such as solar arrays and by 2020, 100 percent of its off-campus electricity will be clean energy. As noted above, UC Merced is also planning to use landfill gas from the Merced County Highway 59 landfill to generate electricity and for water heating by 2020. The Campus has acknowledged that the hot water boilers in campus housing as well as in the housing added under the 2020 Project will continue to be operated on natural gas and therefore, all of the existing Scope 1 emissions will not be eliminated. However, all new buildings constructed under the 2020 LRDP will be fully electric and hot water boilers will be either solar or electric. Therefore, UC Merced will not increase its Scope 1 emissions even as the campus grows. **Table 4.3-6** below reports the amount by which campus emissions would exceed the target in 2030 if only the Scope 2 emissions were eliminated and the amount of exceedance if both Scope 1 and Scope 2 emissions were eliminated.

Table 4.3-6
Exceedance of 2030 Target (in $MTCO_2e$/year)

GHG Emissions Source	2030 Emissions	2030 Emissions with Zero Scope 1 and 2 Emissions
Scope 1 Area Sources and Campus Fleet	3,160	0
Scope 2 Electricity	0	0
Scope 3 Commuting	4,994	4,994
Scope 3 Water Supply	8	8
Scope 3 Wastewater	44	44
Scope 3 Solid Waste	944	944
Total	**10,137**	**5,990**
Campus 2030 Emissions Target	3,300	3,300
Exceedance	6,837	2,690

Source: Impact Sciences and Barati Consulting 2019.

In both cases, the total emissions would exceed the targeted emission level of 3,300 $MTCO_2e$/year, and the impact would be significant. To address this impact**, LRDP Mitigation Measure GHG-1a** is set forth below which requires UC Merced to implement additional measures to reduce its emissions, and if adequate reductions are not achieved, the mitigation measure requires UC Merced to purchase GHG offsets. UC Merced would also implement **LRDP Mitigation Measure AQ-2a,** which requires implementation of measures to reduce combustion emissions from a variety of sources, and **LRDP Mitigation Measure AQ-2b** to reduce mobile source emissions. Both measures would reduce GHG emissions. **LRDP Mitigation Measure GHG-1c** commits UC Merced to continue to evaluate and implement new technologies that would reduce its emissions.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the small size and nature of these projects, they would be unlikely to result in substantial GHG emissions during their operation.

Mitigation Measures:

LRDP MM GHG-1a: UC Merced shall set a goal to reduce or control the increase in its GHG emissions such that the total emissions do not exceed 3,300 $MTCO_2e$/year by the end of the year 2030.

UC Merced shall monitor GHG emissions each year, monitor upcoming projects for their potential to increase the campus' GHG emissions, and implement project-specific and campus-wide GHG reduction measures to reduce the campus' GHG emissions in accordance with the 3,300 $MTCO_2e$/year goal for 2030.

In the event that adequate reduction is not achieved by these measures, UC Merced shall purchase renewable energy credits, or other verifiable GHG offsets to keep the net emissions at or below 3,300 $MTCO_2e$/year.

LRDP MM GHG-1b: UC Merced shall implement **LRDP Mitigation Measures AQ-2a and -2b.**

LRDP MM GHG-1c: UC Merced shall periodically review new technologies that can be implemented to further reduce the campus' GHG emissions.

Significance after Mitigation: As shown in **Table 4.3-6**, to achieve the 3,300 $MTCO_2e$/year goal, UC Merced will need to reduce its 2030 emissions by about an amount ranging between about 2,690 and 6,837 $MTCO_2e$/year which would not be a large reduction. Further, UC Merced has determined that it is feasible to purchase the required renewable energy credits and offsets. Therefore, with the implementation of **LRDP Mitigation Measures GHG-1a, 1b, and 1c**, the impact would be less than significant.

LRDP Impact GHG-2: Implementation of the 2020 LRDP would conflict with state law, UC Sustainable Practices Policy, and the UC Merced Climate Action Plan, adopted for the purpose of reducing the emissions of greenhouse gases. (*Significant; Less than Significant with Mitigation*)

State Laws

AB 32 established the goal for the reduction of California's GHG emissions to 1990 levels by 2020. In 2015 and 2016, SB 350 and SB 32 were signed into law, establishing the state's mid-term target for 2030 emissions to be 40 percent below the 1990 emissions. In view of this mid-term target, as noted above, the 2017 Scoping Plan sets forth a target efficiency threshold of 6.0 $MTCO_2e$/ capita as applicable to plans through 2030. The analysis under **LRDP Impact GHG-1** above shows that with the implementation of the 2020 LRDP, on a per capita basis, the campus would emit 0.63 $MTCO_2e$/capita/year in 2030. This is substantially below the state average rate of 6.0 $MTCO_2e$/capita/year as well as the campus-specific rate of 2.44 $MTCO_2e$/capita/year derived for the campus for compliance with SB 32. Furthermore, UC Merced would implement **LRDP Mitigation Measures GHG-1a, 1b,** and **1c** to reduce its total emissions such that they are below 3,300 $MTCO_2e$/year, a target emissions level that is 40 percent less than the campus' 2020 emissions target. Therefore, with mitigation, campus development under the 2020 LRDP, including small-scale projects developed on CMU, CBRSL or ROS lands, will not conflict with the state laws and regulations related to GHG emissions.

UC Plans and Policies

The 2020 LRDP is a projected development program for the Merced campus for the years 2020 through 2030. Under the plan, the campus is anticipated to add about 1.83 million square feet of building space by 2030. The campus population is projected to increase to about 17,400 persons by 2030. The addition of building space would increase the use of energy on the campus and the additional population would result in more persons commuting to the campus. Increased on-campus population would also increase water use, wastewater generation and solid waste generation. All of these changes would have the potential to increase the campus' GHG emissions. However, as under existing conditions, campus development under the 2020 LRDP would continue to be completed in a manner that it is compliant with the UC Sustainability Policy, UC Merced Sustainability Strategic Plan, and the UC Merced CAP. Campus projects under the 2020 LRDP will continue to achieve a minimum of a Silver rating under the LEED Green Building Rating System. UC Merced will continue to develop on-site renewable energy sources, procure clean energy, and obtain offsets as necessary, in compliance with **LRDP Mitigation Measure GHG-1a**. It would also continue to implement and expand TDM programs to minimize the increase in commuting and other emissions in compliance with **LRDP Mitigation Measures AQ-2a** and **-2b,** and evaluate and implement new technologies that reduce emissions, pursuant to **LRDP Mitigation Measure GHG-1c**. Therefore, with mitigation, implementation of the 2020 LRDP, including the small-scale projects that are less than 10,000 square feet in building space and/or 2 acres in ground disturbance, would not conflict with the UC Sustainability Policy or the UC Merced plans adopted to reduce GHG emissions.

Mitigation Measures:

LRDP MM GHG-2: Implement **LRDP Mitigation Measures GHG-1a, 1b, and 1c.**

Significance after Mitigation: With mitigation, which includes purchase of offsets if needed, the impact would be reduced to a less than significant level.

4.3.6 Cumulative Impacts and Mitigation Measures

Cumulative Impact C-GHG-1: Implementation of the 2020 LRDP would result in a significant cumulative GHG impact. (*Significant; Less than Significant with Mitigation*)

As the impact from a project's GHG emissions is essentially a cumulative impact, and the methodologies and standards applied in the analysis presented above are designed to assess the cumulative significance of GHG emissions under the 2020 LRDP, the analysis presented above provides an adequate analysis of the cumulative impact related to GHG emissions from campus development under the 2020 LRDP. Based on the analysis under **LRDP Impact GHG-1**, the operational emissions from campus development under the 2020 LRDP would result in a significant cumulative impact.

Mitigation Measures:

MM C-GHG-1: Implement **LRDP Mitigation Measures GHG-1a, 1b, and 1c.**

Significance after Mitigation: With mitigation, which includes purchase of offsets if needed, the impact would be reduced to a less than significant level.

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4.4 HYDROLOGY AND WATER QUALITY

4.4.1 Introduction

This section of the Recirculated Draft SEIR (SEIR) discusses the existing regional hydrology and water quality conditions in the project vicinity and evaluates the potential hydrology and water impacts associated with campus development under the 2020 LRDP. The primary concerns related to hydrology and water quality are increased urban runoff and the potential of this increased runoff to result in water quality impacts and downstream flooding; short-term construction phase impacts on water quality; and effect of groundwater extraction and increased impervious surfaces on local and regional groundwater levels.

The following sources of information were used in the preparation of this section:

- Regional Water Management Group (RWMG). Merced Integrated Regional Water Management Plan (MIRWMP). August 2013.
- California Groundwater Bulletin 118. San Joaquin Valley Groundwater Basin, Merced Subbasin. Prepared by Department of Water Resources. 2004 and 2016 Interim Update.
- Clean Water Act (CWA) 2014 and 2016 Section 303(d) List of Water Quality Limited Segments and 305(b) Report (CVRWQCB). Prepared by State Water Resources Control Board Central Valley Region. April 2018.
- The Water Quality Control Plan (Basin Plan) for the Sacramento and San Joaquin River Basin. Fifth Edition. Prepared by Regional Water Quality Control Board. Central Valley Region. May 2018.
- City of Merced 2015 Urban Water Management Plan. Prepared by Carollo. Adopted 2015, amended 2017.
- Merced Groundwater Subbasin Groundwater Sustainability Plan. Prepared by Woodard & Curran, November 2019.

4.4.2 Environmental Setting

General Climate, Precipitation, and Topography

The San Joaquin Valley is surrounded on the on the east by the Sierra Nevada, on the south by the San Emigdio and Tehachapi Mountains, west by the Coast Ranges, and on the north by the Sacramento-San Joaquin Delta and Sacramento Valley. The UC Merced campus is located in the central-eastern portion of the San Joaquin Valley, in the eastern portion of Merced County, and northeast of the Merced city limits. The land surrounding the campus consists of gentle rolling hills and flatland primarily used for agriculture. The general slope of this area is to the west and southwest.

The climate of the valley floor around the project region is arid to semi-arid with dry, hot summers and mild winters. Summer temperatures may be higher than 100 degrees Fahrenheit (°F) for extended periods of time; winter temperatures are only occasionally below freezing (Jones & Stokes 1998). The Merced region averages 11 to 13 inches of rain per year increasing eastward (DWR 2004). Nearly 80 percent of the annual precipitation falls in the six months between November and March (City of Merced 2012). The winter snowpack, which accumulates above 5,000 feet elevation, primarily in the Sierra Nevada, supplies the vast majority of water in the basin. The streams in the western portion of the county contribute little to the water totals in the valley because the Coast Range is too low to accumulate a snowpack and its east slope is subject to a rain shadow phenomenon, therefore producing only seasonal runoff.

Regional Drainage Basin and Surface Water Resources

The San Joaquin Valley drainage basin is a long trough that is approximately 11,000 square miles in area and is approximately 110 miles long and 95 miles wide (City of Merced 2012). The drainage basin extends from near the City of Stockton to the north to near the City of Fresno to the south, and from the Sierra Nevada on the east to the Coastal Ranges on the west.

The drainage basin is divided lengthwise into two major subbasins that drain to different locations. The San Joaquin subbasin drains the northern portion of the valley into the San Joaquin River which flows into the Sacramento-San Joaquin Delta to eventually discharge into the Pacific Ocean. Surface water in the southern portion of the valley flows into the Tulare subbasin where there is no outlet. Only during rare high flood flows, water in the Tulare subbasin reaches an outlet and drains into the San Joaquin River.

Merced County and the project area are located within the northerly San Joaquin subbasin. Merced County is further divided into two subbasins. One subbasin drains into the Merced River and the other drains into the San Joaquin River.

The San Joaquin River is the principal river within the project region. The San Joaquin River originates in the Sierra Nevada mountains and flows southwesterly to the vicinity of Mendota. It then flows northwesterly to its mouth in the Suisun Bay. Principal tributaries to the San Joaquin River include the Stanislaus, Tuolumne, and Merced Rivers. Bear Creek, Black Rascal Creek, and Fahrens Creek that flow through the City of Merced are tributaries to Merced River. In addition to the rivers and streams, there are many reservoirs, agricultural canals, laterals, and drains that also convey runoff and irrigation water through San Joaquin Valley. Canals in the project vicinity include the Main Canal, Le Grand Canal, the Fairfield Canal, and Yosemite Lateral. The Main Canal diverts water from the Merced River and discharges it into Lake Yosemite, which is located to the north of the campus. Water from Lake Yosemite is conveyed to the south by the Le Grand and Fairfield Canals. Lake Yosemite and its canals are used primarily for irrigation and secondarily, for flood control.

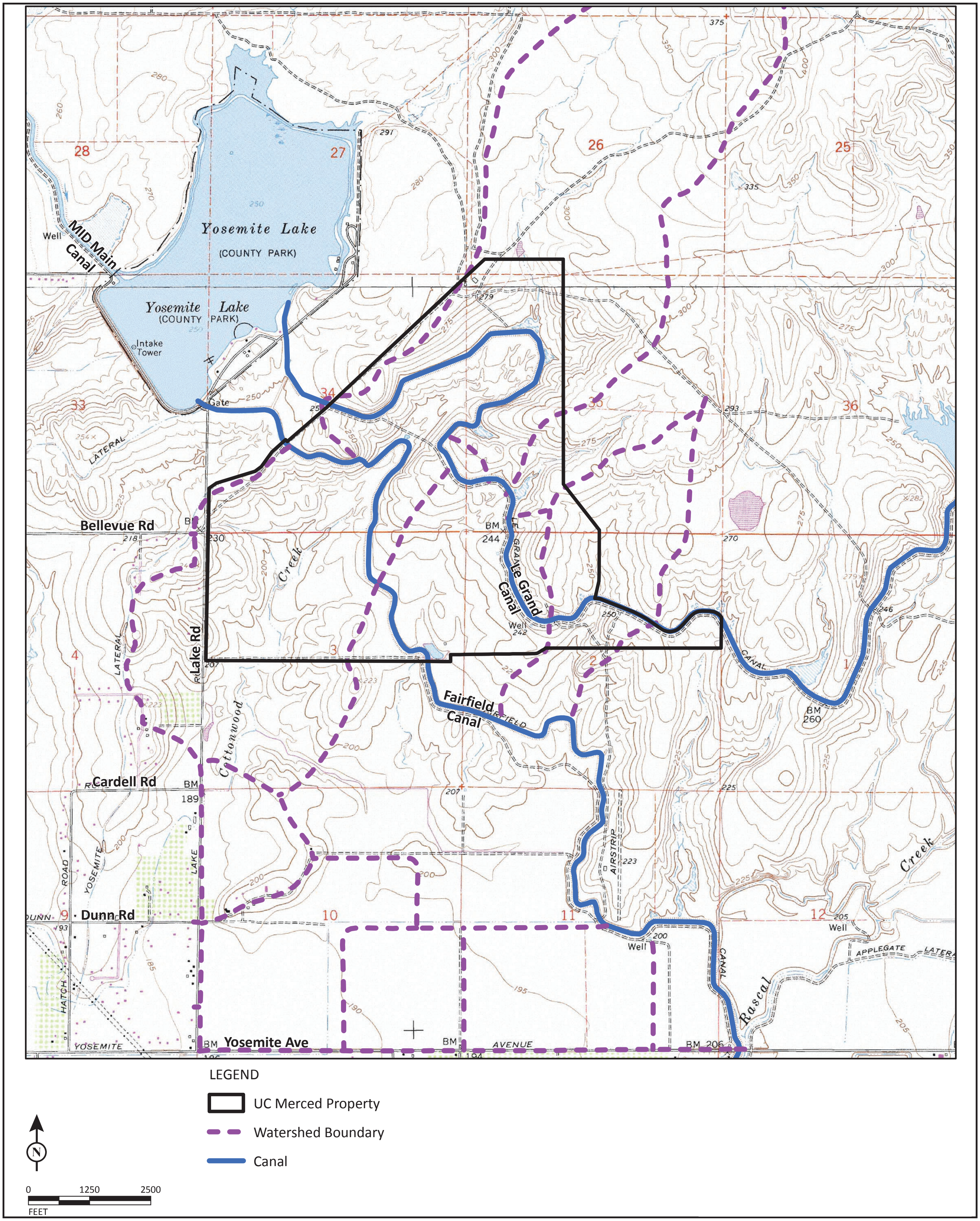
Campus Site Hydrology

The campus is located to the southeast of Lake Yosemite on the eastern side of Merced County, in a transition zone between the Sierra Nevada foothills to the east and the flat San Joaquin Valley floor to the west. The topography of the campus site is flat to undulating. The northeastern portion of the project site contains small hills and valleys while the remainder of the undeveloped portion of the campus site slopes gently from the northeast to southwest. The southern portion of the campus is generally level land. Elevations on the campus range from approximately 300 feet above mean sea level (msl) in the northeast to about 200 feet msl in the southwest near Lake Road.

Figure 4.4-1, Campus Site Watersheds, shows the watersheds that make up the campus site. As the figure shows, the watersheds are aligned in a northeast to southwest direction in general and are bisected by Le Grand and Fairfield Canals that traverse through the campus. The primary drainage feature within the project area is Cottonwood Creek, an intermittent creek that historically had its headwaters in the northeastern portion of the campus site and drained in a southwesterly direction towards Lake Road. However, the topography of the campus site has been substantially altered from historical conditions due to three to four separate phases of development. Prior to any land development on the campus site, the site was altered in conjunction with agriculture. During the 1860s, many local ranchers and farmers began to develop small-scale irrigation projects, and between 1903 and 1909, the Crocker-Huffman Land & Water Company constructed the Fairfield Canal extending from Lake Yosemite to the south, passing through the project site. In 1922, Merced Irrigation District (MID) purchased the Crocker-Huffman system and at some point in the mid to late 1920s, MID substantially altered the alignment and geometry of Fairfield Canal. Sometime between 1922 and 1927, the MID built the Le Grand Canal. Although the canals were developed to follow the contours of the land, nonetheless, the canals resulted in the interruption of the sheet flow of runoff that drained generally from northeast to southwest across the current campus site. Construction of the canals resulted in the truncation of the headwaters of Cottonwood Creek that were located within the north-central portion of the current campus site. Additionally, the project site was altered by the construction of ponds for cattle watering, and in the southern portion of the current campus site, the land was leveled and placed under irrigated pasture. **Figure 4.4-1** is based on a 1987 USGS topographic map. The USGS topographic map shows that by 1987, the intermittent Cottonwood Creek originated to the south of Fairfield Canal.

In the 1990s, the project site was further altered by the construction of a golf course. The Merced Hills Golf Course was constructed on approximately 200 acres in the north-central portion of the current campus site and opened to the public in 1995. The development of the golf course also affected the headwaters of Cottonwood Creek as a man-made lake (now called Little Lake) and a pond (Lower Pond) were constructed in the area of the creek below Fairfield Canal. The golf course was closed in 2002, when the site was approved for the development of the campus. At the time that the campus site was acquired by the University, headwaters of Cottonwood Creek were substantially absent from the campus site, and the creek was located on UCLC land to the south of the campus, fed by some runoff from the campus site and by runoff from the two irrigation pivots.

The first phase of the campus (Phase 1) was developed beginning in 2002 on the northern 80 acres of the 200-acre Merced Hills Golf Course, in the area occupied by the clubhouse facilities (UC Merced 2001; County of Merced 2001). In 2011, upon receipt of applicable permits and approvals from the U.S. Army Corps of Engineers (USACE) and California Department of Fish and Wildlife (CDFW), other portions of the former golf course site were developed with campus facilities. The second major phase of campus construction (UC Merced 2020 Project) commenced in 2016 and is currently underway to the south of the first phase. **Figure 4.4-2, UC Merced Campus Site (June 2016),** is an aerial photograph of the campus as of June 2016 before construction of the 2020 Project was commenced. As the photograph shows, traces of the former creek channel can be seen south of Fairfield Canal, but a clear continuous creek is not visible on the campus. A creek alignment can be seen in the area of the irrigation pivot. Since 2016, as part of the 2020 Project, Little Lake has been modified and Lower Pond has been filled. Furthermore, lands to the east and south of these waterbodies have been graded and filled for the development of parking lots. **Figure 4.4-3, UC Merced Campus Site (June 2018),** shows the campus in June 2018. As the aerial photo shows, at the present time only a small segment of the creek remains on the southern portion of the current campus site within the irrigation pivot area.



SOURCE: UC Merced, 2019; USGS 7.5-minute Topo Quads - Merced, Calif. (1987) and Yosemite Lake, Calif. (1987)

FIGURE **4.4-1**

Campus Site Watersheds

SOURCE: UC Merced, 2019

FIGURE 4.4-2

UC Merced Campus Site (June 2016)

SOURCE: UC Merced, 2019

FIGURE **4.4-3**

UC Merced Campus Site (June 2018)

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Flooding

The Federal Emergency Management Agency (FEMA) provides information on flood hazard and frequency for cities and counties on its Flood Insurance Rate Maps (FIRM). FEMA identifies designated zones to indicate flood hazard potential. In general, flooding occurs along waterways, with infrequent localized flooding also occurring due to constrictions of storm drain systems or surface water ponding. The San Joaquin River and its tributaries that flow through Merced, Stanislaus and Fresno Counties form part of the drainage system for over 9,000 square miles of the Sierra Nevada and foothill region. High flows of moderate duration in these rivers and streams can result in flooding and can occur from intense rainstorms. In addition, snowmelt in the Sierra Nevada can produce high flows of longer duration during the spring. Bear Creek, Black Rascal Creek, and Fahrens Creek, which are part of the Merced County Streams Group, flow through the City of Merced and are tributaries to the San Joaquin River. Lack of channel capacity and problems of erosion and sedimentation, which further reduce channel capacity, are responsible for flooding along all of the creeks in the Merced County Streams Group (Merced County General Plan Chapter V).

There are areas southeast of the campus that are located in FEMA Zone A, which includes areas subject to inundation by the 1 percent annual flood event. Zone A is determined to have no base flood elevations. None of the watercourses within the campus (the two canals and the limited headwaters of Cottonwood Creek) are included in the 100-year floodplain as defined by FEMA.

Lake Yosemite has a 53-foot-high earthen dam located along the lake's southwest side. The lake is owned by the Merced Irrigation District (MID) and is regulated by the DWR Division of Safety of Dams (DSOD). The area to the west and southwest of the lake would experience a gradual flooding if the earthen dam were to fail (Merced County 2004). Failure of the earthen dam would occur if the lake were overtopped by water. According to the MID, the crest of Lake Yosemite Dam is approximately 4 feet higher than the edge of the rim of the lake (Merced County 2004).

The Le Grand and Fairfield Canals traverse the northern and central portions of the campus. These canals are constructed with earthen embankments and are subject to erosion. The canals are owned and operated by MID. According to MID, the campus could experience flooding if the embankments failed or if the tops were over filled due to excess volume of water. In addition, the levees could also fail due to burrowing animals within the levees. According to MID, the canals often need to be repaired due to erosion caused by seepage and animal burrowing (Merced County 2004).

Surface Water Quality

As noted in the Merced County General Plan EIR, surface water quality in Merced County varies on a regional level with higher quality water originating in the Sierra Nevada to the east and deteriorating as it moves towards and through the valley. Activities that impact surface water quality in the region include agricultural irrigation and animal confinement operations, forest management, municipal and industrial uses, storm water, mineral exploration and extraction, hazardous and non-hazardous waste disposal, and dredging. Surface water quality is also affected by naturally high concentrations of salts and selenium in the western portions of San Joaquin Valley (Merced County 2013).

The CWA Section 303(d) requires states to adopt water quality standards for all surface waters in the United States. Section 303 (d) establishes the Total Maximum Daily Load (TMDL) process to assist in guiding the application of state water quality standards, requiring states to identify streams whose water quality is "impaired" (affected by the presence of pollutants or contaminants) and to establish the TMDL or the maximum quantity of a particular constituent that a water body can assimilate without experiencing adverse effect. Where multiple uses exist, the water quality standard must protect the most sensitive use. The State Water Control Board (SWRCB) and the applicable Regional Water Quality Control Board (RWQCB) are responsible for implementing and ensuring compliance with the provisions of the federal CWA and the California Porter-Cologne Water Quality Control Act. Several water bodies in Merced County are, or have been, listed as impaired pursuant to Section 303(d). These include several reaches of the San Joaquin River, Bear Creek, Deadman Creek, and Merced River.

Groundwater Resources

Four groundwater subbasins within the larger San Joaquin Valley Groundwater Basin underlie Merced County. The largest is Merced subbasin (Subbasin 5-22.04), followed by Turlock and Chowchilla subbasins, all to the east of the San Joaquin River, and the Delta-Mendota Groundwater subbasin to the west. The campus is located in the Merced Subbasin. This subbasin covers a surface area of approximately 491,000 acres (CA DWR, Bulletin 118), and includes lands south of the Merced River between the San Joaquin River on the west and the crystalline basement rock of the Sierra Nevada foothills on the east. The subbasin boundary on the southern border follows westerly along the Madera-Merced County Line (Chowchilla River) (DWR 2004). As stated in the MIRWMP, there are three groundwater aquifers in the Merced Subbasin: an unconfined aquifer, a confined aquifer, and an aquifer in consolidated rocks. The unconfined aquifer occurs in the unconsolidated deposits above and east of the Corcoran Clay, which underlies the western half of the subbasin at depths ranging from about 50 to 200 feet, except in the western and southern parts of the area where clay lenses occur and semi-confined conditions exist. The confined aquifer occurs in the unconsolidated deposits below the Corcoran Clay and extends downward to the base of fresh water (MIRWMP 2013). The unconsolidated deposits were laid down during the Pliocene Age to present, and include continental deposits, lacustrine and marsh deposits, older alluvium, younger alluvium and flood basin deposits. The continental deposits and older alluvium are the main water-yielding units in the unconsolidated deposits (DWR 2004). The aquifer system in consolidated rocks occurs under both unconfined and confined conditions (MIRWMP 2013). The consolidated rocks include the Ione formation, the Valley Springs formation, and the Mehrten formation. In the eastern part of the subbasin, the consolidated rocks generally yield small quantities of water except for the Mehrten formation, which is an important aquifer (DWR 2004).

Groundwater flow in the Merced subbasin is generally from northeast to southwest following the regional dip of the basement rock and sedimentary units, although groundwater pumping creates localized cones of depression and irrigation may cause mounding, complicating flow patterns and causing them to change over time (Merced Groundwater Basin Groundwater Management Plan 1997). There were two depressions south and southeast of the City of Merced during 1999 (DWR 2004). The response of the aquifers to changes in pumping and irrigation is relatively rapid, and localized flow directions are affected by these changes.

Groundwater from the subbasin is used by the City of Merced (including UC Merced), other water districts and private users. The groundwater aquifer in the Merced Subbasin is not adjudicated, and because of this there are no defined legal pumping rights for the users and there are no legal constraints on groundwater pumping. In 2004, annual urban and agricultural extractions from the subbasin were estimated at 54,000 acre-feet (AF) and 492,000 AF, respectively; other extractions equal approximately 9,000 AF (DWR 2004). The 2013 MIRWMP projects water demand in the subbasin to be approximately 67,800 acre-feet per year (AFY) for municipal use, and approximately 365,700 AFY for agricultural use. Average annual agricultural water demands within the subbasin are projected to remain constant through 2035 (MIRWMP 2013).

Due to limited surface water supplies and the amount of pumping exceeding recharge, the Merced Subbasin has been operating under overdraft conditions for many years. The historical groundwater elevation maps indicate declining water levels and existence of several groundwater depressions in the Merced Subbasin. Well hydrographs for the area provide further evidence of declining groundwater levels and depletion of groundwater storage. Although the subbasin was classified as mildly overdrafted in the 2008 Merced Area Groundwater Pool Interests (MAGPI) Groundwater Management Plan (GWMP), the subbasin is included in the California Department of Water Resources (DWR) list of critically overdrafted basins. According to the DWR Bulletin 118, the average annual overdraft is estimated to be about 44,000 AFY. DWR's classification of the Merced subbasin as critically overdrafted will likely drive regional groundwater management policies for the next 20 years.

Groundwater Quality

The Merced Subbasin groundwater is generally calcium-magnesium bicarbonate at the basin interior, sodium bicarbonate to the west, and calcium-sodium chloride waters exist at the southwest corner of the basin (DWR 2004). Total dissolved solids (TDS) values in the eastern two-thirds of the Merced Subbasin generally measure less than 500 mg/L (MIRWMP 2013). In general, groundwater with high concentrations of TDS is present throughout the Merced Subbasin, generally located at depths between 400 to 800 feet. Saline waters originating from ancient marine sediments are migrating upward and mixing with freshwater in the basin. This process results from natural conditions; however, pumping of deep wells within the western and southern parts of the Merced Subbasin may cause these saline waters to upwell and mix with fresh water more rapidly than under natural conditions (MIRWMP 2013). The subbasin does have localized water quality impairments, including high hardness, iron, nitrate, and chloride.

Groundwater Management

To meet the requirements of the 1993 Groundwater Management Act (AB 3030), Merced Area Groundwater Pool Interests (MAGPI) entered into a Memorandum of Understanding (MOU) with the California DWR to support water management programs. In 1997, MAGPI published a Groundwater Management Plan (GWMP) update that describes the Merced Subbasin's physical characteristics, water quality conditions, and methods to sustain groundwater. In 2008, MAGPI updated the GWMP to address the legislative requirements of SB 1938 and SB 1672. The goal of these updates was to monitor, protect, and sustain groundwater in the Merced Subbasin.

In 2008, MAGPI established a subcommittee to encourage cooperative planning among additional aspects of water resources management beyond groundwater management and to lay the groundwork for development of the first Merced IRWM Plan (MIRWMP 2013). In 2012, MAGPI transferred responsibility for development of the MIRWMP to the interim Regional Water Management Group (RWMG), which is composed of the City of Merced, County of Merced, and Merced Irrigation District (MID). The interim RWMG is responsible for overseeing this first Merced IRWM planning process. The Merced IRWM process has been a strongly stakeholder-driven process. The RWMG is advised by a Regional Advisory Committee (RAC) that represents the broad interests of the Merced Region and shapes the direction of the IRWM program (MIRWMP 2013). The first Merced Integrated Regional Water Management Plan (MIRWMP) was adopted in 2013. The MIRWMP has identified the correction of overdraft conditions as one of the highest priorities for the region. Both the GWMP and the MIRWMP identify various strategies to address overdraft in the subbasin, including groundwater recharge, water conservation and education, conjunctive use of water resources, wastewater reclamation and recycling, and construction and operation of additional facilities.

In 2014, the SGMA was signed into law to provide a framework for management of groundwater supplies by local agencies and restricts state intervention, if required. SGMA provides an opportunity for local agencies overlying the basin to form a Groundwater Sustainability Agency (GSA), which is the primary agency responsible for achieving sustainability. As part of the region's compliance with SGMA, the County of Merced and water districts and cities within the Merced Subbasin formed three GSAs: Merced Irrigation-Urban Groundwater Sustainability Agency (MIUGSA), Merced Subbasin Groundwater Sustainability Agency (MSGSA), and Turner Island Water District Groundwater Sustainability Agency #1 (TIWD GSA-1). The three GSAs coordinated efforts to develop the GSP for the Merced Subbasin (Woodard & Curran 2019). The Draft GSP was published in July 2019, the final GSP was completed in November 2019. The GSAs have commenced proceedings to adopt and submit the final GSP to the California Department of Water Resources by January 31, 2020, for its approval.

SGMA requires that GSPs describe the projects and management actions to be implemented as part of bringing the Subbasin into sustainability. The primary means for achieving sustainability in the basin will be reduction in groundwater pumping achieved through implementation of an allocation framework to allocate the sustainable yield of the basin to the GSAs. A water allocation framework has been the subject of much discussion during GSP development. The GSAs have agreed that they intend to allocate water to each GSA but have not yet reached agreement on allocations or how they will be implemented. Such an agreement will be developed during GSP implementation (Woodard & Curran 2019).

The GSP identifies a shortlist of 12 priority projects that met a series of screening criteria for implementation as well as a longer list of possible future projects that were identified during GSP development. Projects will either increase surface water supplies to augment the sustainable groundwater yield or will increase groundwater recharge, which will in turn increase the amount of groundwater that may be sustainably used (Woodard & Curran 2019). The GSP also includes management actions to be implemented by the GSAs, including the development and implementation of an initial groundwater allocation framework and a demand reduction management action that includes implementation of programs to encourage voluntary reductions, and mandatory reductions if needed. Based on modeling of current and projected Subbasin conditions, absent implementation of any new supply-side or recharge projects, current agricultural and urban groundwater demand in the Merced Subbasin would need to be reduced by approximately 10 percent in order to balance out the change in groundwater storage over a long-term average condition.

As noted in the GSP, implementation of the GSP will be a substantial undertaking that will include implementation of the projects and management actions as well as GSAs administration, public outreach, implementation of the monitoring programs and filling data gaps, development of annual reports, and development of a 5-year update and report. The GSAs have developed an implementation schedule. Demonstration by 2040 of stable groundwater elevations on a long-term average basis, combined with the absence of undesirable results, will support a determination that the basin is operating within its sustainable yield, and thus that the sustainability goal has been achieved (Woodard & Curran 2019).

4.4.3 Regulatory Considerations

Federal Laws and Regulations

Clean Water Act

In 1972, the Federal Water Pollution Control Act—also known as and hereafter referred to as the Clean Water Act (CWA)—was amended to require National Pollutant Discharge Elimination System (NPDES) permits for discharge of pollutants into the "waters of the United States" that include oceans, bays, rivers, streams, lakes, ponds, and wetlands from any point source. In 1987, the CWA was amended to require that the U.S. EPA establish regulations for permitting under the NPDES permit program of municipal and industrial storm water discharges. The U.S. EPA published final regulations regarding storm water discharges on November 16, 1990. The regulations require that municipal separate storm sewer system (MS4) discharges to surface waters be regulated by an NPDES permit.

In addition, the CWA requires the states to adopt water quality standards for water bodies and have those standards approved by the U.S. EPA. Water quality standards consist of designated beneficial uses—e.g., wildlife habitat, agricultural supply, fishing, etc.—for a particular water body, along with water quality criteria necessary to support those uses. Water quality criteria are prescribed concentrations or levels of constituents—such as lead, suspended sediment, and fecal coliform bacteria—or narrative statements that represent the quality of water that supports a particular use. Because California has not established a complete list of acceptable water quality criteria, the U.S. EPA established numeric water quality criteria for certain toxic constituents in the form of the California Toxics Rule (40 CFR 131.38).

Water bodies not meeting water quality standards are deemed "impaired" and, under CWA Section 303(d), are placed on a list of impaired waters for which a Total Maximum Daily Load (TMDL) must be developed for the impairing pollutant(s). A TMDL is an estimate of the total load of pollutants from point, nonpoint, and natural sources that a water body may receive without exceeding applicable water quality standards (with a "factor of safety" included). Once established, the TMDL is allocated among current and future pollutant sources discharging to the water body.

CWA Permits for Discharge to Surface Waters

CWA Sections 401 and 402 contain requirements for discharges to surface waters through the NPDES program, administered by the U.S. EPA. In California, State Water Resources Control Board (SWRCB) is authorized by the U.S. EPA to oversee the NPDES program through the RWQCBs (see related discussion under **Porter-Cologne Water Quality Control Act**, below). The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits. The permit contains requirements of allowable concentrations of contaminates contained in the discharge.

Construction General Permit

The SWRCB administers the NPDES *General Permit for Discharges of Storm Water Runoff Associated with Construction Activity* (Construction General Permit). In order to cover a construction project disturbing 1 acre or more of land under the General Construction Permit, the entity responsible for the project must submit a Notice of Intent to the State Board prior to the beginning of construction. Effective July 1, 2010, all dischargers are required to obtain coverage under the Construction General Permit Order 2009-0009-DWQ adopted on September 2, 2009, as amended by 2010-0014-DWQ and 2012-006-DWQ.

The Construction General Permit requires that projects develop and implement a Storm Water Pollution Prevention Plan (SWPPP), identifying potential sources of pollution and specifying runoff controls during construction for the purpose of minimizing the discharge of pollutants in storm water from the construction area. The documents required to register the project under the Construction General Permit include a site map which shows storm water collection and discharge points, general topography both before and after construction, drainage patterns across the project site and "best management practices" (BMPs) to be followed during construction to minimize pollutant discharge. The permit registration documents also include a risk assessment, which determines the BMPs and the level of monitoring required during construction. The risk level is based on the potential for sediment transport and whether the project is in the watershed of a sediment-impaired water body. The SWPPP must list Best Management Practices (BMPs) the discharger will use to protect storm water runoff and the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment.

Municipal Separate Storm Sewer System Permit

In 1987, in recognition that diffuse, or non-point, sources were significantly impairing surface water quality, Congress amended the CWA to address non-point source storm water runoff pollution in a phased program requiring NPDES permits for operators of MS4s, construction projects, and industrial facilities. Phase I, promulgated in 1990, required permits for facilities of these types generally serving populations over 100,000, construction permits for projects five acres or greater, and industrial permits for certain industries. The Phase II program expanded on the Phase I program by requiring operators of small MS4s in urbanized areas and operators of small construction sites, through the use of NPDES permits, to implement programs and practices to control polluted storm water runoff. Phase II is intended to reduce these adverse impacts to water quality and aquatic habitat by instituting the use of controls on the unregulated sources of storm water discharges. Under Phase II of the NPDES program, SWRCB has issued three general permits: (1) Municipal permits – required for operators of small MS4s, including universities, (2) Construction permits – required for projects involving one acre or more of construction activity, and (3) Industrial permits. The municipal permit requires development and implementation of a guidance document identifying all permit requirements. The goal of the guidance document or Storm Water Management Plan is to reduce the discharge of pollutants to the Maximum Extent Practicable, as defined by the U.S. EPA. "Minimum Control Measures" (MCMs) is the term used by the U.S. EPA for the six MS4 program elements aimed at achieving improved water quality through NPDES Phase II requirements.

Safe Drinking Water Act

The 1986 federal Safe Drinking Water Act requires each state to develop a wellhead protection plan to describe how areas around wells will be protected from potential contamination. A major element of a wellhead protection program is the determination of protection zones around public supply wellheads. Within these zones, potential protection measures could include limitations on land uses to preclude industrial or agricultural uses with the potential to result in spills of chemicals or overuse of fertilizers and other chemicals.

Federal Flood Insurance Program

Congress responded to increasing costs of disaster relief by passing the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. These acts reduce the need for large publicly funded flood control structures and disaster relief by restricting development on floodplains. FEMA administers the National Flood Insurance Program (NFIP) and issues FIRM for the areas participating in the program. These maps delineate flood hazard zones. The campus is not within a 100-year flood zone. It is located in Zone X, which is defined by FEMA as being outside the floodplain with a 0.2 percent annual chance of flooding.

State Laws and Regulations

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act), which is the state's clean water act, provides the statutory authority for SWRCB and the Regional Water Quality Control Boards (RWQCB) to regulate water quality and was amended in 1972 to extend the federal CWA authority to these agencies (see **Clean Water Act**, above). The Porter-Cologne Act established the SWRCB and divided the state into nine regions, each overseen by a RWQCB. The SWRCB is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies, but much of the daily implementation of water quality regulations is carried out by the nine RWQCBs.

Under the Porter-Cologne Act, the RWQCBs are given the responsibility and authority to prepare water quality plans for areas within the region (Basin Plans), identify water quality objectives, and issue NPDES permits and Waste Discharge Requirements (WDRs). Water quality objectives are defined as limits or levels of water quality constituents and characteristics established for reasonable protection of beneficial uses or prevention of nuisance. NPDES permits, issued by RWQCBs pursuant to the CWA, also serve as WDRs issued pursuant to the Porter-Cologne Act. WDRs are also issued for discharges that are exempt from the CWA NPDES permitting program, discharges that may affect waters of the state that are not waters of the United States (i.e., groundwater), and/or wastes that may be discharged in a diffused manner. WDRs are established and implemented to achieve the water quality objectives (WQOs) for receiving waters as established in the Basin Plans, as described below. Sometimes they are combined WDRs/NPDES permits.

Basin Plan

The Porter-Cologne Act provides for the development and periodic review of water quality control plans (also known as basin plans). The basin plan for the Central Valley Region, which encompasses both the Sacramento River and San Joaquin River Basins, designates beneficial uses for the area's surface and groundwater resources. **Table 4.4-1, Beneficial Uses Identified in Basin Plan for Potential Receiving Waters and Groundwater Basin in the Project Area** presents the beneficial uses identified in the Basin Plan for the water bodies in the project area. The Basin Plan also includes water quality objectives for all surface waters in its region, including San Joaquin River. Specific objectives are provided for the larger water bodies within the region as well as general objectives for surface and groundwater. In general, narrative objectives require that degradation of water quality not occur because of increases in pollutant loads that will impact the beneficial uses of a water body. Water quality criteria apply within receiving waters and do not apply directly to runoff. Basin plans are primarily implemented by using the NPDES permitting system to regulate waste discharges so that water quality objectives are met. The closest receiving water body to the proposed project that has water quality objectives set by the CVRWQCB is the San Joaquin River. Specific objectives for concentrations of chemical constituents are applied to bodies of water based on their designated beneficial uses. Water quality objectives applicable to all groundwaters have been set for bacteria, chemical constituents, radioactivity, tastes and odors, and toxicity (CVRWQCB 2018).

California Water Code

The use of water in the State is governed by the California Water Code or Title 23 of the California Code of Regulations. Title 23 requires that water resources must be put to beneficial use to the fullest extent of which they are capable, and that the waste, unreasonable use, or unreasonable method of use of water is illegal. The conservation of water is encouraged as a reasonable and beneficial use in the interest of the people and for the public welfare.

Groundwater Management Legislation

Several new and existing laws provide framework for groundwater management in the state. The Groundwater Management Act (AB 3030), which took effect in 1993, permitted certain local agencies to develop groundwater management plans. SB 1938 which was enacted in 2002 requires agencies to prepare and implement groundwater management plans to remain eligible for funding administered by the Department of Water Resources for groundwater or groundwater quality projects. In 2009, SB X7-6 established a program for tracking seasonal and long-range groundwater elevation trends in hundreds of California basins. AB 359, that was passed in 2011, requires local agencies to identify recharge areas in groundwater management plans in order to seek state funding for groundwater projects.

Table 4.4-1
Beneficial Uses Identified in Basin Plan for Potential Receiving Waters and Groundwater Basin in the Project Area [1]

	MUN	AGR		IND			Recreation			Freshwater Habitat		Migration		Spawning		Wild	NAV
							REC 1		REC 2								
		Irrigation	Stock watering	Process	Service Supply	Power	Contact	Canoeing and Rafting	Other noncontact	Warm	Cold	Warm	Cold	Warm	Cold	Wildlife habitat	Navigation
Surface Water																	
San Joaquin River (Sac Dam to the mouth of the Merced River)	P	E	E	E			E	E	E	E		E	E	E	P	E	
Yosemite Lake							E		E	E	E					E	
Groundwater Basin																	
Merced	P*	P*	P*	P*	P*												

Source: Central Valley RWQCB 2018.
Notes:
[1] *Only uses allowed in project area; see Basin Plan for other categories of beneficial uses.*
P = Potential Beneficial Use.
E = Existing Beneficial Use.
P= Unless otherwise designated by the Regional Water Board, all groundwaters in the Region are considered as suitable or potentially suitable, at a minimum, for municipal and domestic water supply (MUN), agricultural supply (AGR), industrial service supply (IND), and industrial process supply (PRO) (RWQCB 2018).*

Sustainable Groundwater Management Act (SGMA)

SGMA, a three-bill legislative package composed of AB 1739 (Dickinson), SB 1168 (Pavley), and SB 1319 (Pavley), was passed in September 2014. The legislation provides a framework for sustainable management of groundwater supplies by local authorities, with a limited role for state intervention when necessary to protect the resource. The legislation lays out a process and a timeline for local authorities to achieve sustainable management of groundwater basins. It also provides tools, authorities and deadlines to take the necessary steps to achieve the goal. For local agencies involved in implementation, the requirements are significant and can be expected to take years to accomplish. The State Water Resources Control Board may intervene if local agencies do not form a Groundwater Sustainability Agency (GSA) and/or fail to adopt and implement a Groundwater Sustainability Plan (GSP). The SGMA implementation steps and deadlines are shown in **Table 4.4-2, Sustainable Groundwater Management Act Implementation Steps and Deadlines.**

Table 4.4-2
Sustainable Groundwater Management Act
Implementation Steps and Deadlines

Implementation Step	Implementation Measure	Deadlines
Step One	Local agencies must form local Groundwater Sustainability Agencies (GSAs) within two years	June 30, 2017
Step Two	Agencies in basins deemed high- or medium-priority must adopt Groundwater Sustainability Plans (GSPs) within five to seven years, depending on whether a basin is in critical overdraft	January 31, 2020 for critically overdrafted basins January 31, 2022 for high- and medium-priority basins not currently in overdraft
Step Three	Once plans are in place, local agencies have 20 years to fully implement them and achieve the sustainability goal	January 31, 2040 for critically overdrafted basins January 31, 2042 for high- and medium-priority basins not currently in overdraft

SGMA applies to basins or subbasins designated by the DWR as high- or medium-priority basins, based on a statewide ranking that uses criteria including population and extent of irrigated agriculture dependent on groundwater. The 2018 Draft Basin Prioritization indicates that 109 of California's 517 groundwater basins and subbasins are high- and medium-priority basins. The Merced Subbasin is classified as a Critically Overdrafted Basin and a High Priority Basin.

As discussed above in **Section 4.4.2** under Groundwater Resources, the three GSAs that are responsible for the Merced Subbasin have completed a final GSP. The GSAs have commenced proceedings to adopt and submit the final GSP to the California Department of Water Resources by January 31, 2020, for its approval.

Local Plans and Policies

UC Sustainability Policy

UC Sustainable Practices Policy (Sustainability Policy) sets forth policy goals in nine areas of sustainable practices, including sustainable water systems. The policy notes the following:

I. Sustainable Water Systems With the overall intent of achieving sustainable water systems and demonstrating leadership in the area of sustainable water systems, the University has set the following goals applicable to all locations:

1. Locations will reduce growth-adjusted potable water consumption 20% by 2020 and 36% by 2025, when compared to a three-year average baseline of FY2005/06, FY2006/07, and FY2007/08. Locations that achieve this target early are encouraged to set more stringent goals to further reduce potable water consumption. Each Campus shall strive to reduce potable water used for irrigation by converting to recycled water, implementing efficient irrigation systems, drought tolerant planting selections, and/or by removing turf.

2. Each location will develop and maintain a Water Action Plan that identifies long term strategies for achieving sustainable water systems. The next update of the plan shall be completed in December 2016.

3. Each campus shall identify existing single pass cooling systems and constant flow sterilizers and autoclaves in laboratories and develop a plan for replacement.

4. New equipment requiring liquid cooling shall be connected to an existing recirculated building cooling water system, new local chiller vented to building exhaust or outdoors, or to the campus chilled water system through an intervening heat exchange system if available.

With regard to Water Action Plans, the policy notes:

> *"Each Water Action Plan will include a section on Water Usage and Reduction Strategies that describes the applicable types of water comprising water systems, including but not limited to potable water, non-potable water, industrial water, sterilized water, reclaimed water, stormwater, and wastewater; reports water usage in accordance with the methods set forth in these procedures; considers setting more stringent potable water reduction goals if the location has already achieved a 36% below baseline reduction in per capital potable water consumption; outlines location-specific strategies for achieving the target for reduced potable water consumption; encourages implementation of innovative water-efficient technologies as part of capital projects and renovations (e.g., installation of WaterSense certified fixtures and appliances, graywater reuse, rainwater harvesting, and watershed restoration); addresses use of non-potable water sources, and*

> *how those sources factor into overall sustainable water systems strategy; and analyzes the identified water use reduction strategies using a full cost approach."*
>
> *"Each Water Action Plan will include a section on Stormwater Management developed in conjunction with the location stormwater regulatory specialist that: (a) addresses stormwater management from a watershed perspective in a location-wide, comprehensive way that recognizes stormwater as a resource and aims to protect and restore the integrity of the local watershed(s); (b) references the location's best management practices for preventing stormwater pollution from activities that have the potential to pollute the watershed (e.g., construction; trenching; storage of outdoor equipment, materials, and waste; landscaping maintenance; outdoor cleaning practices; vehicle parking); (c) encourages stormwater quality elements such as appropriate source control, site design (low impact development), and stormwater treatment measures to be considered during the planning stages of projects in order to most efficiently incorporate measures to protect stormwater quality."*

UC Merced Water Action Plan

In 2014, in compliance with the Sustainability Policy, UC Merced prepared a Water Action Plan that includes all the required elements, including: (1) targets and actions to reduce consumptive use of water, and (2) targets and actions to manage stormwater and protect the watershed (UC Merced 2014). The WAP includes education and outreach, and identifies the following actions for some of the major goals included in the plan:

Reduce Water Use on the Campus

Short Term Actions (0-3 Years)

- Implement landscape irrigation practices meeting or exceeding AB 1881 (Model Water Efficient Landscape Ordinance)
- Meet or exceed "Urban Water Conservation" elements of SB X7-7 (Water Conservation Act of 2009)
- Complete Sustainable Sites Initiative pilot landscape around SE2 building
- Maximize USGBC LEED water conservation credits for LEED-NC and LEED-EBOM
- Maximize AASHE STARS water conservation credits
- Install weather-controlled, ET landscape water monitoring system
- Meter, monitor and share UCM real-time water use data using online dashboards
- Transition unnecessary turf to energy smart, California-friendly landscapes or hardscape

Intermediate Term Actions (3-5 Years)

- Implement campus landscape master plan
- Consider adopting Sustainable Sites Initiative Guidelines and Performance Benchmarks
- Create demonstration arboretum for energy smart, Central Valley-friendly plantings

Long Term Actions (5-10 Years)

- Explore developing student internships for implementation of water neutrality projects

Implement Innovative Water-Efficient Technologies

Short Term Actions (0-3 Years)

- Maximize USGBC LEED water conservation credits for LEED-NC and LEED-EBOM
- Maximize AASHE STARS water conservation credits
- Optimize water early leak detection by leveraging Badger Meter Beacon system
- Install only U.S. EPA WaterSense and/or Energy Star approved fixtures and appliances
- Explore using water budgets as a tool to foster innovation and creativity in water efficiency
- Experiment with monitoring-based commissioning approach to water use reduction and leak detection
- Conduct regular campus water audits

Intermediate Term Actions (3-5 Years)

- Consider piloting use of low-flow water measurement sensors in residence halls
- Consider water-efficient and conservation practices for campus cooling towers and central plants

Long Term Actions (5-10 Years)

- Explore feasibility and implementation of distributed wastewater treatment opportunities such as on-site wastewater treatment facility
- Explore amending campus planning, design and construction policies to require leading- edge sustainable water systems
- Explore the use of full-cost pricing in analyzing payback periods for sustainable water systems

Protect & Restore Integrity of Local Watershed

Short Term Actions (0-3 Years)

- Continue reducing stormwater runoff volume and improve water quality
- Maximize USGBC LEED and AASHE STARS stormwater credit

Intermediate Term Actions (3-5 Years)

- Explore creation of applied model for UCM watershed
- Incorporate green infrastructure and low-impact development strategies into site design in order to manage 30-50% of total volume runoff on-site
- Continue incorporating retention basins into site design and development to capture 100% of campus stormwater under normal precipitation conditions

Long Term Actions (5-10 Years)

- Explore feasibility and implementation of distributed wastewater treatment opportunities such as on-site wastewater treatment facility
- Explore feasibility of using captured rainwater for irrigation and non-potable use in buildings

Prevent Stormwater Pollution Resulting from Campus Activities

Short Term Actions (0-3 Years)

- Include and coordinate stormwater management plan with 2020 project
- Continue labeling stormwater inlets to remind constituents that dumping in the storm sewer is harmful to water quality
- Develop and implement a campus and community outreach program on the importance of keeping campus free of trash and other threats to stormwater quality
- Inventory herbicides and pesticides used on campus to assess risk they may have to stormwater

Intermediate Term Actions (3-5 Years)

- Develop and implement UC Merced's Stormwater Management Plan (SWMP) based on mitigation of UC Merced campus high-risk pollutants

Long Term Actions (5-10 Years)

- Continue to implement campus SWMP and revise as needed to address emerging threat to stormwater

Protect Stormwater Quality

Short Term Actions (0-3 Years)

- Include stormwater monitoring and protection measures in construction contract language
- Develop and implement a campus and community outreach program on the importance of keeping campus free of trash and other threats to stormwater quality
- Inventory herbicides and pesticides used on campus to assess the risk they may pose to stormwater

Intermediate Term Actions (3-5 Years)

- Develop and implement UC Merced's Stormwater Management Plan (SWMP) based on mitigation of UC Merced campus high-risk pollutants

Long Term Actions (5-10 Years)

- Continue to implement the campus SWMP and revise as needed to address emerging threats to stormwater

4.4.4 Impacts and Mitigation Measures

Significance Criteria

This SEIR uses significance criteria derived from Appendix G of the *State CEQA Guidelines*. For the purpose of this SEIR, impacts related to hydrology and water quality would be significant if implementation of the 2020 LRDP would:

- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in:
  - substantial erosion or siltation on or off site;
  - substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site;

  - 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; or
  - Impede or redirect flood flows; or
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

Issues Not Discussed Further

The following CEQA checklist issues are not evaluated further in this SEIR because they are adequately addressed in the 2009 LRDP EIS/EIR.

- violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality

Construction Activities under the 2020 LRDP

Impacts on water quality from the development of the campus were evaluated in the 2009 LRDP EIS/EIR and were found to be less than significant. As with the 2009 LRDP, construction activities under the Draft 2020 LRDP could result in soil erosion and release of sediment into receiving waters. However, according to federal law, all construction projects that involve disturbance of more than 1 acre of land are subject to NPDES regulations related to stormwater. All such projects are required by law to prepare and implement a SWPPP during construction. The SWPPP must be kept on site during construction activity and made available upon request to representatives of the RWQCB. The objectives of the SWPPP are to (1) identify pollutant sources that may affect the quality of stormwater associated with construction activity; and (2) identify, construct, and implement stormwater pollution prevention measures to reduce pollutants in stormwater discharges during and after construction. The SWPPP is required to include a description of potential pollutants and the manner in which sediments and hazardous materials present on site during construction (including vehicle and equipment fuels) would be managed. The SWPPP must also include details of how the sediment and erosion control BMPs would be implemented. Adherence to NPDES regulations would ensure that adverse impacts on water quality from construction activities on the campus are avoided.

Campus Operations under the 2020 LRDP

Direct and indirect impacts on water quality from campus operations were evaluated in the 2009 LRDP EIS/EIR and were found to be less than significant. Direct water quality impacts could result from discharge of stormwater pollutants into receiving waters, and indirect water quality impacts could result from the discharge of treated wastewater effluent. As with the 2009 LRDP, campus operations under the

Draft 2020 LRDP could result in direct and indirect impacts on water quality. However, for the same reasons noted in the 2009 LRDP EIS/EIR and set forth below, the impacts on water quality would be less than significant.

Stormwater Discharges

As with the 2009 LRDP, construction activities associated with the implementation of the 2020 LRDP would involve site grading and excavation activities that could cause erosion and sedimentation that could degrade the receiving water quality. Spills or leaks from heavy equipment and machinery (petroleum products and other heavy metals) in staging areas and building sites could also adversely affect receiving water quality. To reduce or eliminate construction-related water quality effects and to comply with the requirements of the CWA, before onset of any construction activities, as required by law, UC Merced or its contractor(s) would obtain coverage under the State NPDES General Construction Permit. UC Merced would be responsible to ensure that construction activities comply with the conditions in this permit, which requires development of a SWPPP, implementation of BMPs identified in the SWPPP, and monitoring to ensure that effects on water quality are avoided or minimized. Compliance with the state law would ensure that the water quality impact from construction activities would be less than significant. Further, the 2020 LRDP would limit almost all of the planned development to the area designated CMU and would therefore involve disturbance of less land area than the area analyzed under the 2009 LRDP. This impact is adequately addressed in the 2009 LRDP EIS/EIR.

Wastewater Discharges

As with the 2009 LRDP, implementation of the 2020 LRDP would not result in discharges that would cause the City of Merced's wastewater treatment plant (WWTP) to violate water quality standards or waste discharge requirements. Wastewater generated on the campus is currently discharged to the City of Merced sewer system and is treated at the City's WWTP. Wastewater generated on the campus under the proposed 2020 LRDP would also be collected and conveyed to the WWTP for treatment and disposal. The City of Merced WWTP discharges treated effluent under a waste discharge requirement order (WDR) from the RWQCB. The WDR establishes limits on the volume and concentrations of constituents in the treated effluent that is discharged by the WWTP. An exceedance of a WDR can occur under two conditions: the total volume of wastewater received by the WWTP exceeds the plant's treatment capabilities, or the wastewater contains constituents that cannot be adequately treated by the WWTP such that discharge of treated effluent exceeds the permit limits established in the WWTP's WDR.

The 2020 LRDP is not anticipated to produce a substantial increase in wastewater and would be within the treatment capacity of the WWTP (See **Section 4.10, Utilities and Service Systems**). Wastewater from the campus under the 2020 LRDP would be similar to wastewater discharged from other parts of the City and would not contain constituents that could cause the City's WWTP to exceed the waste discharge requirements that apply to the discharge of treated effluent. The use of hazardous materials, including biohazardous materials, would occur in the teaching and research laboratories on the campus. The Campus Department of Environmental Health and Safety (EH&S) has developed and implemented comprehensive programs to handle these wastes on the campus. EH&S has established drain disposal guidelines for all campus laboratories. These guidelines prohibit the discharge of hazardous materials into sinks and drains on the campus. As campus development under the 2020 LRDP would adhere to EH&S requirements and also comply with State law, it would not discharge effluent that could cause the WWTP to exceed the WWTP's waste discharge requirements and thereby result in a significant impact on water quality. This impact is adequately addressed in the 2009 LRDP EIS/EIR.

Methodology

The impacts of campus development on surface water hydrology, water quality, and the groundwater resources are analyzed qualitatively based on the proposed 2020 LRDP. A quantitative evaluation is not possible given the programmatic nature of the proposed LRDP.

4.4.5 LRDP Impacts and Mitigation Measures

LRDP Impact HYD-1: Campus development under the 2020 LRDP would not substantially interfere with groundwater recharge nor substantially decrease groundwater supplies. (*Less than Significant*)

Interfere with Groundwater Recharge

Development of additional impervious surfaces such as new buildings, roads, paths and parking lots, would occur on the campus under the 2020 LRDP, which would normally have the potential to reduce recharge of the underlying aquifer. However, campus development under the 2020 LRDP would not substantially reduce recharge compared to existing conditions for a number of reasons. The campus is located in an area that is known to have soil types with low to moderate recharge potential. There are substantial amounts of clay in the campus site soils, which restrict the ability of surface water to percolate into the groundwater aquifer. Also, there is a clay hard pan near the ground surface that further inhibits the potential of surface water to infiltrate down to the groundwater aquifer. Therefore, groundwater recharge under pre-development conditions is generally low on the campus site. Second, compared to the 2009 LRDP, campus development under the 2020 LRDP would be more compact and limited to the 274-acre area designated CMU. Further, the Campus's Water Action Plan sets forth a number of near- and long-term actions that include: (1) incorporating green infrastructure and low-impact development strategies into site design in order to manage 30 to 50 percent of total volume runoff on-site, and (2) continue incorporating retention basins into site design and development to capture 100 percent of campus stormwater under normal precipitation conditions. Therefore, implementation of the 2020 LRDP would not substantially interfere with recharge such that aquifer volume would be affected, and the impact related to groundwater recharge would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the small size and nature of these projects and for the same reasons set forth above, they would be unlikely to substantially affect groundwater recharge. The impact would be less than significant.

Decrease Groundwater Supplies

As discussed in **Section 4.10, Utilities and Service Systems** under **LRDP Impact UTL-1**, the 2009 LRDP EIS/EIR analyzed the potential impacts of campus development under the 2009 LRDP on water supply, based on the assumption that by 2030, campus enrollment would increase to 25,000 students and that the campus would have an employee population of 6,560 faculty and staff for a total of 31,560 persons. The 2009 LRDP EIS/EIR estimated a water demand of 2,387 AFY for the campus by 2030 and compared it to 8,073 AFY included for the campus in the City’s 2005 Urban Water Management Plan (UWMP). As noted in **Section 3.0, Project Description**, UC Merced is now expected to grow at a slower pace than originally anticipated, such that by 2030, the enrollment level is expected to be 15,000 students, and the faculty and staff projection for 2030 is also substantially lower than previously projected and analyzed in the 2009 LRDP EIS/EIR. Additionally, in 2015, the City prepared and adopted a new UWMP, and in 2017 SGMA was passed that requires sustainable management of groundwater supplies by local authorities and lays out a process and a timeline for local authorities to achieve sustainable management of groundwater basins. Given this change in the proposed project and the conditions in which it would be implemented, the impact of campus development under the 2020 LRDP was evaluated for its potential to decrease groundwater supplies.

As noted under **LRDP Impact UTL-1**, based on a water use factor of 31.4 gallons per capita per day (gpcd) and the revised 2030 population projections for the campus, projected water demand for the campus was estimated to be approximately 623 AFY by 2030 (WYA 2018).[1] This estimate is considered conservative because it does not take into account further reductions in campus water use due to UC Merced’s implementation of its Water Action Plan in compliance with the UC Sustainable Practices

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1 In 2019, UC Merced revised its 2030 population projection down to include a smaller increase in faculty and staff than previously projected in 2018. Please see memorandum in **Appendix 4.10** which shows that based on the revised population projection, the campus’s 2030 water demand would be about 612 AFY, and not 623 AFY. As a result, the water demand estimate in the WSE and in the impact analysis above is a conservative estimate.

Policy. As noted above, the UC Merced Water Action Plan includes a number of short-term (within 0 to 3 years), intermediate-term (within 3 to 5 years), and long-term (within 5 to 10 years) actions to reduce water use on the campus. These actions include, but are not limited to, implementation of landscape irrigation practices meeting or exceeding AB 1881 (Model Water Efficient Landscape Ordinance); meeting or exceeding "Urban Water Conservation" elements of SB X7-7 (Water Conservation Act of 2009); installing weather-controlled, ET landscape water monitoring system; transitioning unnecessary turf to energy smart, California-friendly landscapes or hardscape; optimizing water early leak detection by leveraging Badger Meter Beacon system; installing only U.S. EPA WaterSense and/or Energy Star approved fixtures and appliances; conducting regular campus water audits; considering piloting use of low-flow water measurement sensors in residence halls; exploring the feasibility and implementation of distributed wastewater treatment opportunities such as on-site wastewater treatment facility; and considering water-efficient and conservation practices for campus cooling towers and central plants.

The City's 2015 UWMP estimated and included a demand of 1,406 AFY for the campus in 2030. The total demand of 623 AFY associated with the campus under the 2020 LRDP is substantially less than 1,406 AFY of campus water demand anticipated in the City's UWMP. For comparison purposes, the total water demand in the City's service area in 2030 would be 30,006 AFY. The campus' demand would represent about 2.1 percent of the City's total demand. The 2015 UWMP concluded that the City of Merced has an adequate groundwater supply to meet water demands during normal, single-dry, and multi-dry years (WYA 2018). Furthermore, as noted in the 2015 UWMP, groundwater extraction has been reduced since 2013 in response to severe drought conditions. It is anticipated that the amount of groundwater being pumped will not rebound to pre-drought levels because the City recently became fully metered and water conservation measures will remain in effect. UC Merced would also continue to minimize its water use and implement the short-, intermediate-, and long-term actions set forth in its Water Action Plan.

As discussed in **Section 4.4.2**, the three GSAs that manage the Merced Subbasin have completed their GSP which lists priority projects and management actions that the GSAs will implement to reduce water demand, recharge the basin, and increase supply from non-groundwater sources. Plan implementation is to begin in early 2020. As noted earlier, based on modeling of current and projected subbasin conditions, absent implementation of any new supply-side or recharge projects, current agricultural and urban groundwater demand in the Merced Subbasin would need to be reduced by approximately 10 percent in order to balance out the change in groundwater storage over a long-term average condition. As described above, the City's 2015 UMWP includes a water demand projection for the UC Merced campus of 1,406 AFY. This water demand projection was developed based on a larger buildout population and a higher per capita water use by 2030. As noted in the WSE, the previous UC Merced water use factor of 39 gallons per capita per day (gpcd) has been reduced to 31.4 gpcd based on actual water use data for the last 10 years on the UC Merced campus, a reduction of about 19.5 percent. Thus, the projected UC Merced water demand by 2030 is currently estimated to be approximately 623 AFY. This projected water demand is 56 percent lower than the projected water demand for the campus included in the City's 2015 UWMP. Therefore, on both a per capita basis and total demand basis, the Campus has reduced its demand substantially from previous levels and the reductions are significantly more than the required 10 percent water demand reduction identified in the GSP to bring the groundwater subbasin into balance. The Campus is continuing to implement actions to reduce use of potable water. The Campus will also continue to work with the City and MID to identify other sources of water, including the use of canal water for irrigation and other non-potable uses.

In summary, although the Merced Subbasin is in a state of overdraft, the overdraft in itself is not a limitation on the City's ability to draw water from the aquifer. Additionally, UC Merced would implement its Water Action Plan to reduce water demand and facilitate recharge. Further, the City and MID are proactively managing the subbasin to reverse the overdraft trend. Although the implementation of the 2020 LRDP would increase the amount of groundwater that would be withdrawn from the Merced Subbasin compared to existing conditions, however, the amount is substantially less than the amount accounted for UC Merced in the City's UWMP and may be an even smaller amount with the implementation of the UC Merced Water Action Plan. Therefore, the project would not require extraction of groundwater in excess of what is planned and due to the relatively small amount involved, would not, in itself, substantially decrease groundwater supplies. The impact would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the small size and nature of these projects and for the same reasons set forth above, they would be unlikely to substantially decrease groundwater supplies. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact HYD-2: Campus development under 2020 LRDP would not substantially alter the existing drainage pattern of the campus site through alteration of a water course or through the addition of impervious surfaces such that it would result in substantial erosion or siltation on or off site, result in flooding on or off site, contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems, or impede or redirect flood flows. ***(Less than Significant)***

Historically, the campus site was not served by a storm drain system. Storm water that fell on the site would sheet flow in a southerly direction. With the construction of the two on-site canals, Fairfield and Le Grand Canals, the flow of storm water runoff was interrupted in various locations, causing storm water to pond on the upgradient side of the canal levees. This condition still continues. Historically, the runoff from the east side of the campus site generally sheet-flowed in a southeasterly direction onto adjacent lands where it would evaporate or percolate. Storm water from the western portion of the campus site that did not percolate would run offsite in a southerly to southwesterly direction to eventually drain into Cottonwood Creek. Historically, the headwaters of the creek were located on the campus site but were cut off with the construction of the canals and the Merced Hills Golf Course prior to the acquisition of the site by the University for the campus. The creek at the present time is located within the irrigation pivot area in the southern portion of the campus site. It runs in a south southwesterly direction on the east side of Lake Road, crossing under Lake Road in a culvert near Cardella Road, to continue east to its confluence with Fahrens Creek. Historically, some flooding occurred on the east side of Lake Road due to a capacity constraint in the culvert under Lake Road.

With the development of the Phase 1 campus and the ongoing 2020 Project, storm water from developed surfaces is collected by the campus storm drain system and discharged into a number of detention facilities that are designed to hold flows from a 100-year, 24-hour storm. The collected storm water either percolates or evaporates and is not discharged off site at this time.

At the time that the 2009 LRDP EIS/EIR was prepared, it was anticipated that increased runoff from most of the campus would be disposed of in Fairfield Canal. The 2009 LRDP EIS/EIR noted that with the development of the campus, the on-site drainage pattern would be altered and additional runoff that is generated would be collected by the storm drainage system, detained, and then discharged into Fairfield Canal at a discharge rate established by MID. Because the canal is not used during fall and winter to convey irrigation water, under normal conditions, Fairfield Canal would have capacity to handle the storm water discharged by the campus. To ensure that storm water in excess of the capacity of the canal is not discharged into the canal, MID would install water elevation detectors in the canal which would determine when releases to the canal would be allowed. MID indicated that in the event that the entire capacity of Fairfield Canal is needed to convey floodwaters from Lake Yosemite, the campus's storm water detention facilities must be designed to hold runoff from large storm events until such time that capacity in the canal becomes available to receive campus runoff. Therefore, storm water detention facilities would be designed to detain storm water flows that would result from a 100-year, 24-hour storm event. Because storm water from a small southerly portion of the campus was expected to continue to discharge into Cottonwood Creek, the 2009 LRDP EIS/EIR noted that the increased runoff from that area would also be detained in a detention basin along the east side of Lake Road and released at an appropriate rate such that no downstream flooding in Cottonwood Creek would occur. The 2009 LRDP EIS/EIR concluded that with the provision of adequate detention facilities, the increased runoff from campus development would not result in off-site flooding, erosion, or siltation.

As with the prior LRDP, existing drainage patterns would be altered by the construction of new facilities under the 2020 LRDP. However, the area on the campus site that would be developed would be limited to about 274 acres of CMU lands. This area does not include the current alignment of Cottonwood Creek, and the creek would not be directly altered. New construction would, however, have the potential to increase the rate and amount of runoff, and if the runoff were to be discharged uncontrolled to surface waters, it could result in (or exacerbate) flooding as well as potential hydromodification (i.e., erosion and scour) in downstream drainages. However, such downstream impacts would be avoided. New development on the campus would comply with UC Sustainable Practices Policy and the UC Merced Water Action Plan which requires that the integrity of the local watershed be protected and restored, and sets forth a number of short-term, intermediate-term and long-term actions for the campus to implement, including but not limited to: continue reducing storm water runoff volume and improve water quality; maximize USGBC LEED and AASHE STARS storm water credit; explore creation of applied model for UC Merced watershed; incorporate green infrastructure and low-impact development strategies into site design in order to manage 30 to 50 percent of total volume runoff on-site. Further, the Campus will continue incorporating retention and detention basins and other stormwater features into site design and development; these basins would be operated so that all flows under normal rainfall conditions would be retained and under larger storm conditions including the 100-year, 24-hour storm, the flows would be detained and released at rates that would not exceed the existing peak and total flows. Ample land is available on the campus site for the development of storm water detention and retention facilities.

Lastly, no portion of the campus site is within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map. Further, there are no water courses within the CMU area of the campus that would be developed with new facilities. Therefore, no impact related to impeding or redirecting flood flows would occur.

In summary, campus development under 2020 LRDP would generate increased storm water runoff, but with the implementation of LID strategies and green infrastructure as well as the provision of storm water detention and retention facilities, UC Merced would control both the peak flows and the total volume of storm water runoff before discharge into any receiving waters and would avoid potential flooding and erosion/siltation impacts in downstream areas. The impact from changes in storm water runoff from campus development would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the small size and nature of these projects and for the same reasons set forth above, they would be unlikely to substantially alter storm water flows. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

4.4.6 Cumulative Impacts and Mitigation Measures

Cumulative Impact C-HYD-1: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, could cumulatively increase surface runoff but would not increase local and regional flooding. (*Less than Significant*)

Development of the campus under the proposed LRDP would increase the total amount of impervious surfaces and therefore increase surface runoff within the on-site watersheds. This increased runoff would discharge into Bear Creek via Cottonwood Creek. Other development in the project area would also increase the amount of impervious surfaces in the project area and increase stormwater discharges to Bear Creek. Cumulative effects are, therefore, discussed below in terms of the effects on Bear Creek.

Like other creeks of the Merced Streams Group, Bear Creek has historically experienced serious flooding problems that have stemmed from the lack of channel capacity which is aggravated by erosion and overgrowth of vegetation within the channel. Furthermore, high flows of moderate duration in this creek and other streams occur from intense rainstorms and result in flash flooding. In addition, snowmelt in the Sierra can produce high flows of longer duration during the spring. Channel capacity, especially within Bear Creek, has become even more inadequate relative to the flows as more impervious surfaces have been added in the creek's watershed, causing increased runoff to be discharged to the creek.

UC Merced would release some limited stormwater into Cottonwood Creek, which is a tributary to Bear Creek. As discussed above, the stormwater control system for the campus would include on-site retention and detention facilities that would be operated so that all flows under normal rainfall conditions would be retained and under larger storm conditions including the 100-year, 24-hour storm, the flows would be detained and released at rates that would not exceed the existing peak and total flows. This would preclude downstream flooding. Similarly, all other development in the watershed of Bear Creek would also be required to detain additional storm water generated by new impervious surfaces. The City of Merced Vision 2030 General Plan requires new development to use existing detention facilities or construct storm water detention facilities as part of new development. Because additional storm water runoff will be controlled and discharged at rates that would reduce the potential for flooding, the cumulative impact related to flooding is considered to be less than significant.

Mitigation Measures: No mitigation is required.

Cumulative Impact HYD-2: **Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not substantially interfere with groundwater recharge but would deplete groundwater supplies and contribute to the overdraft of the regional groundwater aquifer. (*Significant; Significant and Unavoidable*)**

The Merced Subbasin is the primary source of water in eastern Merced County and serves the water demand of urban areas as well as agricultural areas, although agricultural land uses also use surface water delivered by MID. The subbasin has a surface area of about 491,000 acres, and a total storage capacity of 15.7 million AF to a depth of 300 feet, and 42.2 million AF to the base of fresh water. DWR has estimated that the natural recharge into the basin to be 47,000 AF, and the City estimates that the applied recharge is about 243,000 AF. Extractions for urban and agricultural uses are 54,000 AF and 492,000 AF respectively, with another 9,000 AF of other extractions. Surface inflow values have not been determined (City of Merced 2012). As of 2007, the subbasin is in a state of mild decline with a cumulative decrease in storage of approximately 720,000 AF from about 1980 to 2007 (City of Merced 2012). Based on monitoring data, average groundwater levels in the subbasin declined by about 14 feet between 1980 and 2010 (City of Merced 2012). As noted earlier, the subbasin is listed by the state among the basins that are in critical overdraft.

Impact Related to Groundwater Recharge

Urban development within the subbasin would increase the amount of land area that is under impervious surfaces and would thereby have the potential to reduce recharge of the underlying aquifer. However, the City requires new development to minimize impervious surfaces and to collect and discharge runoff from new impervious surfaces into stormwater detention basins that are either existing or built as part of new development. Runoff discharged into the detention basins percolates into underlying soils and serves to recharge the aquifer. In instances where storm water is discharged into a downstream waterway, such as a creek or a canal, that storm water also contributes to recharge. Similarly, as discussed under **LRDP Impact HYD-1** above, UC Merced will implement a number of actions included in its Water Action Plan to minimize the amount of new runoff that is generated and would also require runoff to be retained or detained in storm water detention basins. Therefore, cumulative development within the subbasin, including development on the campus, would not substantially affect the groundwater aquifer by interfering with recharge.

Impact Related to Groundwater Withdrawal

The City of Merced relies solely on groundwater for its potable water supply. The City's wells pump from the Merced Subbasin which is a non-adjudicated groundwater basin with no limits on pumping. As the supplies the City relies upon are neither in the process of adjudication nor the subject of any new legislation limiting them, the City does not anticipate legal factors that could limit its ability to withdraw the needed amount of groundwater in the near term. However, because the Merced Subbasin has been identified by the state as being in a critical state of overdraft, the City and MID, as part of MAGPI and the MSGSA, have developed plans to address the overdraft condition, which include development of new sources of water other than groundwater to sustain the City's projected population growth. The City is pursuing the following additional sources of water.

- Beginning in 2020, the City plans to exchange recycled water for untreated surface water from MID. The untreated surface water from MID will be used to irrigate a number of landscaped areas within the City.

- The City's 2014 Water Master Plan identifies that the City needs to increase its water supply in the future. The recommended alternative to increase supply involves the construction of a 10 million gallon per day Surface Water Treatment Plant (SWTP) by 2030 that will receive untreated surface water from MID. The City expects to receive an average of 4,000 AFY from MID.

- The City's WWTF is capable of producing 12 mgd of tertiary filtered wastewater, which may be used for a variety of non-potable uses. The City currently does not have the infrastructure to distribute the recycled water produced at the WWTF throughout the City. The City currently uses recycled water for flushing out sewer and storm drains, irrigating landscapes and agriculture, and maintaining wildlife areas. The City will also provide residents with recycled water if they come to collect it at the WWTF. The City anticipates an increase in recycled water use in the future, primarily by agricultural users.

The City is also working with other regional partners, including MID, Merced County, and UC Merced, to address water supply. As stated in the City's 2015 UWMP, the following efforts are being taken or planned to be undertaken to address the long-term overdraft conditions, as identified in the GWMP and MIRWMP (City of Merced 2017).

- **Groundwater Recharge**: MID has implemented in-lieu recharge programs to reduce groundwater pumping. A regional Groundwater Feasibility Study was recently completed and identified areas within the region that would provide optimal artificial recharge.
- **Water Conservation and Education**: The City considers water conservation and education an important aspect of its overall groundwater management efforts. The City has implemented watering restrictions, provided rebates for water efficient fixtures, and distributed educational information.
- **Conjunctive Use of Water Resources**: Conjunctive use is defined as the coordinated use of both groundwater and surface water in an effort to optimize water sources. The City and MID are planning to use surface water from MID canals to irrigate landscape within the City and UC Merced.
- **Wastewater Reclamation and Recycling**: The City's Wastewater Treatment Facility is capable of producing approximately 12 million gallons per day of highly treated recycled water which can be used in-lieu of groundwater for irrigation.
- **Construction and Operation of Facilities**: The construction of groundwater and surface water facilities are discussed in the GWMP as potential projects in the future, which would contribute to recycling, conservation, groundwater recharge, and storage. These projects include the use of non-potable water for irrigation of public land and agriculture; expanding surface water facilities for use in areas without current access; construction of recharge facilities in areas of groundwater decline; adding wetland buffer zones around drainage and recharge areas to promote infiltration; construction of additional surface water storage facilities.

As noted in **Section 4.4.2**, a GSP has been prepared for the Merced Groundwater Subbasin for compliance with SGMA. With the adoption of the GSP, the three GSAs will adopt a sustainability goal for the Merced Subbasin to achieve sustainable groundwater management on a long-term average basis by increasing recharge and/or reducing groundwater pumping, while avoiding undesirable results. The GSP includes a shortlist of 12 priority projects to be implemented over a 20-year period to either increase surface water supplies to augment the sustainable groundwater yield or to increase groundwater recharge. The GSP also includes a demand reduction program that proposes to implement voluntary and mandatory reductions, if needed. Pursuant to the GSP, the University is exploring a partnership with MID for the purpose of reducing groundwater reliance.

The implementation of the GWMP, MIRWMP, and the GSP would reduce the potential for groundwater levels to decline further. However, the effectiveness of the plans remains to be demonstrated. Furthermore, because the groundwater basin is a state of overdraft and because a substantial increase in groundwater withdrawal is anticipated in the next 20 years due to regional growth, conservatively it is concluded that regional growth would result in a significant cumulative impact on the subbasin.

While the water demand estimate for the campus reflects high levels of water conservation, UC Merced will continue to explore additional ways of reducing the use of potable water. UC Merced would implement its Water Action Plan which is specifically designed to reduce the demand for potable water.

All of these efforts by UC Merced would reduce the proposed project's contribution to the significant cumulative impact. However, even with these measures, the project's contribution to the significant cumulative impact would be considerable. **Cumulative Mitigation Measure C-HYD-2** is included to address this cumulative impact.

Mitigation Measures:

Cumulative MM C-HYD-2: UC Merced shall work with the regional water agencies, including the City of Merced and MID, to develop programs to expand conjunctive use capabilities, increase recharge, and reduce groundwater demand.

Significance after Mitigation: While implementation of the various plans developed by the City and other water agencies, and the implementation of **Cumulative Mitigation Measure C-HYD-2** would reduce the effect of the cumulative demand on the groundwater aquifer, neither the University nor the City can predict with any certainty that the rate of overdraft will not increase with future urban development within the City's service area. Therefore, the impact would be a significant and unavoidable impact.

4.4.7 References

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4.5 NOISE

4.5.1 Introduction

This section of the Recirculated Draft SEIR (SEIR) describes the existing noise environment in the project area. The noise impacts associated with the implementation of the proposed 2020 LRDP are assessed with respect to the applicable significance thresholds specified in the state and local regulatory programs and adopted plans. Key noise issues include exposure of existing and proposed noise-sensitive land uses to construction noise and increases in traffic noise along the roadway network from project-related changes in traffic patterns.

4.5.2 Environmental Setting

Fundamentals of Noise

Sound is mechanical energy transmitted by pressure waves in a compressible medium such as air. Noise can be defined as unwanted sound. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient sound level. The decibel (dB) scale is used to quantify sound intensity. Because sound pressure can vary enormously within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. The human ear is not equally sensitive to all frequencies in the entire spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called "A-weighting," written "dBA." In general, human sound perception is such that a change in sound level of 3 dB is just noticeable, a change of 5 dB is clearly noticeable, and a change of 10 dB is perceived as doubling or halving sound level.

Different types of metrics are used to characterize the time-varying nature of sound. These metrics include the equivalent sound level (L_{eq}), the minimum and maximum sound levels (L_{min} and L_{max}), percentile-exceeded sound levels (L_{xx}), the day-night sound level (L_{dn}), and the community noise equivalent level (CNEL). Below are brief definitions of these metrics and other terminology used in this chapter:

- **Sound.** A vibratory disturbance created by a vibrating object which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.

- **Decibel (dB).** A unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.
- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- **Maximum Sound Level (L_{max}).** The maximum sound level measured during the measurement period.
- **Minimum Sound Level (L_{min}).** The minimum sound level measured during the measurement period.
- **Equivalent Sound Level (L_{eq}).** The equivalent steady state sound level that in a stated period of time would contain the same acoustical energy.
- **Day-Night Level (L_{dn}).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 PM to 7:00 AM.
- **Community Noise Equivalent Level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 PM to 10:00 PM and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 PM to 7:00 AM.

L_{dn} and CNEL values differ by less than 1 dB. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such in this noise assessment.

Existing Conditions

The campus is located in eastern Merced County, east of Lake Yosemite and Lake Road, approximately 2 miles northeast of the corporate limits of the City of Merced, California. The Regents approved the establishment of the new campus on the site in 2002 and following the completion of the first set of campus facilities, the campus was inaugurated in 2005. Since then, campus development has continued, and new facilities are currently under construction as part of the 2020 Project which would allow the campus to accommodate an enrollment level of about 10,000 students.

Other than campus development and ongoing construction, the project site is largely undeveloped and no major fixed noise sources exist on the site. Noise sources include traffic on local roadways and noise from agricultural operations. Noise-sensitive receptors in the vicinity of the project site include a few residences located along the east side of Lake Road and Bellevue Avenue to the south of the project site.

Roadways and Freeways

No heavily traveled roads or freeways are within the vicinity of the campus. State Route (SR) 99, SR 59, and SR 140 are all located about 2.5 miles or further from the campus site and do not affect noise levels in the project area. Nearby roadways tend to be light to moderately traveled, at moderate vehicle speeds, and do not handle large volumes of heavy-duty trucks or buses. As such, while motor vehicle traffic causes noise within the project area and tends to be the primary noise source in locations adjacent to traveled roadways, the resulting noise levels are not excessive.

The existing ambient noise levels were estimated for the segments of the two main roads leading to campus, Lake and Bellevue Roads, based on average daily trips provided in the traffic study for this project. The traffic noise was modeled using the Federal Highway Administration Highway (FHWA) Highway Noise Prediction Model (FHWA-RD-77-108). The highest traffic volumes during either the AM or PM peak hour were used as inputs to the model. The estimated ambient roadway noise levels are presented in **Table 4.5-1, Existing Roadway Modeled Noise Levels**. As shown, the modeled roadway noise level on Lake Road adjacent to the campus is 59.7 dB(A) CNEL at 75 feet while the modeled roadway noise level on Bellevue Road leading to the campus is 60.5 dB(A) CNEL at 75 feet. It is noted that noise levels along these roadways are likely slightly higher than these modeled levels due to the contribution of noise from other non-roadway noise sources. However, traffic is the dominant noise source in the area.

Table 4.5-1
Existing Roadway Modeled Noise Levels

Roadway Segment/Intersection	CNEL at 75 Feet	Distance to Noise Contour [a]		
		70 CNEL	65 CNEL	60 CNEL
Lake Road				
Between Bellevue and Cardella	59.7	--[b]	--[b]	--[b]
Between Cardella and Yosemite	59.5	--[b]	--[b]	--[b]
Bellevue Road				
Between Lake Road and G Street	60.5	--[b]	--[b]	81
Between G Street and State Route 59	60.5	--[b]	--[b]	81

Source: Impact Sciences. Model results are contained in ***Appendix 4.5****.*

[a] *Distances are in feet from roadway centerline. The identified noise level at 75 feet from the roadway centerline is for reference purposes only as a point from which to calculate the noise contour distances. It does not reflect an actual building location or potential impact location.*

[b] *Noise contour is located within the roadway right-of-way.*

Railroad Traffic

The Burlington Northern/Santa Fe (BNSF) Railroad main line passes through the City of Merced and is approximately 2.5 miles to the south of the project site. This rail line carries frequent north-south freight train traffic and daily Amtrak passenger trains. Because the railroad is sufficiently distant from the project area, noise from railroad traffic does not affect ambient noise levels on the campus.

Aircraft Overflights

The Merced Municipal Airport is approximately 7 miles to the southwest of the campus, and Castle Airport (the former Castle Air Force Base) is approximately 6 miles to the west. While noise from aircraft overflights is occasionally perceptible on the campus, it does not substantially affect the noise environment. A review of the County's Noise Element indicates that the 65 dBA L_{dn} noise contours associated with the airports in the region do not encompass or include any portion of the campus.

A private airstrip is located approximately 1.8 miles southeast of the built portion of the campus. The airstrip is used by planes involved in agriculture operations (e.g., fertilizing, seeding, and baiting). As the airstrip does not support commercial flights and is used for a limited number of agricultural flights, it is not anticipated that the airstrip would alter the ambient noise levels at or near the campus.

Stationary and Area Sources

Stationary and area noise sources include common building or home mechanical equipment, such as air conditioners, ventilation systems, or pool pumps, and industrial or agricultural operations. These noise sources become a concern when they are in close proximity to land uses where people would be noise-sensitive. No industrial or manufacturing facilities are located on the campus; however, some agricultural-related operations and land maintenance activities cause occasional, daytime noise within the southern portion of the campus (e.g., noise from farm equipment, crop-dusting, etc.). To the northwest of the campus, the Lake Yosemite facilities provide recreational boating opportunities, which generate noise primarily during the daytime hours of the warmer months.

4.5.3 Regulatory Considerations

State Regulations

The pertinent State of California regulations are contained in the California Code of Regulations (CCR). Title 24 "Noise Insulation Standards" establish the acceptable interior community noise level for multifamily dwellings (and may be extended by local legislative action to include single-family dwellings). Section 65302(f) of the CCR establishes the requirement that local land use planning jurisdictions prepare a General Plan. The Noise Element is a mandatory component of the General Plan. It includes general community noise guidelines developed by the California Department of Health Services and specific planning guidelines for noise/land use compatibility developed by the local jurisdiction. The state guidelines recommend that the local jurisdiction consider adopting a local nuisance noise control ordinance.

The California Department of Health Services has developed guidelines (1987) for community noise acceptability for use by local agencies. Selected relevant levels are the following:

- CNEL below 60 dBA—normally acceptable for low-density residential use.
- CNEL of 55 to 70 dBA—conditionally acceptable for low-density residential use.
- CNEL below 65 dBA—normally acceptable for high-density residential use.
- CNEL of 60 to 70 dBA—conditionally acceptable for high-density residential, transient lodging, churches, educational and medical facilities.
- CNEL below 70 dBA—normally acceptable for playgrounds, neighborhood parks.

"Normally acceptable" is defined as satisfactory for the specified land use, assuming that normal conventional construction is used in buildings. "Conditionally acceptable" may require some additional noise attenuation or special study. Under most of these land use categories, overlapping ranges of acceptability and unacceptability are presented, leaving some ambiguity in areas where noise levels fall within the overlapping range.

The State of California additionally regulates the noise emission levels of licensed motor vehicles traveling on public thoroughfares, sets noise emission limits for certain off-road vehicles and watercraft, and sets required sound levels for light-rail transit vehicle warning signals. The extensive state regulations pertaining to worker noise exposure are for the most part applicable only to the construction phase of any project.

Local Plans and Policies

Pursuant to the University of California's constitutional autonomy, development and uses on property owned or controlled by the University that are in furtherance of the University's educational purposes are not subject to local land use regulation, including general plans and zoning. However, the University seeks to cooperate with the local jurisdictions to reduce any physical consequences of potential land use conflicts to the extent feasible.

The campus is located in unincorporated Merced County. Some of the existing noise-sensitive receptors along Bellevue and Lake Roads that lead to the campus and could be affected by project traffic related noise increases are located in unincorporated Merced County. Therefore, Merced County noise regulations are pertinent and are summarized below.

Merced County

Noise is addressed in Chapter IV (Noise) of the Year 2000 Merced County General Plan. Chapter IV, Section C, sets forth goals, objectives, policies, and implementation guidelines to assure land use compatibility with respect to noise. Among these objectives is that citizens of the county are not significantly impacted by excessive noise levels. New residential land uses and projects should be located where noise will not exceed an existing or projected future exterior noise level standard of 65 dBA L_{dn}, and an interior noise level standard of 45 dBA L_{dn}.

The Merced County Zoning Code requires that no use shall create any disturbing ground vibration, heat, glare, and electrical disturbances based on typical human reaction beyond the boundaries of the site (Merced County Code Chapter 18.41.090).

Construction activity is exempt from the sound level limitations specified in the Noise Control Code, provided that all construction in or adjacent to urban areas is limited to the daytime hours between 7:00 AM and 6:00 PM, and all construction equipment is properly muffled and maintained. For construction occurring outside of these hours, the Code limits maximum noise levels from construction to 75 dBA L_{max} at any residential property or 80 dBA L_{max} at any non-residential property. The L_{dn} limit would not be applicable in this case because it is a day-night average noise level and the daytime construction activities would be considered exempt. The Code also specifies that no person shall generate a sound level that exceeds the background sound level by more than 10 dBA L_{eq} between the hours of 6:00 PM and 10:00 PM, or by more than 5 dBA L_{eq} between the hours of 10:00 PM and 7:00 AM.

The Code also limits the hourly average sound level not to be more than 10 dBA L_{eq} above the ambient sound level between the hours of 6:00 PM and 10:00 PM, or an hourly sound level more than 5 dBA L_{eq} above the ambient sound level between the hours of 10:00 PM and 7:00 AM.

4.5.4 Impacts and Mitigation Measures

Significance Criteria

This SEIR uses significance criteria derived from Appendix G of the *State CEQA Guidelines*. For the purpose of this SEIR, impacts related to noise would be significant if implementation of the 2020 LRDP would result in:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies; or
- Generation of excessive ground borne vibration or ground borne noise levels.

Noise Standards and Thresholds used for Impact Evaluation

The areas surrounding the campus are in unincorporated Merced County. Although the University is not subject to local standards and ordinances, the University has elected to use the County's noise standards and construction noise ordinance to evaluate the potential for campus development under the proposed LRDP to adversely affect ambient noise levels in the vicinity of the campus, as set forth below.

Operational Noise

The Merced County standard for residential land uses is 65 dBA L_{dn} for exterior noise levels and 45 dBA L_{dn} for interior noise levels. For purposes of evaluating the significance of the project's operational noise impacts, the following numeric thresholds were used:

- An increase in noise which causes the thresholds (65 dBA L_{dn} for residential) to be exceeded and the project results in an increase in noise of 3 dBA or more;
- An increase of 3 dBA where the resulting outdoor noise levels with the project are above the thresholds (65 dBA L_{dn} for residential);
- An increase of 5 dBA, where the noise levels without the project are 50 to 65 dBA L_{dn} for residential uses and the increase in noise from the project does not cause the significance thresholds to be exceeded; or
- An increase of 10 dBA, where noise levels without the project are less than 50 dBA L_{dn} for residential uses.

Construction Noise

Merced County exempts noise from construction activity from the sound level limits, provided that all construction in or adjacent to urban areas is limited to the hours between 7:00 AM and 6:00 PM, and all construction equipment is properly muffled and maintained. County Ordinance 10.60.0303 applies to construction occurring outside of these hours. The following ordinance thresholds were used to evaluate the significance of the construction noise impacts:

- Construction occurring between the hours of 7:00 AM and 6:00 PM would result in a less than significant noise impact.
- Construction occurring between the hours of 6:00 PM and 10:00 PM would result in a significant construction noise impact if maximum noise levels exceed 75 dBA Lmax at any residential property or 80 dBA Lmax at any non-residential property or if construction activities result in a sound level that is more than 10 dB L_{eq} above the ambient sound level.
- Construction occurring between the hours of 10:00 PM and 7:00 AM would result in a significant construction noise impact if maximum noise levels exceed 75 dBA Lmax at any residential property

or 80 dBA Lmax at any non-residential property or if construction activities result in a sound level that is more than 5 dB L_{eq} above the ambient sound level.

Issues Not Discussed Further

The following CEQA checklist issue is not evaluated further in this SEIR because it is adequately addressed in the 2009 LRDP EIS/EIR.

- For a project located within the vicinity of a private airstrip or an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels.

Impacts related to the exposure of people residing or working in the project area to excessive noise levels from the operation of a public airport or a private airstrip were evaluated in the 2009 LRDP EIS/EIR. The campus is located approximately 7 miles to the northeast of the Merced Regional Airport and Castle Airport is approximately 6 miles to the west. Given these distances, noise generated by aircraft operations at these facilities would not expose receptors on the campus to excessive noise levels. A private airstrip is located approximately 1.8 miles southeast of the built portion of the campus. The airstrip is used by aircraft involved in agriculture operations (e.g., fertilizing, seeding, and baiting). As the airstrip does not support commercial flights and is used for a limited number of agricultural flights, it is not anticipated that the airstrip would alter the ambient noise levels at or near the campus. This impact is adequately addressed in the 2009 LRDP EIS/EIR.

Methodology

The primary noise issues associated with campus development under the 2020 LRDP are the exposure of existing and proposed noise-sensitive land uses to short-term construction activities and noise from project-related traffic and changes in traffic patterns (long term). Secondarily, noise would also be generated by daily activities on the campus, such as noise from landscaping, mechanical equipment, recreational activities, and parking lot activities, and from special events at the campus, that could affect nearby receptors.

As noted above, existing noise levels along the two main roadways that serve the campus were estimated based on traffic noise modeling conducted using traffic data developed for this SEIR. To estimate both existing and future traffic noise levels with the addition of traffic related to the campus, the Federal Highway Administration (FHWA) Traffic Noise Model (TNM v 2.5) was used. Noise modeling assumed soft ground type and did not take any shielding from barriers, structures, or terrain into account. Traffic noise was estimated for the following scenarios: Existing, 2030 No Project, 2030 with Proposed Project, 2035 No Project, and 2035 with Proposed Project. AADT traffic volumes, traffic speeds, and vehicle mix (percentages of automobiles, buses, medium trucks, and heavy trucks) were provided by the transportation consultant for input into the traffic noise model.

4.5.5 LRDP Impacts and Mitigation Measures

LRDP Impact NOI-1: Implementation of the 2020 LRDP would not substantially increase ambient traffic noise levels at existing off-site noise-sensitive uses. (*Less than Significant)*

The 2009 LRDP EIS/EIR analyzed the potential for campus development under the 2009 LRDP to result in substantial traffic noise impacts on sensitive receptors located along roadways that would experience increases in campus-related traffic. That analysis, which was presented under Impact NOI-1, showed that the increase in traffic due to the 25,000 student Campus and adjacent University Community would add a substantial amount of traffic to Cardella and Kibby Roads such that traffic noise along these roads would increase by 5 dBA and a significant noise impact would result to receptors along those roadways. Traffic noise impacts along all other study roadways were found to be less than significant.

As noted in **Section 3.0, Project Description**, UC Merced is now expected to grow at a slower pace than originally anticipated, such that by 2030, the enrollment level is expected to be 15,000 students, and the faculty and staff projection for 2030 is also substantially lower than previously projected and analyzed in the 2009 LRDP EIS/EIR. Additionally, while a University Community to house the campus-related population was envisioned in the 2009 LRDP EIS/EIR, such a community has not developed near the campus and it is not foreseeable that such a community would develop within the timeframe of the 2020 LRDP. Given this change in the proposed project and the conditions in which it would be implemented, a revised analysis of the project's traffic noise impacts is presented below.

Campus development under the 2020 LRDP would increase traffic volumes on the local roadway network compared to existing conditions, which would have the potential to result in increased traffic noise levels at noise-sensitive receptors located along these roadways. Bellevue and Lake Roads are the two arterials that provide access to the campus and would experience the greatest increases in LRDP-related traffic. Although other roadways in the City and the County would also experience project traffic increases, the increase would be substantially less than previously analyzed in the 2009 LRDP EIS/EIR. Furthermore, as traffic generated by the proposed project would disperse with distance from the campus, it is unlikely that a sufficient volume of project-related traffic would be added to more distant roadways to result in a noise increase of 3 dBA or more along other roadways. With respect to Cardella and Kirby Roads, in the absence of the University Community, these roadways would not experience substantial traffic increases and significant impacts along these roadways are not anticipated. The traffic noise impact analysis below is therefore focused on Bellevue and Lake Roads.

There are some existing residential receptors along Bellevue and Lake Roads that would be exposed to noise from traffic on the two roadways. Most homes on Lake Road and Bellevue Road are set back about 100 feet from the center of the road. However, a small number of homes along Bellevue Road are located about 80 feet from the roadway. Noise increases due to project-related traffic on Bellevue and Lake Roads were calculated by comparing project traffic noise levels to no-project traffic noise levels within the same time frame (i.e., 2030 No Project vs. 2030 with Proposed Project). **Table 4.5-2, 2030 Predicted Traffic Noise Levels and Increases**, summarizes the calculated L_{dn} noise levels at a distance of 100 feet from roadway links on the surrounding road network under Existing, 2030 No Project, and 2030 with Project traffic conditions. The calculated traffic-generated noise increases between existing conditions and 2030 both with and without the proposed project are also presented in the table.

Table 4.5-2
2030 Predicted Traffic Noise Levels and Increases
(at 100 feet from the Center of the Roadway)

		Modeled L_{dn} Noise Level, dBA[1]			Increase over Existing, dBA		2030
Road	**Location**	**Existing**	**2030 No Project**	**2030 with Project**	**2030 No Project**	**2030 with Project**	**with Project Increase over 2030 No Project**
Lake Road	South of Bellevue	60.9	61.2	61.6	0.3	0.7	0.4
Lake Road	South of Cardella	61.0	61.1	62.6	0.1	1.6	1.5
Bellevue Road	East of SR 59	58.5	58.6	61.1	0.1	2.6	2.5
Bellevue Road	East of G St	59.6	59.7	62.6	0.1	3.0	2.9

Source: Impact Sciences. Model results are contained in ***Appendix 4.5****.*
Note: Noise level is calculated from the cumulative traffic noise resulting from Lake Road and Bellevue Road at actual nearest receptor locations. Distances to these receptors are approximately 100 feet from the center of the roadway.
[1] *Calculations assume an ambient background noise level of about 50 dBA L_{dn}.*

As **Table 4.5-2** above shows, background plus project traffic on Bellevue Road would cause the ambient noise levels to increase from less than 59 dBA L_{dn} at the present time to about 63 dBA L_{dn} under 2030 conditions. Noise levels at residences at a distance of up to 80 feet from this roadway would experience a slightly higher noise level increase. Along Lake Road, noise levels would increase from about 61 dBA L_{dn} at the present time to about 63 dBA L_{dn} in 2030. The resulting noise levels in 2030 along both roadways would not exceed the exterior noise standard of 65 dBA L_{dn} that is applicable to residential land uses in Merced County. Furthermore, as the table shows, although the project would cause a noise increase, the increase would be less than 3 decibels. As noted above, under the significance criteria, a noise impact would be considered significant if the project causes an increase of 5 dBA or more, where the noise levels without the project are 50 to 65 dBA L_{dn} for residential uses and the increase in noise from the project does not cause the significance thresholds to be exceeded. The traffic added by the project would not cause the exceedance of this significance criteria.

In summary, implementation of the 2020 LRDP would not substantially increase ambient traffic noise levels at existing off-site noise-sensitive uses, and the impact would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the small size and nature of these projects, they would be unlikely to substantially increase traffic and traffic-related noise levels at off-site noise sensitive uses. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact NOI-2: Daily operations on the campus under the 2020 LRDP would not expose existing off-site and future on-site noise-sensitive receptors to noise levels in excess of applicable standards. (*Less than Significant*)

The 2009 LRDP EIS/EIR analyzed the potential for campus operations under the 2009 LRDP to result in noise impacts on nearby sensitive receptors. That analysis, which was presented under Impact NOI-2, concluded that campus operations would not result in a significant noise impact on off-site receptors. However, on-site receptors on the campus and in the University Community could be significantly affected by stationary noise sources such as HVAC on large buildings or a large stadium on the campus. The EIS/EIR concluded that noise from a large stadium or a similar facility may not be reduced to a less than significant level with mitigation.

As noted above, UC Merced is now expected to grow at a slower pace than originally anticipated, such that by 2030, the enrollment level is expected to be 15,000 students, and the faculty and staff projection for 2030 is also substantially lower than previously projected and analyzed in the 2009 LRDP EIS/EIR. Additionally, UC Merced is proposing a much more compact development and it is envisioned that all new campus facilities under the 2020 LRDP would be located within lands designated CMU, in the central portions of the campus site. In view of these changes, the potential for noise from campus operations to affect nearby receptors is reevaluated below.

Daily noise-generating activities on the campus would include student gatherings and conversations, athletic and recreational activities, social events, landscaping and maintenance activities, on-site traffic, and mechanical equipment noise. The closest noise-sensitive receptors to the project site include residences along Lake Road and Bellevue Road to the west. The closest off-site residences would be located directly across Lake Road from the campus' western boundary under the 2020 LRDP and about 500 feet from the campus' western boundary along Bellevue Road. However, a 400-foot strip of Campus Parkway Open Space as well as Lake Road would separate the nearby existing residences along both Lake Road and Bellevue Road from future development on the campus on lands designated Campus Mixed Use (CMU) on the 2020 LRDP land use map. As a result of the intervening distance and the fact that noise levels generated by these activities are generally low at the source, noise generated by daily campus activities is not expected to exceed the noise standard of 65 dBA L_{dn} exterior and 45 dBA L_{dn} interior at off-site residential locations. Off-site receptors are not expected to be exposed to noise levels in excess of the standards for noise-sensitive uses.

On-site noise-sensitive receptors, including student housing and academic buildings on the campus, could be exposed to excessive noise from other land uses that are developed within the campus. For instance, noise levels could be elevated from the operation of commercial-grade heating, ventilation, and air conditioning (HVAC) systems for large office and research facilities. However, noise levels associated with typical commercial grade HVAC systems can be reduced to below the noise standard for residences at a distance of less than 50 feet from the source with the use of standard attenuation barriers. As a result, on-site receptors are not expected to be exposed to noise levels in excess of the standards for noise-sensitive uses.

In summary, existing off-site sensitive receptors would not be substantially affected by noise generated by on-site noise sources. In addition, sensitive land uses within the campus would also not be substantially affected by noise generated at these facilities. This impact would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they would be unlikely to substantially increase on-site noise levels and off-site sensitive receptors would not be affected. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact NOI-3: **Construction activities associated with development under the 2020 LRDP could expose existing off-site and future on-site noise-sensitive receptors to elevated noise levels. (*Potentially Significant; Less than Significant*)**

The 2009 LRDP EIS/EIR analyzed the potential for construction activities associated with projects under the 2009 LRDP to result in noise impacts on nearby sensitive receptors. That analysis, which was presented under Impact NOI-3, concluded that significant noise impacts would occur if construction activities were undertaken during nighttime hours.

As noted above, UC Merced is now expected to grow at a slower pace than originally anticipated. Additionally, UC Merced is proposing a much more compact development and it is envisioned that all new campus facilities under the 2020 LRDP would be located on lands designated CMU, in the central portions of the campus site. In view of these changes, the potential for noise from campus construction activities to affect nearby receptors is reevaluated below.

Intermittent construction under the 2020 LRDP would occur between 2020 and 2030 and would include ground clearing, earthmoving, foundations, erection of structures, and finishing. Noise impacts resulting from construction depend on the noise generated by various pieces of construction equipment, the timing and duration of noise-generating activities, and the distance and shielding between construction noise sources and noise-sensitive areas. **Table 4.5-3, Construction Equipment Noise Emission Levels**, summarizes noise levels produced by commonly used construction equipment. Individual types of construction equipment are expected to generate noise levels ranging from 74 to 89 dBA at a distance of 50 feet.

Table 4.5-3
Construction Equipment Noise Emission Levels

Equipment	Typical Noise Level (dBA) 50 feet from Source
Grader	85
Bulldozers	85
Truck	88
Loader	85
Roller	74
Air Compressor	81
Backhoe	80
Pneumatic Tool	85
Paver	89
Concrete Pump	82

Source: Federal Transit Administration 2006.

Noise generated by construction activities is anticipated to be greatest during site grading activities and excavation for underground utilities. Noise generated during foundation and building construction would be lower. Maximum noise levels at a distance of 50 feet from the source would typically range from 70 to 90 dBA during excavation and grading activities and from 65 to 85 dBA during building construction. Hourly average construction noise levels measured at a distance of 50 feet from the center of the site are typically 75 dBA to 85 dBA during busy construction periods. Hourly average construction noise levels would typically range from 74 to 85 dBA at a distance of 50 feet from the center of construction activities and 56 to 71 at a distance of 400 feet, not taking into account shielding from buildings or terrain. Maximum noise levels would typically range from 70 to 90 dBA at a distance of 50 feet and 52 to 72 dBA at a distance of 400 feet. Construction noise levels decrease at a rate of about 6 dBA per doubling of distance between the source and receptor. Shielding by buildings or terrain often results in much lower construction noise levels at distant receptors.

Noise Impacts from On-Site Construction

The closest noise-sensitive receptors to the project site include residences along Lake Road and Bellevue Road to the west. However, as noted above, a 400-foot strip of land designated Campus Parkway Open Space would separate the closest existing residences from future CMU development on the campus, and the intervening distance between construction sites and other nearby residences would be even greater.

As discussed earlier in this section, daytime construction noise would be exempt from the County's Ordinance and would result in a less than significant impact. A significant noise impact would occur if construction activity is predicted to result in: (1) maximum noise levels exceeding 75 dBA L_{max} at any residential property or 80 dBA L_{max} at any non-residential property between the hours of 6:00 PM and 7:00 AM; (2) an hourly average sound level that is more than 10 dBA L_{eq} above the ambient sound level between the hours of 6:00 PM and 10:00 PM; or (3) an hourly sound level more than 5 dBA L_{eq} above the ambient sound level between the hours of 10:00 PM and 7:00 AM. Maximum noise levels are predicted to exceed 75 dBA within 300 feet from construction activities. Ambient sound levels are predicted to increase at the residences by more than 5 dB L_{eq} when construction is located within 500 feet of residences. Ambient sound levels are predicted to increase at the residences by 10 dB L_{eq} or more when construction is within 300 feet of residences.

Some of the off-site residences along Lake Road would be located within 500 feet of campus construction in the western portion of the campus. Construction occurring within 300 feet of residences between the hours of 6:00 PM and 10:00 PM and within 500 feet of residences between the hours of 10:00 PM and 7:00 AM would result in a significant noise impact. **LRDP Mitigation Measure NOI-3** is set forth below to address this impact.

Noise Impacts from Off-Site Construction

Providers of utilities to the campus would construct off-site utility connections and infrastructure improvements, which could include installation of electrical lines, gas pipelines, sewer and potable water lines, and possibly roadway improvements. For linear projects such as these, the zone of potential noise impacts is continuously moving during the project's construction phase. Generally, the noisiest activities come and go (from the standpoint of a fixed noise-sensitive receiver) within a few days. Construction-phase noise would primarily result from the use of motorized construction equipment. Other short-term impacts from construction noise could result from construction traffic, including materials delivery. Noise impacts would be most noticeable in residential areas in the vicinity of project construction locations. Noise levels would vary depending on the type of equipment used, how it is operated, and how well it is maintained. Standard excavation and installation equipment, such as graders, backhoes, loaders, side-boom tractors, welders, and trucks, would be used for construction of most project facilities.

Noise associated with infrastructure construction does not typically exceed 80 dBA L_{eq} at a distance of 50 feet. Noise levels from construction operations decrease at a rate of approximately 6 dBA per doubling of distance between the source and receptor. Therefore, at a distance of 100 feet (which is approximately the distance from many of the existing noise-sensitive land uses to the edges of the roadways), noise levels from infrastructure construction would be approximately 74 dBA L_{eq} or less. The noise levels from construction of infrastructure are predicted to be 5 dBA higher than existing noise levels and thus clearly audible. Construction activities would be limited to between the hours of 7:00 AM and 6:00 PM and the duration of construction adjacent to any individual receptors would be short. Construction taking place between the hours of 7:00 AM and 6:00 PM is exempt from the County's Ordinance. Therefore, noise impacts from off-site infrastructure would be less than significant.

In summary, construction activities occurring on the campus between the hours of 6:00 PM and 7:00 AM would result in significant noise impacts. Although daytime construction activities would not result in significant noise impacts as defined by the noise thresholds, because of the longer durations and higher noise levels that potentially could be involved in the construction of facilities within the campus, it is recommended that standard noise reduction techniques be used to further reduce the noise exposure of nearby noise-sensitive receptors both off and on-campus to construction noise. **LRDP Mitigation Measure NOI-3** is proposed to reduce the noise impact from nighttime construction and to further minimize the less than significant impact from daytime construction.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, construction activities associated with these small projects would be unlikely to substantially increase on-site noise levels and on- and off-site sensitive receptors would not be affected. The impact would be less than significant.

Mitigation Measures:

LRDP MM NOI-3: Prior to initiation of construction on a project that is within 500 feet of off-site residential receptors, UC Merced shall develop and implement a construction noise mitigation program for that project that includes but is not limited to the following:

- Construction activities within 500 feet of any residences shall be restricted to the hours of 7:00 AM and 6:00 PM on weekdays and Saturdays with no construction on Sundays and holidays.
- All noise-producing project equipment and vehicles using internal combustion engines shall be equipped where appropriate with exhaust mufflers and air-inlet silencers in good operating condition that meet or exceed original factory specifications.
- Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) shall be equipped with shrouds and noise control features that are readily available for that type of equipment.
- All mobile or fixed noise-producing equipment used on the project that is regulated for noise output by local, state or federal agency shall comply with such regulation while engaged in project-related activities.
- Electrically powered equipment shall be used instead of pneumatic or internal combustion powered equipment, where practicable.
- Material stockpiles, mobile equipment staging, construction vehicle parking, and maintenance areas shall be located as far as practicable from noise-sensitive land uses.
- Stationary noise sources such as generators or pumps shall be located away from noise-sensitive land uses as feasible.
- The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only. No project-related public address loudspeaker, two-way radio, or music systems shall be audible at any adjacent noise-sensitive receptor except for emergency use.
- The erection of temporary noise barriers shall be considered where project activity is unavoidably close to noise-sensitive receptors.
- The noisiest construction operations shall be scheduled to occur together to avoid continuing periods of the greatest annoyance, wherever possible.
- Construction vehicle trips shall be routed as far as practical from existing residential uses.

- The loudest campus construction activities, such as demolition, blasting, and pile driving, shall be scheduled during summer, Thanksgiving, winter, and spring breaks when fewer people would be disturbed by construction noise.
- Whenever possible, academic, administrative, and residential areas that will be subject to construction noise shall be informed a week before the start of each construction project.

Significance after Mitigation: Construction noise impacts at existing noise-sensitive uses would be reduced to a less than significant level with the implementation of **LRDP Mitigation Measure NOI-3**.

LRDP Impact NOI-4: Pile driving activities during construction could expose nearby receptors to perceptible levels of groundborne vibration. (*Potentially Significant; Less than Significant*)

The 2009 LRDP EIS/EIR analyzed the potential for construction activities associated with projects under the 2009 LRDP to result in groundborne vibration impacts on nearby sensitive receptors. That analysis, which was presented under Impact NOI-4, concluded that in the event that impact pile driving was employed in the construction of campus buildings, it could result in damage to structures when conducted within 50 feet of a structure and could also affect highly sensitive uses such as certain types of laboratories.

As noted above, UC Merced is projecting less growth and is proposing a much more compact development. It is envisioned that all new campus facilities under the 2020 LRDP would be located within lands designated CMU, in the central portions of the campus site. In view of these changes, the potential for vibrations from campus construction activities to adversely affect nearby receptors is reevaluated below.

Vibration levels generated by construction activities would vary depending on project conditions such as soil conditions, construction methods, and equipment used. Typical project construction activities would not generate substantial levels of vibration. Pile driving is not anticipated for the proposed project due to the geology that is typical for Merced County. However, in the event that pile driving is required during construction, it could produce groundborne vibration levels that might be perceptible to nearby sensitive receptors.

County Code 18.41.090 specifies that no use shall create any disturbing ground vibration based on typical human reaction beyond the boundaries of the site but does not provide specific vibration thresholds. However, the U.S. Department of Transportation suggests a vibration damage threshold of

0.50 inch/second of peak particle velocity (ppv) for reinforced buildings, 0.20 inch/second for non-engineered timber and masonry buildings, and 0.12 inches/second for buildings extremely susceptible to vibration damage (Federal Transit Administration 2006). The Transportation Research Board (Transportation Research Board 1997) suggests maximum allowable peak particle velocities from pile driving for various structure types and conditions. **Table 4.5-4, Transportation Research Board Building Structure Vibration Criteria**, summarizes these values. For the purposes of this assessment, pile driving will be considered to result in a significant ground vibration impact if fragile or historic building structures would be exposed to ground vibration in excess of 0.20 inch/second or if other building structures would be exposed to ground vibration in excess of 0.50 inch/second.

Table 4.5-4
Transportation Research Board Building Structure Vibration Criteria

Structure and Condition	Limiting PPV (in/sec)
Historic and some old buildings	0.2
Residential structures	0.5
New residential structures	1.0
Industrial buildings	2.0
Bridges	2.0

Source: Transportation Research Board 1997.

Impact pile drivers are estimated to generate an upper range of 0.537 inch/second, ppv, at a distance of 50 feet and vibratory pile drivers are estimated to generate an upper range of 0.260 inches/second, ppv. At a distance of 100 feet, impact pile drivers are estimated to generate an upper range of 0.190 inches/second, ppv, and vibratory pile drivers are estimated to generate an upper range of 0.092 inch/second, ppv. Groundborne vibration levels at distances of approximately 100 feet or more would not result in vibration levels exceeding 0.20 inch/second, ppv and would not, therefore, be anticipated to result in substantial effects. Impact pile driving within 50 feet of structures could cause structural damage to typical building structures and could cause annoyance to persons. Furthermore, at a few future campus facilities, such as laboratories, vibrations could have the potential to disrupt experiments. This is a potentially significant impact, and **LRDP Mitigation Measure NOI-4a** and **4b** are set forth below to mitigate this impact.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, construction activities associated with these small projects would be unlikely to result in substantial vibrations and on- and off-site sensitive receptors would not be affected. The impact would be less than significant.

Mitigation Measures:

LRDP MM NOI-4a: UC Merced shall avoid impact pile driving where possible in vibration-sensitive areas. Drilled piles or the use of vibratory pile driving will be used where geological conditions permit their use. For impact pile driving activities occurring within 50 feet of typical structures, limit groundborne vibration due to construction activities to 0.50 inch/second, ppv (limit of potential for damage to typical structures) in the vertical direction at sensitive receptors. Since in many cases the information available during the preliminary engineering phase would not be sufficient to define specific vibration mitigation measures, UC Merced shall describe and commit to a mitigation plan to minimize construction vibration damage using all feasible means available.

LRDP MM NOI-4b: For construction adjacent to highly sensitive uses such as laboratories, UC Merced shall apply additional measures as feasible, including advance notice to occupants of sensitive facilities to ensure that precautions are taken in those facilities to protect ongoing activities from vibration effects.

Significance after Mitigation: With the implementation of the proposed mitigation measures, the impact would be reduced to a less than significant level.

4.5.6 Cumulative Impacts and Mitigation Measures

Cumulative Impact C-NOI-1: **Development on the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not generate a substantial permanent increase in noise levels at off-site locations. (*Less than Significant)***

The year of analysis for the cumulative analysis in this SEIR is 2035. Although the horizon year used in this SEIR for the 2020 LRDP is 2030 and this plan does not provide land use planning for campus growth beyond that year, it is anticipated that UC Merced will continue to grow beyond 2030, although the rate and manner of that growth is not known at this time. For purposes of the cumulative impact analysis in this SEIR, it is assumed that enrollment will continue to increase at the same annual rate as is currently projected between 2020 and 2030. Based on this assumption, the enrollment is projected to increase to 17,500 students, and faculty and staff are projected to increase to 2,975 employees by 2035. Using this enrollment and employment levels, traffic that would be generated by the campus in 2035 was estimated (see **Section 4.8** for 2035 Campus Scenario traffic analysis). The traffic data for the 2035 Campus Scenario combined with background traffic in 2035 was used to analyze the increases in noise levels at off-site receptors under cumulative conditions.

Table 4.5-5, 2035 Predicted Traffic Noise Levels and Increases, presents the calculated L_{dn} noise levels at a distance of 100 feet from roadway links on the surrounding road network under Existing, 2035 No Project, and 2035 with 2035 Campus Scenario traffic conditions. The calculated traffic-generated noise increases are also summarized.

Table 4.5-5
2035 Predicted Traffic Noise Levels and Increases
(at 100 feet from the Center of the Roadway)

		Modeled L_{dn} Noise Level, dBA[1]			Increase over Existing, dBA		
Road	**Location**	**Existing**	**2035 No Build**	**2035 Campus Scenario**	**2035 No Build**	**2035 Campus Scenario**	**2035 Campus Scenario Increase over 2035 No Project**
Lake Road	South of Bellevue	60.9	61.3	61.8	0.4	0.9	0.5
Lake Road	South of Cardella	61.0	61.1	63.1	0.1	2.1	2.0
Bellevue Road	East of SR 59	58.5	58.7	61.8	0.2	3.3	3.1
Bellevue Road	East of G St	59.6	59.7	63.4	0.1	3.8	3.7

Source: Impact Sciences. Model results are contained in ***Appendix 4.5****.*
Note: Noise level is calculated from the cumulative traffic noise resulting from Lake Road and Bellevue Road at actual nearest receptor locations. Distances to these receptors are approximately 100 feet from the center of the roadway.
1 *Calculations assume an ambient background noise level of about 50 dBA L_{dn}.*

As **Table 4.5-5** above shows, background plus 2035 Campus Scenario traffic on Bellevue Road would cause the ambient noise levels to increase from less than 59 dBA L_{dn} at the present time to slightly more than 63 dBA L_{dn} under 2035 conditions. Along Lake Road, ambient noise levels would increase from about 61 dBA L_{dn} at the present time to about 63 dBA L_{dn} in 2035. The noise levels in 2035 along both roadways would not exceed the exterior noise standard of 65 dBA L_{dn} that is applicable to residential land uses in Merced County. Furthermore, as the table shows, the project would cause noise increases that would be less than 4 decibels. As noted above, under the significance criteria, a noise impact would be considered significant if the project causes an increase of 5 dBA, where the noise levels without the project are 50 to 65 dBA L_{dn} for residential uses and the increase in noise from the 2035 Campus Scenario traffic does not cause the significance thresholds to be exceeded. The traffic added by the 2035 Campus Scenario to the background traffic in 2035 would not cause the exceedance of this significance criteria. As a result, there would not be a significant cumulative impact with respect to traffic noise.

Mitigation Measures: No mitigation is required.

Cumulative Impact C-NOI-2: **Noise from construction and/or stationary sources on the campus, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not combine to substantially affect the same sensitive receptors. (*Less than Significant)***

With respect to cumulative construction noise and vibration impacts, those would occur only if the projects proposed by others were to be under construction the same time as the projects on the campus and if these concurrent projects would be in close proximity of the same sensitive receptor. At this time, there are no other projects proposed in proximity to the campus that would be under construction at the same time as the projects on the campus. Similarly, in order for the on-site stationary noise (HVAC, generators, pumps, etc.) associated with the proposed project to accumulate with noise from other stationary noise sources, the noise sources would need to be in close proximity of the same sensitive receptor. At this time, there are no other projects proposed that would be in the vicinity of the same sensitive receptors as the projects on the campus. For this reason, there would not be a cumulative noise impact with respect to construction noise or noise from stationary sources.

Mitigation Measures: No mitigation is required.

4.5.7 References

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4.6 POPULATION AND HOUSING

4.6.1 Introduction

This section describes the population and housing characteristics within eastern Merced County, and evaluates potential impacts to those characteristics that could result from implementation of the 2020 LRDP.

Sources of information used in this analysis include:

- U.S. Census Bureau data from the 2010 Census and 2012-2016 American Community Surveys
- Department of Finance (DOF 2018)
- Merced Vision 2030 General Plan (City of Merced 2012)
- Merced County 2030 General Plan Draft Program EIR (Merced County 2012)
- Merced County Association of Governments (MCAG 2018)

4.6.2 Environmental Setting

Population

Current Population

The County of Merced (County) consists of six incorporated cities (Merced, Atwater, Dos Palos, Gustine, Livingston and Los Banos) and unincorporated land. **Table 4.6-1, Merced County Population,** identifies the 2010 population for the County and the cities based on the 2010 US Census and the current (2018) population reported by the California Department of Finance (DOF). As shown in **Table 4.6-1**, the current (2018) population of Merced County is 279,793 residents, of which 95,125 individuals reside in unincorporated areas. The remainder of the County population resides in the City of Merced (86,750), Atwater (31,235), and Dos Palos, Gustine, Livingston, and Los Banos (66,867, combined). Since 2010, the County's population has increased by 9.5 percent, the population of the unincorporated areas has increased by 6.7 percent, and the population of Merced, Atwater, and other cities has increased by 9.9 percent, 10.9 percent, and 12.4 percent, respectively.

Forecast Population

Table 4.6-2, Merced County Population Projections, presents the projected population of the County, its cities, and unincorporated areas based on Merced County Association of Governments (MCAG) forecasts. As shown in the table between 2018 and 2030, the County population (including unincorporated areas) is forecast to increase by 19.4 percent to 334,443 residents; the population of the unincorporated areas is forecast to increase by 21.2 percent to 115,315 residents; and the population of Merced, Atwater, and other cities is anticipated to increase by 18.7 percent, 17.8 percent and 18.7 percent, respectively, over the same period (MCAG 2018). These forecasts prepared by MCAG incorporate the most up to date background data from the U.S. Census Bureau, the Internal Revenue Service and the California Vital Statistics Query System. They incorporate feedback from Merced County along with the incorporated cities within the County.

Table 4.6-1
Merced County Population

	2010 (US Census)	2018 (DOF)
City of Merced	78,958	86,750
City of Atwater	28,168	31,235
Other Cities[1]	59,500	66,867
Total Cities	166,626	184,852
Unincorporated Area	89,167	95,125
Total Merced County	255,793	279,977

Source: US Census Bureau 2010; California Department of Finance 2018.
[1] *Other cities include Dos Palos, Gustine, Livingston, and Los Banos.*

Table 4.6-2
Merced County Population Projections

	2018 [2]	2020	2030	2035
City of Merced	86,750	89,719	102,952	109,986
City of Atwater	31,235	32,037	36,803	39,331
Other Cities [1]	66,867	68,400	79,373	85,201
Total for All Cities	184,852	190,156	219,128	234,518
Unincorporated County	95,125	100,900	115,315	122,978
Total Merced County	279,977	291,056	334,443	357,496

Source: MCAG, 2018 Regional Transportation Plan for Merced County.
[1] *Other cities include Dos Palos, Gustine, Livingston, and Los Banos.*
[2] *California Department of Finance*

The City of Merced anticipated growth within the Merced Specific Urban Development Plan (SUDP) in the currently adopted Merced Vision 2030 General Plan (2012). In the adopted General Plan, the City of Merced projected that the population of Merced would approach 159,900 by 2030 (City of Merced 2012). Should the City's population increase to 159,900 by 2030, it would represent an increase of 84.3 percent between 2018 and 2030. The campus is included in the Merced SUDP, and the City's General Plan reported a campus population of up to 25,000 students. As shown in **Table 4.6-2**, MCAG forecasts, which are more recent and reflect lower growth rates, include a lower estimate of 102,952 residents for the City by 2030. MCAG forecasts are updated every two years and typically reflect the most accurate population forecasts for the cities and Merced County.

Housing

Current Supply

Table 4.6-3, Merced County Housing Stock, presents the number of dwelling units located within Merced County. As of January 1, 2018, based on California Department of Finance data, there are 85,927 dwelling units within Merced County, of which 28,525 are located in unincorporated areas. The City of Merced contains 27,863 dwelling units, Atwater contains 10,130 dwelling units, and the remaining cities contain 19,409 dwelling units.

Table 4.6-3
Merced County Housing Stock

	2010 (US Census)	2018 (DOF)
City of Merced	27,446	27,863
City of Atwater	9,771	10,130
Other Cities [1]	18,482	19,409
Total Cities	55,699	57,402
Unincorporated Area	27,999	28,525
Total Merced County	83,698	85,927

Source: US Census Bureau 2010; California Department of Finance 2018.
[1] *Other cities include Dos Palos, Gustine, Livingston, and Los Banos.*

Housing Projections

The City of Merced does not prepare projections of additional housing that could be built in the future. However, an estimate of additional housing in the City that could be considered foreseeable can be derived based on the applications that are on file with the City for new housing development. Based on proposed and pending projects that are listed in **Table 4.0-1, Cumulative Project List** in **Section 4.0**, about 3,662 units would be added to the housing stock of the City.

The State Housing Law requires the preparation of the Regional Housing Needs Assessment (RHNA) by the local council of governments, in this case MCAG. The RHNA quantifies the need for housing within each jurisdiction during specified planning periods. Communities use the RHNA in land use planning, prioritizing local resource allocation, and in deciding how to address identified existing and future housing needs resulting from population, employment and household growth. The City complies with the State Housing Law and RHNA and updates its Housing Element periodically. The latest update of the Housing Element was completed in 2016. The Housing Element includes the City of Merced's RHNA for the period of 2014 to 2023 for low-income units and concludes that the City has sufficient sites zoned appropriately to accommodate the RHNA requirement of 2,303 units for extremely low-, very low- and low-income housing. The City's General Plan Housing Element also notes that vacant land designated for residential uses within the City could accommodate between 6,523 and 12,636 additional dwelling units (City of Merced 2016).

With regard to housing in unincorporated County areas in the vicinity of the campus, according to the County about 105 dwelling units could be developed in the Bellevue corridor within the timeframe of the 2020 LRDP. In 2019, VST commenced an application process with Merced County for the development of the former University Community North, with the purpose of developing a mixed-use project south of the campus. VST's application is not included in the Cumulative Project List, however, as VST's application had not been submitted at the time of publication of the NOP and scoping for this SEIR.

Table 4.6-4, Merced County Housing Projections, presents MCAG projections which indicate that county-wide the number of dwelling units is projected to increase by approximately 14,265 units between 2020 and 2030, and housing stock in the City of Merced would increase by approximately 4,900 dwelling units during the same period. This number is consistent with the City's General Plan which, as stated above, shows that land zoned for residential development in the City could accommodate a substantially higher number of housing units.

Table 4.6-4
Merced County Housing Projections

	2018 [2]	2020	2030
City of Merced	27,863	30,545	35,416
City of Atwater	10,130	10,853	12,599
Other Cities [1]	19,409	20,898	24,510
Total Cities	57,402	62,296	72,525
Unincorporated County	28,525	29,393	33,429
Total Merced County	85,927	91,689	105,954

Source: MCAG, 2018 Regional Transportation Plan for Merced County.

[1] *Other cities include Dos Palos, Gustine, Livingston, and Los Banos.*

[2] *California Department of Finance*

Housing Vacancy Rates

According to the Merced County General Plan Housing Element, housing vacancy rates historically have ranged from an average of 8.3 percent in 2000 to 11.2 percent in 2013 in the unincorporated areas of the County and 5.8 percent in 2000 to 9.4 percent in 2013 in the incorporated areas of the County. **Table 4.6-5, Housing Vacancy Rates,** presents housing vacancy rates for the City of Merced and Merced County based on the California Department of Finance estimates. The table also reports comparable vacancy rates for the state as a whole. As shown, housing vacancy rates for the City of Merced are lower than comparable rates for the County and state as a whole.

Table 4.6-5
Housing Vacancy Rates

Year	City of Merced (%)	Merced County (%)	State of California (%)
2014	5.8	7.3	7.4
2015	4.3	6.4	7.2
2016	3.6	5.9	7.1
2017	3.6	6.2	7.2
2018	4.6	6.8	7.4

Source: DOF 2018.

Employment

Table 4.6-6, 2016 Merced County Employment, identifies the number of employed persons residing in Merced County in 2016 based on the 2012-2016 American Community Survey, the most recent data available. The total number of employed residents in Merced County in 2016 was 97,146 persons, of which 34,198 resided in unincorporated areas. The remainder of the employed population resided in Merced (29,020); Atwater (10,795); and Dos Palos, Gustine, Livingston, and Los Banos (23,133, combined).

Table 4.6-6
2016 Merced County Employment

	Employed Residents
City of Merced	29,020
City of Atwater	10,795
Other Cities [1]	23,133
Total Cities	62,948
Unincorporated Area	34,198
Total Merced County	97,146

Source: US Census Bureau 2016.
[1] *Other cities include Dos Palos, Gustine, Livingston, and Los Banos.*

According to MCAG, the number of jobs within Merced County totaled 72,864 in 2015, of which 23,995 resided in unincorporated areas. The remainder of jobs were located in Merced (29,693); Atwater (5,002); and Dos Palos, Gustine, Livingston, and Los Banos (14,174, combined). The number of jobs by city and unincorporated area is not readily available. As shown in **Table 4.6-7, Merced County Employment Projections**, based on MCAG projections, employment is anticipated to increase to 137,200 jobs by 2030.

Table 4.6-7
Merced County Employment Projections

	2010	2020	2030
Merced County [1]	95,200	116,800	137,200

Source: MCAG, 2007 Regional Transportation Plan for Merced County.
1 Employment projections by city/unincorporated area are not available from MCAG.

The unemployment rate in Merced County has been high historically. Based on data from the California Employment Development Department (EDD) the average annual unemployment rates for Merced County have ranged between 9.3 percent and 10.1 percent in the last 10 years compared to the average annual unemployment rates for State of California which ranged from 4.8 percent to 5.4 percent over the same period (EDD 2018). As of August 2018, the County's unemployment rate was 7.0 percent (EDD 2018).

4.6.3 Regulatory Considerations

State Regulations

Regional Housing Needs Allocation Plan

California General Plan law requires each city and county to have land zoned to accommodate a fair share of the regional housing need. The share is known as the Regional Housing Needs Allocation and is based on a Regional Housing Needs Allocation Plan (RHNA Plan) developed by councils of government. MCAG is the lead agency for developing the RHNA Plan for the County. The 2009 LRDP is accounted for in the current housing need projections developed by MCAG as part of the 2015-2023 RHNA Plan. If approved, the 2020 LRDP would be included as part of future housing need projections developed by MCAG.

Local Plans and Policies

University of California President's Housing Initiative

On January 20, 2016, the University of California announced a housing initiative aimed at supporting current students and future enrollment growth across the UC system. Through the Housing Initiative, UC expects to expand the pool of student housing over the next four years (through 2020), and to accelerate the timetable for completing student housing developments that are already in the planning phase. Current estimates project that UC could add nearly 14,000 new affordable student housing beds to the campuses' stock by fall 2020, and one of the initiative's central tasks will be accelerating this timeline. This includes the creation of new beds for undergraduates in residence halls and the addition of more graduate student housing and other apartments that are generally open to all students. Communities around California for years have faced the challenge of ensuring sufficient affordable housing for residents. Housing availability is in particularly short supply in some of the communities that are home to UC campuses.

The Housing Initiative addresses those circumstances by harnessing the expertise and resources of the UC system to accelerate the creation of affordable student housing at every UC campus. The Housing Initiative provides an ambitious target for new student housing within the 10-campus UC system and does not set individual targets or policy numbers for any campus. In 2016, UC Merced began student housing projects within the framework of the Merced 2020 Project that would provide up to 1,680 new beds. The additional beds provided as part of the 2020 Project fulfils the Merced Campus's obligation under the Housing Initiative to provide additional student beds through 2020.

4.6.4 Impacts and Mitigation Measures

Significance Criteria

This Draft SEIR uses significance criteria derived from Appendix G of the *State CEQA Guidelines*. For the purposes of this Draft SEIR, impacts related to population and housing would be significant if implementation of the 2020 LRDP would:

- Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure); or
- Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.

Issues Not Discussed Further

The following CEQA checklist issues are not evaluated further in this Draft SEIR because they are adequately addressed in the 2009 LRDP EIS/EIR.

- Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.

Impacts on the displacement of people or housing from development of the campus and University Community North sites were evaluated in the 2009 LRDP EIS/EIR and no impacts were found related to this criterion. Except for student housing on campus, no dwelling units or businesses are currently situated on the campus site, and thus no housing units, residents or employees would be displaced. This impact is adequately addressed in the 2009 LRDP EIS/EIR.

Methodology

Various data sources were reviewed to describe existing conditions in the project region related to population and housing. As noted in **Section 4.8, Transportation**, a GIS analysis of the locations of student and staff residences within Merced and the greater region was conducted based on 2013 place of residence data provided by UC Merced staff. Based on this data, a majority of students (95 percent) and faculty/staff (83 percent) live within 40 miles of the campus. This distance captures all the major cities within Merced, Madera, and Stanislaus Counties. Using this distribution pattern, the new students and employees were distributed among the communities. The number of students, faculty, and staff, along with their dependents that would require housing in the City of Merced was calculated and compared to the number of vacant residential units, approved and pending residential units, and projected residential units in the City to determine if enough housing would be available to meet the demand generated by the campus and well as future development. In addition, the number of students, faculty, and staff, along with their dependents that would demand housing outside the City of Merced but within a 40-mile radius of the campus was calculated and compared to the number of vacant residential units and projected residential units in Merced County, as well as large portions of Madera and Stanislaus Counties.

4.6.5 LRDP Impacts and Mitigation Measures

LRDP Impact PH-1: Implementation of the 2020 LRDP would not result in substantial unplanned population growth and related demand for housing in the City of Merced and in surrounding communities. (*Less than Significant*)

The 2009 LRDP EIS/EIR analyzed the potential for campus development under the 2009 LRDP to result in substantial population growth in the City of Merced and Merced County. The analysis under Impact SOC-1 in the 2009 LRDP EIS/EIR was based on the assumption that campus enrollment would increase to 25,000 students by 2030 and that the campus would also have an employee population of 6,560 faculty and staff. The EIS/EIR also estimated students and employees who would be already living in the area and hence would not represent new population and the number of persons who would be new to the area. The EIS/EIR estimated and reported the number of dependents that would accompany the students and employees that would relocate into the City of Merced and the County. The EIS/EIR estimated that a population of 38,044 persons associated with the campus would be added to the area by 2030. The EIS/EIR noted that while this increase was already accounted for in the MCAG projections for the City and the County and was also accounted for in the City's General Plan, this population would represent a substantial population increase within the City and County of Merced. The primary concern with a substantial population increase due to a project is the potential for that increase to result in environmental impacts. The 2009 LRDP EIS/EIR noted that the adjacent University Community would provide all of the housing, retail, and public service needs of this new population, including the indirect/induced population. The development of that community would result in significant and unavoidable impacts, and therefore the substantial population growth due to the proposed campus would result in a significant impact for which no feasible mitigation is available.

As noted in **Section 3.0, Project Description**, UC Merced is now projected to grow at a slower pace than originally anticipated, adding no more than 5,300 additional students between 2020 and 2030, such that by 2030, the enrollment level is expected to be 15,000 students, and the faculty and staff projection for 2030 is also substantially lower than previously projected and analyzed in the 2009 LRDP EIS/EIR. Additionally, while a University Community to house the campus-related population was envisioned in 2009, such a community has not developed near the campus and it is not foreseeable that such a community would develop within the timeframe of the 2020 LRDP. Given this change in the proposed project and the conditions in which it would be implemented, a revised analysis of the project's population growth and housing impacts is presented below.

According to the significance criteria for evaluating environmental effects, the proposed project's impact related to population would be significant if the proposed project induced substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure). The direct increase in population from the growth of the campus is evaluated below. Population growth indirectly induced through extension of roads or other infrastructure is addressed in **Section 6.4, Growth-Inducing Impacts**.

Table 4.6-8, Campus Student Population and Employees, summarizes enrollment and employment at UC Merced under current and future conditions. In fall 2018, approximately 8,500 students attended UC Merced and there were 1,215 faculty and staff on campus, for a total population of 9,715 persons. By 2030, this is projected to increase to 17,411, an increase of 7,696 persons over current conditions and an increase of 6,431 persons from 2020 conditions.

Table 4.6-8
Campus Student Population and Employees

	2017	2018	2020	2030	Projected Increase 2020-2030
Commuting Students	5,152	4,997	4,900	7,800	2,900
Resident Students	2,815	3,503	4,800	7,200	2,400
Subtotal	7,967	8,500	9,700	15,000	5,300
Faculty	384	415	440	786	346
Staff (on-campus)	756	800	840	1,625	785
Subtotal	1,140	1,215	1,280	2,411	1,131
Total Population (excluding dependents)	**9,107**	**9,715**	**10,980**	**17,411**	**6,431**

Source: University of California, Merced 2019

Student Population and Housing Demand

As the table above shows, enrollment is anticipated to increase by 5,300 students between 2020 and 2030. Although some of these students would be graduates from local high schools in the City of Merced and greater Merced County, and some would be transfer students from local community colleges, and therefore already living in the area at the time of initial enrollment, however, for purposes of this analysis, it is conservatively assumed that all new students would be from outside Merced County and would require new housing.

Some of the students relocating from outside the area would be accompanied by a certain number of dependents. It is assumed that 10 percent of students would have families, each with 1.5 dependents. Therefore, a population of 795 dependents would accompany the student population relocating to the area. Combined, a population of 6,095 students and their dependents are anticipated to relocate to the City of Merced and the surrounding area.

The 2020 LRDP plans to provide on-campus housing for at least 50 percent of all enrolled students. UC Merced also has instituted a requirement that all freshmen and sophomores live on campus. Therefore, in addition to the new beds that will be added to the campus when the 2020 Project is completed in Fall 2020, more housing will be added to the campus under the 2020 LRDP. As a result, of the 5,300 new students, 2,400 students would be housed on the campus with the remaining 2,900 new students residing off campus. No housing for student families would be provided on the campus. Therefore, students with families are included in the new students who would live off campus. To estimate the housing demand associated with the 2,900 new students who would live off campus, the analysis assumes that approximately 530 of these students would have families and require one residential unit each. With respect to the new students with no dependents, the analysis conservatively assumes that there would be 2 students per dwelling unit; therefore the remaining 2,370 students living off campus would require approximately 1,185 resident units. Combined, off-campus students would demand up to 1,715 housing units. In 2013, 31.6 percent of student households lived in the City of Merced and 49.8 percent lived outside the City of Merced but within a 40-mile radius of campus in communities such as Atwater, Turlock, and Modesto. This distribution of student households has not changed substantially over the last five years, and thus it is expected that new students who would live off campus would result in a demand of 542 units in the City of Merced and 854 units in other communities within 40 miles of the campus.

Faculty and Staff Population and Housing Demand

Between 2020 and 2030, faculty at UC Merced is anticipated to increase by 346 persons and staff is anticipated to increase by 785 persons, for a total employment increase of 1,131 persons. Faculty and staff that are hired could already be living in the City of Merced or within the 40-mile radius of the campus at the time of hire. However, for purposes of this analysis, it is conservatively assumed that all new faculty would relocate from outside the area while half of staff would relocate from outside the 40-mile radius area (half of the new staff would be local hires). Based on these assumptions, approximately 739 new employees would relocate from outside the area. The faculty and staff population relocating from outside the area would be accompanied by dependents. The current (2018) household size in the City of Merced is 3.22 persons per household (DOF 2018). Based on an average of 2.22 dependents per employee, employees relocating to the project area would be accompanied by approximately 1,641 dependents. Combined, a population of 2,380 persons (employees and their dependents) are anticipated to relocate to the City of Merced and the surrounding area.

The 739 employees relocating from outside the area would require housing and assuming one residential unit per employee, would require 739 units. In 2013, 49.3 percent of UC Merced faculty and staff lived in the City of Merced while 34.0 percent lived outside the City of Merced but within a 40-mile radius of the campus. This distribution of employees has not changed substantially over the last five years, and thus it is expected that the new employees would demand 364 units in the City of Merced and 251 units in other communities within 40 miles of the campus.

Based on the above calculations, a total of population of 8,475 students and employees, and the dependents of each group would relocate into the City of Merced and surrounding communities from other locations. This increase is substantially lower than the increase of 30,044 persons previously projected in the 2009 LRDP EIS/EIR. Further, the General Plans of the City of Merced and County of Merced include the population increase of 30,044 persons that was based on the enrollment projection of 25,000 students by 2030. As the population increase due to the implementation of the 2020 LRDP would be substantially lower than the growth that has been accounted for in the general plans, it would not represent substantial unplanned growth, and the impact related to population growth would be less than significant.

The significance of this population increase is analyzed below in terms of its effects on available housing in the study area, focusing on whether there would be adequate housing in the City of Merced and surrounding communities to house this population.

Impact on Housing

Based on the population numbers and assumptions set forth above, **Table 4.6-9, Estimated LRDP Population Related Housing Demand and Available Supply,** below presents the estimated demand for off-campus housing by the LRDP-related new population. As the table shows, this LRDP-related population would require approximately 906 residential units within the City of Merced and about 1,105 residential units in other communities within 40 miles of the campus (i.e., Rest of Study Area).

Table 4.6-9
Estimated LRDP Population Related Housing Demand and Available Supply (Dwelling Units)

	City of Merced	Rest of Study Area	Total
Students	542	854	1,396
Faculty and Staff	364	251	615
Total Demand	*906*	*1,105*	*2,011*
Existing Vacant Housing	1,278	19,078	20,356
Projected Housing based on applications with the City	3,662	NA	3,662
MCAG Projections	4,900	52,850	57,750

Source: DOF 2018, Impact Sciences 2018
Note: The previously circulated Draft SEIR included an estimated 2,050 new dwelling units as a housing projection for the City of Merced. That number was in error and did not agree with the total number of dwelling units that are planned or proposed in the City based on the list of cumulative projects in Table 4.0-1. Based on the projects in Table 4.0-1, a total of 3,662 new housing units are projected; this number is also consistent with the growth projections used in the transportation impact analysis.

Impact on City of Merced Housing

The vacancy rate in the City of Merced is presently 4.6 percent, and with a total of 27,863 residential units in the City, there are currently 1,278 unoccupied units in Merced (DOF 2018). While some of these units may be unavailable due to safety or code violations, a majority of them are available for purchase and/or rent. In addition, as shown in **Table 4.0-1**, there are a large number of proposed and pending residential projects in the City of Merced which, when completed, would provide an additional 3,662 residential units in Merced. Finally, MCAG projects that the City of Merced will add approximately 4,900 new units between 2020 and 2030. This projection is based on estimates contained in the City of Merced's General Plan, which took into account campus growth within its SUDP. The amount of campus growth within the City's SUDP was based on the 2009 LRDP, which planned to accommodate up to 25,000 students by 2030. Thus, given the number of units currently available, the number of units proposed and pending, and the fact that the City's General Plan planned for more campus growth than is now projected through 2030 under the 2020 LRDP, there would be enough housing in the City of Merced to accommodate the LRDP-related population expected to reside within the City's limits. As noted above, the University will develop more on-campus housing so that at least 50 percent of the enrolled students under the 2020 LRDP can be housed on campus. Development of housing off campus is outside the purview of the University. However, in compliance with State Housing Law the Cities of Merced and Atwater periodically update their General Plan Housing Elements and plan to provide adequate land for the needed housing identified for each city by MCAG under the Regional Housing Needs Allocation program. Furthermore, as noted above, an additional 3,662 residential units are included in the list of proposed and pending projects in the City.

Comments received on the Draft SEIR assert that the LRDP-related demand for housing in the City of Merced would result in increases in rents and the cost of housing for the public. This SEIR does not analyze any indirect socioeconomic effects, such as effects on the cost of housing, that could result from the campus-related demand for housing. CEQA does not require a discussion of socioeconomic effects except where they would result in physical changes, and states that social or economic effects shall not be treated as significant effects (see CEQA Guidelines Section 15131).

Impact on Housing within the Rest of Study Area

The rest of the study area comprises communities within a 40-mile radius of the campus. It includes all of Merced County and large portions of Madera and Stanislaus Counties that contain urban centers. The vacancy rate in Merced County is presently 6.8 percent while the vacancy rates in Madera and Stanislaus Counties are higher at 10.1 and 7.1 percent, respectively (DOF 2018). With a total of 58,064 residential units within Merced County (excluding the City of Merced), there are currently 3,948 unoccupied units in the County. With a total of 50,315 residential units in Madera County and 141,516 residential units is Stanislaus County, there are currently 5,082 and 10,048 unoccupied units in each jurisdiction, respectively. For the same reasons discussed, most of these units are also available for purchase or rent. In addition, MCAG projects that incorporated and unincorporated portions of Merced County (excluding the City of Merced) will add approximately 9,400 new units between 2020 and 2030. Similarly, Madera County is projected to add approximately 18,700 households, which is a proxy for housing units, between 2020 and 2035 (MCTC 2014), while Stanislaus County is projected to add about 24,750 new residential units over the same period of time (StanCOG 2018). Therefore, given the number of units currently available and projected residential units in communities within a 40-mile radius of campus, there would be enough housing in the area to accommodate the LRDP-related population expected to reside within these communities.

In summary, as enough housing is available and planned in the City of Merced and in communities within the 40-mile radius study area to house additional students, employees, and dependents that would relocate into the study area, the impact on population growth and housing would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they would not cause the campus population to increase, and to the extent a small project would add employees to the campus, those new employees are accounted for in the employment increase analyzed above. For the same reasons that are set forth above, the impact of small-scale projects on population and housing would be less than significant.

Mitigation Measures: No mitigation is required.

4.6.6 Cumulative Impacts and Mitigation Measures

Cumulative Impact C-PH-1: **Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not substantially increase regional population. (*Less than Significant*)**

The year of analysis for the cumulative impact analysis is 2035. Although the horizon year used in this Draft SEIR for the 2020 LRDP is 2030 and the plan does not provide land use planning for campus growth beyond that year, it is anticipated that the campus will continue to grow beyond 2030, although the rate and manner of that growth is not known at this time. For purposes of the cumulative impact analysis in this Draft SEIR, it is assumed that enrollment will continue to increase at the same annual rate as is currently projected between 2020 and 2030. Based on this assumption, the enrollment is projected to increase to 17,500 students, and faculty and staff are projected to increase to 2,975 employees by 2035 (see **Table 4.6-10**). In addition, approximately 1,200 additional students would be housed on the campus over this 5-year period. When combined with the number of students and employees added under the 2020 LRDP through 2030, the campus is expected to add 7,800 students, 460 faculty members, and 1,235 staff between 2020 and 2035. In addition, 3,600 of the 7,800 new students would be housed on the campus by 2035.

Table 4.6-10
Campus Student Population and Employees by 2035

	2020	2030	2035	Projected Increase 2020-2035
Commuting Students	4,900	7,800	9,100	4,200
Resident Students	4,800	7,200	8,400	3,600
Subtotal	9,700	15,000	17,500	7,800
Faculty	440	786	900	460
Staff (on-campus)	840	1,625	2,075	1,235
Subtotal	1,280	2,411	2,975	1,695
Total Population (excluding dependents)	**10,980**	**17,411**	**20,475**	**9,495**

Source: University of California, Merced 2019

Student Population and Housing Demand

Assuming that 10 percent of students would have families, each with 1.5 dependents, a population of 1,170 dependents would accompany the student population relocating to the area, thus resulting in additional combined population of 8,970 students and their dependents between 2020 and 2035. As a total of 3,600 students would be housed on the campus, the remaining 4,200 would reside off campus. As no family housing would be provided on the campus, approximately 780 of these students would have families and thus would require one residential unit each. Again, based on a conservative assumption of two students per unit, the remaining 3,420 students living off-campus would require an additional 1,710 residential units. Combined, by 2035 new students living off campus would require 2,490 residential units. Assuming the same distribution of students living in the City of Merced and in the surrounding study area as above, approximately 787 units would be needed in the City while the remaining 1,240 units would be needed outside Merced but within a 40-mile radius.

Employee Population and Housing Demand

Based on the same assumption that all faculty members and one-half of staff members would originate outside the study area, a total of 1,078 employees would relocate to the City of Merced and surrounding study area between 2020 and 2035. Furthermore, assuming an average of 2.22 dependents per employee, approximately 2,393 dependents would accompany the new faculty and staff members, thus resulting in additional combined population of 3,471 employees and their dependents over this 15-year period. Combined, faculty and employees would demand 898 units. Assuming the same distribution of employees living in the City of Merced and in the surrounding area as above, employees would demand an additional 531 residential units in the City and 367 additional residential units outside Merced but within the 40-mile radius study area.

Based on the above calculations, by 2035 a total of 12,441 students and employees, and the dependents of each group would relocate into the City of Merced and surrounding communities from other locations. This increase is substantially lower than the increase of 30,044 persons previously projected in the 2009 LRDP EIS/EIR. Further, the General Plans of the City of Merced and County of Merced include the population increase of 30,044 persons that was based on the enrollment projection of 25,000 students by 2030. As the population increase due to campus growth through 2035 would be substantially lower than the campus growth that has been accounted for in the general plans, it would not represent substantial unplanned growth, and the cumulative impact related to population growth would be less than significant.

Impact on Study Area Housing

Based on calculations presented above, the students, employees, and dependents would demand about 1,460 residential units within the City of Merced and about 1,607 residential units in other communities within 40 miles of the campus by 2035.

According to MCAG, the City of Merced is expected to add 20,267 residents between 2020 and 2035, and with a current household size of 3.22 residents per unit, would require the addition of 6,294 residential units. Merced County (not including the City of Merced) is also expected to add 46,173 residents over the same 15-year period, and with a current household size of 3.41 residents per unit, would require 13,540 residential units. Finally, Madera and Stanislaus Counties are expected to add 59,354 and 102,880 residents between 2020 and 2035, respectively. Madera County currently has a household size of 3.34 residents per unit while Stanislaus County has a household size of 3.25 residents per unit. Based on these figures, population growth in Madera and Stanislaus Counties would require the addition of 17,771 and 31,655 residential units in each jurisdiction, respectively.

Combined, campus growth and expected growth in the City of Merced would require an additional 7,754 residential units. As discussed above, there are currently 1,278 unoccupied units in the City of Merced, and a total of 3,662 new residential units are including in proposed and pending projects. Combined these unoccupied and new units would meet approximately 64 percent of campus demand and expected growth in Merced. In addition, according to MCAG projections for the City of Merced, which take into account campus growth, the City is projected to add approximately 20,267 new units between 2020 and 2035, which would cover the remainder of campus growth and expected growth in Merced. For these reasons, there is enough existing and planned housing in the City of Merced to accommodate future growth in the City, including campus growth.

Combined, campus growth and projected growth outside the City of Merced but within a 40-mile radius of the campus would require an additional 64,573 residential units. **Table 4.6-11, Existing and Projected Housing Supply within a 40-mile Radius through 2035,** below presents the current and projected housing in Merced, Madera and Stanislaus Counties.

Table 4.6-11
Existing and Projected Housing Supply within a 40-mile Radius through 2035

County	Existing Vacant Housing	Projected New Housing
Merced (excluding City of Merced)	3,948	66,440
Madera	5,082	18,662
Stanislaus	10,048	35,717
Total	19,078	120,819
Cumulative Demand	64,573	

Source: MCAG 2018, Impact Sciences 2018

As discussed above, there are currently 3,948 unoccupied units in Merced County (excluding the City of Merced), 5,082 unoccupied units in Madera County, and 10,048 unoccupied units in Stanislaus County. In addition, MCAG projects that incorporated and unincorporated portions of Merced County (excluding the City of Merced) will add approximately 66,440 new units between 2020 and 2035. Similarly, Madera County is projected to add approximately 10,562 households, which is used as a proxy for housing units, between 2020 and 2035 (MCTC 2018), while Stanislaus County is projected to add about 35,717 new residential units over the same period of time (StanCOG 2018). Combined, unoccupied units within a 40-mile radius of the campus would meet approximately 30 percent of campus demand and expected growth in Merced, Madera, and Stanislaus Counties, while the additional housing projected in surrounding communities would cover the remainder of campus growth and other foreseeable growth in the area. There would be enough housing in the area to accommodate future growth within a 40-mile radius of the campus, including campus growth.

In summary, as enough housing would be available in the City of Merced and in communities within a 40-mile radius of the campus, implementation of the 2020 LRDP along with reasonably foreseeable development would not induce substantial population growth in the study area, and this cumulative impact would be less than significant.

Mitigation Measures: No mitigation is required.

4.6.7 References

California Department of Finance. 2018. E-5 Population and Housing Estimates for Cities, Counties and the State, 2011-2018, with 2010 Benchmark.

City of Merced. 2012. *Merced Vision 2030 General Plan*. January 3.

Employment Development Department (EDD). 2018. Civilian Labor Force, Employment, and Unemployment, Merced MSA. October.

Merced County. 2012. *2030 Merced County General Plan Update Draft Program Environmental Impact Report*. November.

Madera County Transportation Commission (MCTC). 2018. *2018 Regional Transportation Plan and Sustainable Communities Strategy.*

Merced County Association of Governments (MCAG). 2018. *2018 Regional Transportation Plan/Sustainable Communities Strategy for Merced County*.

Stanislaus Council of Governments (StanCOG). 2018. *2018 Regional Transportation Plan/Sustainable Communities Strategy.*

U.S. Census Bureau. 2010. *U.S. Population 2010 Census.*

U.S. Census Bureau. 2016. *2012-2016 American Community Survey.*

4.7 PUBLIC SERVICES AND RECREATION

4.7.1 Introduction

This section of the Recirculated Draft SEIR (SEIR) describes the existing public services that serve the project site and its vicinity and potential impacts to these services from the development of the UC Merced campus under the 2020 LRDP. The public services addressed in this section include fire protection, law enforcement, schools, libraries, and parks. Regulations and policies affecting the public services and recreational resources in the project area are also described. Information presented in this section is based on consultation with service providers.

4.7.2 Environmental Setting

Law Enforcement Services

As with all UC campuses, law enforcement services to the campus are provided by the UC Merced Police Department out of a police station located on the campus. The UC Merced Police Department is responsible for providing 24-hour service for on-campus calls. The UC Merced Police Department has a mutual aid agreement with the Merced County Sheriff's Department and the City of Merced Police Department.

Currently, the Campus police department consists of 16 sworn officers. The UC Merced Police Department maintains service level standard of 0.7 officer per 1,000 persons of the campus population (Matthew 2008). It is anticipated that when the campus enrollment level is 15,000 full-time equivalent students, a total of 30 sworn officers would serve the campus (Her 2018).

Fire Protection and Emergency Medical Services

The project site and its vicinity are currently served jointly by the Merced County Fire Department and the California Department of Forestry and Fire Protection (Cal Fire). The Merced County Fire Department (MCFD) is a full-service fire department, providing emergency services to all unincorporated areas of the county through a network of fire stations, personnel, and equipment. The MCFD provides the fire stations, equipment, and tools while Cal Fire provides administrative staff, firefighting personnel, and training. Fire stations are staffed 24 hours a day by a full-time career Fire Captain or Fire Apparatus Engineer, and emergency response is augmented with more than 227 Paid Call Firefighters (PCF) or volunteers (Merced County 2013). This joint service provides fire response from several existing fire stations in the local area. The nearest County fire station is Fire Station 85, located on McKee Road near the El Portal Road intersection. The station currently has one paid fire fighter to staff its one Type II engine and a volunteer company (through County of Merced Fire Department, responding to 40-60 percent of calls per year) (Gladwin 2019).

As discussed in the Merced County 2030 General Plan Program EIR (PEIR), "the 1999 Merced County Fire Master Plan defined Levels of Service in terms of five land use categories within Merced County. These categories are High Urban, Urban, Rural, Outlying, and Basic Level of Service. These categories correlate with the Land Use chapter of the 2000 Merced County General Plan. Each land use category has its own response requirements, and the level of service provided varies accordingly. The level of service delivered by a fire department can be measured by fire flow delivery capability, response times of apparatus, number of firefighters per capita, square footage of facilities per capita, staffing levels on apparatus, and reserve capacity (County of Merced 2013)."

The PEIR further notes that, "according to the Merced County Fire Master Plan, many of the Department's facilities are inadequately staffed and equipped. Several stations and equipment repair facilities are 40-50 years old, and were designed when fire apparatus were smaller and much less complicated. These facilities are in need of remodeling or replacement in order to meet current safety standards, and to provide adequate space for routine Department activities. In addition, response times in the county have increased due to rapid growth without a correspondent growth in fire protection facilities and staffing. The provision of adequate staffing for the MCFD is becoming increasingly difficult as the number of volunteers continues to decline. Adequate staffing cannot be accomplished without appropriate training and education for career and paid-call volunteers. Likewise, training cannot be delivered without appropriate facilities. State and federal mandates require in excess of two hundred hours of training per year for all career firefighters. Although the MCFD has acquired training facilities and offices at Castle Airport, certain training topics require the use of specialized facilities such as burn buildings and training towers. These facilities are not presently available in Merced County (Merced County 2013)."

The City of Merced Fire Department provides mutual aid support, upon request, to Merced County Fire Department/Cal Fire under a signed Mutual Aid Agreement. There is no automatic response contractual agreement in place between the two Fire Departments.

Schools

The project site is located within the boundaries of the Merced City School District (MCSD), the Weaver Union School District (WUSD), and the Merced Union High School District (MUHSD). The MCSD and WUSD provide education for kindergarten through eighth grade. The MUHSD serves students in grades 9 through 12.

There are 14 elementary schools and 4 middle schools in the MCSD. Peterson Elementary School is located closest to the project site at 848 East Donna Drive, approximately 3 miles southwest the project site. Enrollment for the 2017-2018 school year at Peterson Elementary is 676 students; below its capacity of 750 students (CDE 2018). The nearest junior high school is Cruickshank Middle School, located at 601 Mercy Avenue, approximately 2.5 miles southwest of the campus. Enrollment at Cruickshank is 561, well below its capacity of 1,088 students (CDE 2018). The student generation rates for MCSD are 0.441 student per dwelling unit for single-family residences and 0.195 student per multifamily apartment (MCSD 2017).

There are two elementary schools and one middle school in the WUSD. Pioneer Elementary School is located at 2950 Gerard Avenue, approximately 4 miles south of the project site. Weaver Middle School is also located approximately 5 miles south of the project site at 3076 East Childs Avenue. Enrollment in the Weaver Union School District for the 2017–2018 school year was 2,816 students, and the WUSD has a capacity for 2,470 students (CDE 2018). The District is currently operating above its capacity and will continue to do so until new facilities are developed. The student generation rate for WUSD is 0.5 student per single-family residence (WUSD 2018).

The MUHSD operates nine high schools, six of which are located within Merced City limits: Merced High School, Golden Valley High School, Sequoia High School, El Capitan High School, Yosemite High School and Independence High School; the latter two are alternative high schools. The other three high schools in the district are Atwater High School, Buhach Colony High School, and Livingston High School. The MUHSD also operates the Merced Adult School.

The project site is located within the attendance area of El Capitan High School. El Capitan High School is the closest high school to the campus, at 100 Farmland Avenue, approximately 2 miles to the west. Golden Valley High School and Merced High School are also close to the campus, located at 2121 East Childs Avenue and 205 West Olive Street, respectively. Enrollment at El Capitan High School is currently approximately 1,664 students and the capacity of the school in permanent classrooms is 1,800 students (CDE 2018). El Capitan High School is the District's newest school and opened in 2013 to mitigate overcrowding at the Merced and Golden Valley High Schools. The student generation rates for MUHSD are 0.213 student per single-family residence and 0.074 student per multifamily apartment.

Public Libraries

UC Merced provides extensive library resources through its Leo & Dottie Kolligian Library, located on the campus at 5200 N. Lake Road. The resources are primarily for the research and educational needs of students, faculty and staff; however, there is some public access.

Parks and Recreational Facilities

County of Merced Parks and Recreational Facilities

County-owned recreational facilities are managed by the Merced County Parks and Recreation Office. County recreational facilities near the project site are described below.

Lake Yosemite Regional Park

Lake Yosemite Regional Park is an important regional recreation facility serving thousands of area residents annually. The Merced Irrigation District owns the 486-acre lake and the surrounding shoreline, which has been a regional recreational site since the late 1930s. The County operates the lake and the shoreline for recreational uses under a 50-year lease (1976 to 2026). The County-owned regional park is approximately 233 acres total, and the developed portion of the County property is approximately 89 acres. Some land acreage within the park site currently is undeveloped and is not used for recreational purposes. In 1969 and 1974, the County purchased approximately 260 acres of land adjacent to Lake Yosemite Regional Park to expand the park. About 167 acres of this land has been placed under a conservation easement by UC Merced and those lands will not be used for park expansion. Furthermore, at this time, there are no plans to expand the park.

Lake Yosemite provides a variety of passive and active recreational facilities, including swimming, powerboat and sailboat facilities, and a boat ramp. Water skis and jet skis are allowed, and there are no maximum engine size or noise restrictions on boat motors or jet skis. Park facilities include the following:

- Picnic tables and barbeque pits
- Paved trails for bicycling and walking
- Two beach areas for swimming
- Two boat launching ramps
- Sixty sailboat slips
- Mooring slips for powerboat use
- Two recreational baseball fields
- Rainbow trout fishing
- Three playgrounds for children
- Volleyball courts

- Rental facilities (picnic sites and a building for indoor activities)
- Support facilities (first aid, food concession, restrooms, water wells, and parking)

Bike Paths in the Project Area

A Class I bike path is located along the eastern side of Lake Road between Yosemite Avenue and Lake Yosemite. The Merced and Atwater Bicycle Plan shows this existing bike path would connect to a bike path proposed on Lake Road, south of Yosemite Avenue, and continuing along Black Rascal Creek to the west. Another proposed extension of this bike path would be located east of Lake Road along the alignment of the future Campus Parkway. There is also a bike path along Bellevue Road between Lake Road and G Street.

City of Merced Parks and Recreational Facilities

The City of Merced Parks and Community Services Department maintains city parks and recreational facilities. Both active and passive recreational areas, which include a variety of park types, are available to residents, as well as an extensive off-street bicycle path system. The City currently maintains approximately 84 acres of community parks, 64 acres of neighborhood parks, 4 acres of mini-parks, 120 acres of linear parks, and 57 acres of other parks and recreational sites. Nearby community and neighborhood parks include Elmer Murchie Park, Fahrens Park, Bob Carpenter Neighborhood Park, Merino Park, Rahilly Park, and Burbank Park (City of Merced 2011).

4.7.3 Regulatory Considerations

State Laws and Regulations

California Fire Code

The California Fire Code (Title 24 CCR, Part 9) establishes minimum requirements to safeguard public health, safety, and general welfare from the hazards of fire, explosion, or dangerous conditions in new and existing buildings. Chapter 33 of CCR contains requirements for fire safety during construction and demolition.

Senate Bill 50

The Leroy F. Greene School Facilities Act of 1998, or Senate Bill 50 (SB 50), restricts the ability of a local agency to deny project approvals on the basis that public school facilities (classrooms, auditoriums, etc.) are inadequate. School impact fees are collected at the time building permits are issued. These fees are used by the local schools to accommodate the new students added by the project, thereby reducing potential impacts on schools to a less-than-significant impact. Payment of school fees is required by SB 50 for all new residential development projects and is considered full and complete mitigation of school impacts.

Quimby Act

California Government Code Section 66477, Subdivision Map Act, referred to as the Quimby Act, permits local jurisdictions to require the dedication of land and/or the payment of in-lieu fees solely for park and recreation purposes. The required dedication and/or fee are based on the residential density, parkland cost, and other factors. Land dedicated and fees collected pursuant to the Quimby Act may only be used for developing new, or rehabilitating existing, park or recreational facilities. The maximum dedication and/or fee allowed under current state law is equivalent to providing 3 acres of park land per 1,000 persons, unless the park acreage of a municipality exceeds that standard, in which case the maximum dedication is 5 acres per 1,000 residents (County of Merced 2004).

Local Plans and Policies

All of the development under the 2020 LRDP would be located on the campus which is owned by the University. None of the City and County plans and policies related to public services and recreation are applicable to campus projects.

4.7.4 Impacts and Mitigation Measures

Significance Criteria

This SEIR uses significance criteria derived from Appendix G of the *State CEQA Guidelines*. For the purposes of this SEIR, impacts on public services and recreation would be significant if implementation of the 2020 LRDP would:

- Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered 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 following public services:
  - Fire protection
  - Police protection
  - Schools
  - Parks
  - Other public facilities such as libraries

- 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; or
- Include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment.

Issues Not Discussed Further

All of the CEQA checklist items listed above are addressed in the analysis below.

Methodology

The full development of the campus under the 2020 LRDP was used to analyze impacts to public services and recreational facilities. Public service providers in the Merced region were contacted to determine current operational service levels and whether there are existing service deficiencies. The proposed project's demand for public services was determined and compared to service providers' ability to meet the anticipated project-related demand with existing or planned facilities.

4.7.5 LRDP Impacts and Mitigation Measures

LRDP Impact PUB-1: Implementation of the 2020 LRDP would increase demand for law enforcement services and would require the construction of new facilities but the impacts from construction would be less than significant with mitigation. (*Less than Significant*)

The 2009 LRDP EIS/EIR analyzed the potential for campus development under the 2009 LRDP to result in substantial demand for law enforcement services. The analysis under Impact PUB-1 in the 2009 LRDP EIS/EIR was based on the assumption that campus enrollment would increase to 25,000 students by 2030 and that the campus would also have an employee population of 6,560 faculty and staff for a total of 31,560 persons by 2030. Based on the fact that the University would add staff as the campus needs grow and that the campus had adequate land to expand the police station if needed, the EIS/EIR concluded that the impact related to law enforcement would be less than significant.

As noted in **Section 3.0, Project Description**, UC Merced is now expected to grow at a slower pace than originally anticipated, adding no more than 5,300 additional students between 2020 and 2030, such that by 2030, the enrollment level is expected to be 15,000 students, and the faculty and staff projection for 2030 is also substantially lower than previously projected and analyzed in the 2009 LRDP EIS/EIR. In light of this change in the proposed project and the conditions in which it would be implemented, a revised analysis of the project's impact on law enforcement is presented below.

As described above, the UC Merced campus is served by the UC Merced Police Department. The UC Merced Police Department would expand service as development of the campus continues. To maintain the right staffing level, about 30 sworn officers would be required at full campus development. Based on the experience at other UC campuses, adequate staff will be provided on the campus. The 2020 LRDP land use diagram includes adequate land for the expansion of the Campus police station as needed. The environmental consequences of developing campus facilities, including additional police facilities, on land designated CMU in the 2020 LRDP are evaluated in other sections of this SEIR and would be mitigated to the greatest extent feasible by the mitigation measures included in this SEIR. For reasons presented above, the impact of implementation of the 2020 LRDP related to police facilities and services would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they would not cause the campus population to increase and thereby affect police services. To the extent a small project would add employees to the campus, those new employees are accounted for in the campus population increase analyzed above. For the same reasons that are set forth above, the impact of small-scale projects on police services would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact PUB-2: **Implementation of the 2020 LRDP would increase demand for fire protection services and could require an expansion of an existing fire station or the construction of a new facility, but the impacts from construction would be less than significant with mitigation. (*Less than Significant*)**

As noted above, the campus is jointly served by the County of Merced Fire Department and Cal Fire. The nearest County fire station is the McKee Fire Station 85, which currently has one paid fire fighter to staff its one Type II engine and a volunteer company (through County of Merced Fire Department, responding to 40-60 percent of calls per year) (Gladwin 2019). The County Fire Department response standard for a building fire is a "2 in, 2 out" standard, i.e., in responding to building fires, the department requires that there be two fire fighters available outside and 2 fire fighters available to go inside the building. The County Fire department responds to incidents at UC Merced with its engine company out of Fire Station 85, supplemented by a ladder truck from the Atwater fire station (as needed) and PCFs (Krippner 2019). The University and the County have reached an agreement to increase staffing at Fire Station 85 to a minimum of two paid fire fighters 24 hours per day, seven days a week, thereby increasing the station's capacity to serve the campus in the near term.

As noted in **Section 3.0**, the 2020 LRDP is not a specific development project but a long-range development plan to guide campus growth and development over the next 10 years. The 2020 LRDP would support the development of new buildings on the campus to accommodate the projected growth in enrollment and employment at the campus. The 2020 LRDP is similar to a general plan in that it focuses on designating land uses for portions of the campus. It does not specify densities or development standards, and the University has the discretion to develop the land at densities that are consistent with its specific programmatic needs. The scale and density of future phases of campus development are not known at this time. The scale and density of future campus development would be determined by the specific programmatic needs of the campus as well as available funding. What can be reasonably projected at this time is that as campus enrollment increases to 15,000 students between 2020 and 2030, there would be an accompanying increase in building space on the campus, which the 2020 LRDP projects will be on the order of about 1.83 million gsf of additional space, and more mid-rise buildings would be added to the campus. The growth in both enrollment and building space would occur incrementally over the planning horizon of the 2020 LRDP. Therefore, there would not be an immediate need for increased fire service or additional resources from the fire department. However, as building space and campus population increase over time, there would be an incremental increase in fire or EMT-related emergencies and therefore in the need for expanded fire service than the campus requires at the present time. The additional fire protection services needed could include additional equipment and/or staffing to meet response time and other performance standards adopted by the County or any other entity that would provide fire protection services, although precise estimates of additional staffing and equipment that would be needed cannot be developed at this time. As CEQA is concerned with the impacts on the environment, any additional demand for equipment and staffing to serve the campus growth to comply with the performance standards would not, in itself, represent an environmental impact of the project. However, if the demand for staff and equipment results in the need for new or modified fire station facilities to house the additional staff and/or equipment, the environmental impacts from fire station construction would need to be evaluated and disclosed.

Fire service to the expanded campus could be provided under one of the following options: (1) continuing to contract with Merced County Fire Department at the current or expanded level of service; (2) contracting with Merced City Fire Department for fire protection services; (3) constructing an on-site UC Merced Fire Department; or (4) contracting with a private fire protection service entity.

If UC Merced were to contract with the County for a higher level of service, an expansion of the County fire station may be required to serve the expanded campus. It is anticipated that should the expansion of the nearest fire station (Fire Station 85) be needed, the County will complete CEQA documentation for any expansion that is proposed. Based on a review of the current condition at Fire Station 85, there appears to be vacant land available at the fire station to expand the facility. Furthermore, the area of expansion on the site is either paved (parking lot or driveway) or is previously disturbed or landscaped. Consequently, any expansion of the fire station would be unlikely to affect sensitive biological and cultural resources. To the extent that construction noise could affect birds nesting in nearby trees, it is anticipated that the County would comply with the California Fish and Game Code and ensure that pre-construction surveys are conducted and precautions are taken to avoid significant impacts on nesting birds. Similarly, while cultural resources are not expected to be affected by the expansion at this site due to previous disturbance, should cultural resources be encountered during construction, the County would implement mitigation measures, which would reduce the impact to a less than significant level. Similarly, the County would implement standard noise and construction emissions and dust minimization measures to minimize construction-phase noise and air quality impacts. Therefore, the impacts from an expansion of the existing fire station are expected be less than significant or less than significant with mitigation. To the extent that Merced County Fire Department determines that it would not expand the existing station and instead build a new station to serve future development, including the expanded campus, where a new fire station would be located is not known at this time and the environmental impacts from its development cannot be analyzed. However, according to the Merced County 2030 General Plan PEIR, should new fire stations be constructed, their impacts would be less than significant because of the policies included in the General Plan and the County's environmental review process which would require mitigation if significant impacts are identified (Merced County 2013) (for a more detailed discussion, see **Cumulative Impact C-PUB-2** below). If an existing County fire station is expanded or a new one is constructed by the County and significant environmental impacts requiring mitigation are identified by the County, the University will pay for its fair share of the cost of mitigation.

While the University continues to work with the County for the provision of adequate fire service to the campus, if in the future the campus is served by the City of Merced Fire Department, the nearest City fire station is Station 55, located at 3520 Parsons Avenue, at the intersection of Parsons Avenue and Silverado Avenue. It is unclear whether the City would expand that fire station or construct a new fire station. However, based on the recommendations in the Standards of Coverage Assessment completed by the City Fire Department in 2018, the City should initiate planning for an additional fire station to serve existing and future development generally north of Merced College and within the City's current/projected sphere of influence (SOI). The Standards of Coverage Assessment also recommends that as strategic planning and fiscal resources permit, the Department and City should consider a second ladder truck in the north/northeast section as the City continues to expand in that direction toward UC Merced. The City should consider exploring a shared-cost fire and EMS partnership with UC Merced

(Citygate Associates 2018). The recommendations in the assessment are consistent with the City's General Plan which also identified the need for more fire stations to serve growth in the northern portion of the City and in the City's SOI. According to the City of Merced Vision 2030 General Plan EIR, "As the City continues to grow in population and area there would be increased demand for fire and emergency medical protection, and the fire protection system will have to change if it is to maintain this response time standard. This would require two existing stations to be relocated and five new facilities with personnel and equipment to be added to the system. The actual location of new and expanded facilities will depend on the pattern of growth that occurs in the City limits and proposed SUDP/SOI, which is not known at this time." However, according to the General Plan EIR, should new fire stations be constructed, their impacts would be less than significant because of the policies included in the General Plan and the City's environmental review process which would require mitigation if significant impacts are identified (for a more detailed discussion, see **Cumulative Impact C-PUB-2** below). If an existing City fire station is expanded or a new one is constructed and significant environmental impacts requiring mitigation are identified by the City, the University will pay for its fair share of the cost of mitigation.

If a fire station were to be constructed on the campus, it would be located in a CMU designated land use area. Construction of this on-campus facility could result in environmental impacts. These impacts would be analyzed in a project-specific analysis but are expected to be less than significant with the implementation of the 2020 LRDP mitigation measures set forth in other sections of this SEIR and in the 2009 LRDP EIS/EIR.

With regard to the option of UC Merced contracting with a private fire protection service entity, not enough information is available at this time to determine whether a new for expanded fire station would be needed and no further analysis is feasible.

Although CEQA does not require this SEIR to analyze fire operational metrics such as response times (as they do not constitute environmental impacts), it is noted that the 2020 LRDP does not propose off-campus circulation system changes that could affect the County or the City's fire department response time in the vicinity of and to the campus. No modifications to Lake Road, such as termination of access via Lake Road, would be made in connection with the proposed LRDP as the University does not own or control Lake Road. With regard to the concern that increased response times could result due to congestion at Bellevue/Lake intersection, please see the traffic analysis for this intersection in **Table 4.8-8** in **Section 4.8, Transportation**. This intersection would continue to operate acceptably (LOS B) in the AM peak hour in 2030 even with the implementation of the 2020 LRDP. While the intersection would degrade to LOS F in the PM peak hour, the traffic improvements identified for this intersection would improve intersection operations in the PM peak hour to LOS B (see **Table 4.9-9**). Furthermore, as stated under

LRDP Mitigation Measure TRANS-1, since this intersection directly serves the campus, the University will be responsible for the entire cost of improvements at this intersection. Therefore, the University will ensure that unacceptable congestion does not occur at this intersection, and fire department response times are not adversely affected.

In summary, for reasons presented above, the impact on fire facilities and services from implementation of the 2020 LRDP would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they would not result in a substantial increase in the need for fire services. To the extent a small project would require additional fire services, that demand is accounted for in the analysis above. For the same reasons that are set forth above, the impact of small-scale projects on fire services would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact PUB-3: Implementation of the 2020 LRDP would increase enrollment in local public schools but would not require construction of new facilities. (*Less than Significant)*

The 2009 EIS/EIR analyzed the potential for campus development under the 2009 LRDP to result in an increase in enrollment in the local public schools. The analysis under Impact PUB-3 in the 2009 LRDP EIS/EIR was based on the assumption that campus enrollment would increase to 25,000 students by 2030 and that the campus would also have an employee population of 6,560 faculty and staff for a total of 31,560 persons. The EIS/EIR concluded that the impact related to schools would be less than significant. As noted above, UC Merced is now expected to grow at a slower pace than originally anticipated, such that by 2030, the enrollment level is expected to be 15,000 students, and the faculty and staff projection for 2030 is also substantially lower than previously projected and analyzed in the 2009 LRDP EIS/EIR. In light of this change in the proposed project and the conditions in which it would be implemented, a revised analysis of the project's impact on local schools is presented below.

Continuing development of the campus would generate a demand for primary and secondary educational facilities. As stated in **Section 3.0, Project Description**, no faculty or staff housing would be built on the campus. The 2020 LRDP does not plan for any student family housing on the campus. Therefore, no student households would live on the campus and the on-campus resident student would also not generate primary or secondary school-age students. As shown in **Table 4.6-8**, **Campus Student**

Population and Employees, in **Section 4.6, Population and Housing**, enrollment is anticipated to increase by 5,300 students between 2020 and 2030. These students would be from the City of Merced, greater Merced County, and other parts of the state and country. For purposes of the analysis in **Section 4.6**, it is conservatively assumed that all students would be from outside Merced County. Between 2020 and 2030, faculty at UC Merced is anticipated to increase by 346 persons and staff is anticipated to increase by 785 persons, for a total employment increase of 1,311 persons. Faculty and staff that are hired could already be living in the City of Merced and/or greater Merced County at the time of hire. However, for purposes of the analysis in this SEIR, it was assumed that all new faculty would relocate from outside the area while half of staff would relocate from outside the area (half of the new staff would be local hires). Based on these assumptions, approximately 739 new employees would relocate from outside the area. It is assumed that 10 percent of students would have families (530 students with families) and all faculty and staff population relocating from outside the area would also be accompanied by dependents.

These 530 student households and 739 faculty and staff households would generate school-age children who would attend area schools. University-specific student generation rates were used to estimate the number of school-age children that would be associated with families living off-campus (UC Merced 2009). As shown in **Table 4.7-1, School-Age Children Associated with Buildout under the 2020 LRDP,** approximately 900 school-age children (630 K–8 students and 270 high school students) would be associated with these student, faculty, and staff households.

Table 4.7-1
School-Age Children Associated with Buildout under the 2020 LRDP

Housing Units1	K–8 Student Generation Rate	Total Students Generated
530 Student Families	0.496	263
739 Employees		367
Total K-8 Students		**630**
Housing Units	**9–12 Student Generation Rate**	**Total Students Generated**
530 Student Families	0.213	113
739 Employees		157
Total High School Students		**270**
Total K–12 students generated		**900**

The approximately 900 K-12 students generated from campus growth under the 2020 LRDP would be dispersed throughout the City of Merced as well as in other Merced County communities and in Mariposa and Stanislaus Counties. As enrollment growth continues and employees are hired within the parameters of the 2020 LRDP, homes will concurrently be developed throughout the study area. Pursuant to SB 50, developers will be required to pay school impact fees as single-family homes or multi-family units are constructed. School impact fees are considered full and complete mitigation for school impacts. Students, faculty, and staff that are homeowners would also pay property taxes a portion of which would go towards the funding local K-12 public schools. Therefore, the impact related to schools would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they would not cause the campus population to increase and thereby affect schools. To the extent a small project would add employees to the campus, those new employees are accounted for in the campus population increase analyzed above. For the same reasons that are set forth above, the impact of small-scale projects on schools would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact PUB-4: Implementation of the 2020 LRDP would not substantially increase demand for public libraries. (*Less than Significant*)

The 2009 LRDP EIS/EIR analyzed the potential for campus development under the 2009 LRDP to result in an increased demand for public libraries. The analysis under Impact PUB-4 in the 2009 LRDP EIS/EIR was based on the assumption that campus enrollment would increase to 25,000 students by 2030 and that the campus would also have an employee population of 6,560 faculty and staff for a total of 31,560 persons. The EIS/EIR concluded that the impact related to libraries would be less than significant. As noted above, UC Merced is now expected to grow at a slower pace than originally anticipated. In light of this change in the proposed project and the conditions in which it would be implemented, a revised analysis of the project's impact on libraries is presented below.

The increased population associated with the 2020 LRDP would result in increased demand for public library services compared to existing conditions. However, the library system of the campus would continue to meet the needs of a modern research and teaching institution, and thus provide a large array of library services, would continue to be available to students, staff, and faculty of the campus, as well as the general public on a limited basis. Therefore, the impact on the City library system associated with implementation of the 2020 LRDP would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they would not cause the campus population to increase and thereby affect libraries. To the extent a small project would add employees to the campus, those new employees are accounted for in the campus population increase analyzed above. For the same reasons that are set forth above, the impact of small-scale projects on libraries would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact PUB-5: Implementation of the 2020 LRDP would result in an increased demand for parks and recreational facilities but would not require the construction of new recreational facilities off site. (*Less than Significant)*

The 2009 LRDP EIS/EIR analyzed the potential for campus development under the 2009 LRDP to result in an increased demand for parks. The analysis under Impact PUB-5 in the 2009 LRDP EIS/EIR was based on the assumption that campus enrollment would increase to 25,000 students by 2030 and that the campus would also have an employee population of 6,560 faculty and staff for a total of 31,560 persons. The EIS/EIR concluded that the impact related to parks would be less than significant. As noted above, UC Merced is now expected to grow at a slower pace than originally anticipated. In light of this change in the proposed project and the conditions in which it would be implemented, a revised analysis of the project's impact on parks is presented below.

The land use diagram in the 2020 LRDP assigns nine acres for Active Open Space (athletic facilities and fields) and 289 acres for Passive Open Space (large landscaped spaces). Of the 1,026 acres on the campus, approximately 29 percent are planned as active and passive open space. Many of these areas on the campus, including trails and bicycle paths, would also be available to the general population of the surrounding area.

Development of the campus under the 2020 LRDP would result in a residential campus population of about 7,200 students by 2030. No employees would reside on the campus. Recreational facilities and open space that would be developed on the campus would adequately serve the needs of the residential population, as well as the daytime population of the campus. Consequently, the population increase would not result in demand for the construction of off-site recreational facilities. Implementation of the 2020 LRDP would not trigger the construction of new parks or expansion of existing parks in areas outside of the campus. There would be no environmental impacts from the construction of new parks or expansion of existing parks off site.

The environmental impacts from the development of all campus lands, including those lands that would be developed with recreational facilities and open space, are addressed in the other sections of this SEIR and mitigated to the extent feasible by the mitigation measures included in this SEIR. The impact would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they would not cause the campus population to increase and result in the need for recreation facilities. To the extent a small project would add employees to the campus, those new employees are accounted for in the campus population increase analyzed above. For the same reasons that are set forth above, the impact of small-scale projects on recreational facilities would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact PUB-6: Implementation of the 2020 LRDP would increase the use of Lake Yosemite Regional Park which could accelerate physical deterioration of park facilities. (*Potentially Significant; Less than Significant with Mitigation*)

As discussed under **LRDP Impact PUB-5** above, adequate land for parks and recreational facilities is included in the campus land use diagram to serve the on-campus residential population. Therefore, implementation of the 2020 LRDP is not expected to result in the excessive usage of off-site recreational facilities. However, due to the proximity of Lake Yosemite Regional Park to the campus and the range of unique water-related recreational amenities offered at the regional park which would not be available on the campus, it is anticipated that new on-campus student residents as well as faculty and staff would use the regional park. As stated in the 2009 LRDP EIS/EIR, there is no measure available to estimate the level of usage that would represent over usage and would result in a corresponding deterioration of the park facilities. However, because the park is currently at capacity during summer months, this SEIR conservatively assumes that the use of the park by the students could accelerate the physical deterioration of the park facilities and contribute to the need for new park facilities. Although it is anticipated that most of the increase in park facility use associated with the campus (i.e., during periods in which the school is in session (i.e., fall until late spring) would not coincide with the current peak park use which occurs during summer, nonetheless the deterioration of existing park facilities could be accelerated and is considered a potentially significant impact associated with implementation of the 2020 LRDP.

As noted in **LRDP Impact PUB-5** above, the University will develop on-campus recreational facilities, including shared use facilities such as on-campus sports, recreational, and parking facilities, as part of the overall campus development. In addition, **LRDP Mitigation Measures PUB-6a** through **PUB-6c** are proposed to reduce the impact from campus development to a less than significant level. These mitigation measures would focus on park improvements within the existing 298-acre park site and would not extend any improvements into adjacent County-owned lands that contain sensitive biological resources.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they would not cause the campus population to increase and thereby affect regional park facilities. To the extent a small project would add a few employees to the campus, those new employees are accounted for in the analysis above. For the same reasons that are set forth above, the impact of small-scale projects on the regional park would be less than significant with mitigation.

Mitigation Measures:

LRDP MM PUB-6a: UC Merced shall work with the County to avoid physical deterioration of existing facilities at Lake Yosemite Regional Park, and/or improve park facilities within the existing park site as necessitated by the increased uses associated with development of the campus.

LRDP MM PUB-6b: UC Merced will pay its fair share of the cost of necessary improvements to the regional park. UC Merced's share of funding will be based on the percentage that on-campus residential population represents of the total population in eastern Merced County at the time that an improvement is implemented.

LRDP MM PUB-6c: In recognition of the sensitive resources present on lands immediately adjacent to the regional park, all regional park improvement projects that are implemented by the County within 250 feet of the park's eastern boundary pursuant to **LRDP Mitigation Measures PUB-6a** and **PUB-6b** above, will implement mitigation measures to avoid and minimize indirect effects on biological resources.

Significance after Mitigation: Implementation of these mitigation measures listed above would reduce the impact to a less than significant level. Furthermore, implementation of **LRDP Mitigation Measure PUB-6c** would avoid any substantial secondary impacts of these improvements.

4.7.6 Cumulative Impacts and Mitigation Measures

Cumulative Impact C-PUB-1: Campus development under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would result in increased need for law enforcement services, the provision of which would not result in a significant cumulative environmental impact. (*Less than Significant*)

With the construction of new housing and expansion of businesses in Merced, the population of the City of Merced and the surrounding areas would continue to grow and the need for law enforcement in the region would proportionally increase. New staff and facilities would be needed to serve increased demand. It is unknown exactly where the facility expansions would occur to support the cumulative increase in population, though they would occur within urbanized areas where there is a concentration of population. In the future, as specific police services and facilities expansion or improvement projects are identified, additional project-specific environmental analyses would be completed by the City or the County.

Campus development under the 2020 LRDP would be served by the UC Merced Police Department and would generally not result in an increased need for law enforcement services from the City Police Department or the County Sheriff's office. Therefore, implementation of the 2020 LRDP would not contribute to any cumulative impact related to law enforcement services. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

Cumulative Impact C- PUB-2: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would generate an increased demand for fire protection services, the provision of which would not result in a significant cumulative environmental impact. (*Less than Significant*)

As discussed above under **LRDP Impact PUB-2**, under one of the options for fire service that UC Merced may pursue, the expanded campus would be served by the Merced County Fire Department. Under this option, the cumulative context would be existing and reasonably foreseeable development in unincorporated Merced County and the development on the campus. The cumulative effect of future growth and development in unincorporated Merced County on fire service is analyzed in the Merced

County 2030 General Plan Program EIR (PEIR). The PEIR states that "The 2030 General Plan would result in future residential and commercial development leading to increased demands for fire protection and emergency response services. This increased demand would likely result in the construction of new or expanded facilities at unknown locations generally within cities' spheres of influence or designated urban communities. The 2030 General Plan also contains policies to avoid or reduce many adverse environmental effects that could occur with the construction of infrastructure necessary to serve planned growth. Additionally, future facility plans for new fire station facilities would be evaluated on a case-by-case basis, and undergo project-level environmental review, which would ensure that the potential environmental effects of each new fire facility would be identified. Mitigation measures would also be identified." The PEIR further notes that "2030 General Plan policies to minimize the number of new or expanded facilities necessary to maintain adequate levels of service, as well as policies to reduce or avoid environmental effects, coupled with the required subsequent site-specific environmental review of new facilities, would ensure that the construction of new fire stations and other facilities would not result in reasonably foreseeable, substantial adverse physical effects at a programmatic level, thereby resulting in a less-than-significant impact" (County of Merced 2013). Furthermore, as noted under **LRDP Impact PUB-2** above, if an existing County fire station is expanded or a new one is constructed by the County and significant environmental impacts requiring mitigation are identified by the County, the University will pay for its fair share of the cost of mitigation.

As discussed above under **LRDP Impact PUB-2**, under one of the options for fire service that UC Merced may pursue, the expanded campus would be served by the City of Merced Fire Department. The City of Merced also analyzed both the General Plan-level and cumulative impacts on fire service from the development of the city consistent with the Merced 2030 Vision General Plan. The General Plan EIR states that "As the City continues to grow in population and area there would be increased demand for fire and emergency medical protection, and the fire protection system will have to change if it is to maintain this response time standard. This would require two existing stations to be relocated and five new facilities with personnel and equipment to be added to the system. The actual location of new and expanded facilities will depend on the pattern of growth that occurs in the City limits and proposed SUDP/SOI, which is not known at this time. However, fire and emergency response facilities would be allowed in most proposed General Plan land use designations." The General Plan EIR also states that the City would comply with Implementing Action 2.1.d which "provides guidelines for siting new firehouse facilities. Guidelines include fire stations being located on streets close to and leading into major or secondary thoroughfares; fire stations being near the center of their primary service area; convenient to high value areas of commercial or industrial districts; stations being located away from other uses which may be sensitive to the noise impacts of frequent alarms; and residential service areas, fire stations should be located in or near those sections which have the highest density" (City of Merced 2011). As a result, the

City concluded that both the General Plan level and cumulative impacts related to the provision of fire service would be less than significant. Furthermore, as noted under **LRDP Impact PUB-2** above, if an existing City fire station is expanded or a new one is constructed by the City and significant environmental impacts requiring mitigation are identified by the City, the University will pay for its fair share of the cost of mitigation.

Based on the analyses in the two general plan EIRs, it is reasonable to assume that should UC Merced continue its contract with the County for fire service or execute a new contract with the City for fire services in the future, in the event that new or expanded fire station facilities are needed, their construction and operation would not result in significant environmental impacts, and the cumulative impact would be less than significant.

Mitigation Measures: No mitigation is required.

Cumulative Impact C-PUB-3: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would generate an increased demand for elementary and secondary school facilities, the provision of which would not result in a significant cumulative impact. (*Less than Significant*)

The study area for a potential cumulative impact on schools is the service area of City School District, the Weaver Union School District, and the Merced Union High School District (MUHSD).

The cumulative context for impacts on school services is the increased demand for these services as a result of residential and non-residential growth in Merced under the adopted City of Merced General Plan. The projected growth in Merced would be expected to result in the need for additional schools.

Some of the schools within the study area are at capacity. The MUHSD has a five-year facility plan, which is continually updated to monitor and project the growth in enrollment and to identify additional facilities needed to serve the growth in enrollment. Other school districts also have similar plans for the development of new facilities. Developer fees are collected in order to address the school impacts from new development. In addition, the school districts work with developers of large residential developments to provide land for the construction of new schools within the project site to serve the new population.

Ass mentioned above, for purposes of the analysis in this SEIR, it was assumed that all new faculty would relocate from outside the area while half of staff would relocate from outside the area (half of the new staff would be local hires). Based on these assumptions, approximately 739 new employees would relocate from outside the area. It is assumed that 10 percent of students would have families (530 students with families) and all faculty and staff population relocating from outside the area would also be accompanied by dependents.

The increased population associated with the 2020 LRDP would result in an increased demand for educational services. Similarly, new development within the City of Merced SOI would result in an increased need for elementary and secondary schools. All new development would be required to pay school impact fees, which are considered full and complete mitigation for school impacts. Therefore, the cumulative increase in demand for school facilities would be less than significant.

Mitigation Measures: No mitigation is required.

Cumulative Impact C-PUB-4:	**Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would result in increased demand for library services, the provision of which would not result in a significant cumulative impact. (*Less than Significant*)**

Public library services are provided to the region by Merced County. Therefore, the study area for a potential cumulative impact on library services is eastern Merced County. The Merced County Library system includes the main library, which is located in Merced and regional branches located in Atwater, Dos Palos, Gustine, Livingston, and Los Banos.

The cumulative context for impacts on library services is the increased demand for these services as a result of residential and non-residential growth in Merced under the adopted Merced Vision 2030 General Plan, Merced County 2030 General Plan, and the development of the campus under the 2020 LRDP.

The cumulative effect of future growth and development in unincorporated Merced County on library service is analyzed in the Merced County 2030 General Plan PEIR. The PEIR states that "Implementation of the proposed 2030 General Plan would involve future population growth and urban development within the unincorporated county that could result in substantial changes to existing (school and) library services. Increasing demands would result in the need to provide additional (school and) library facilities… Likewise, without needed improvements to libraries commensurate with the growing population and changes in information technology, these facilities could also become overused and outdated. This could result in the construction of new or physically altered (school or) library facilities, or the modification of existing facilities to serve growth. This construction could result in environmental impacts." "The 2030 General Plan would result in future residential and commercial development leading to increased demands for (school and) library services. This increased demand would likely result in the construction of new or expanded facilities at unknown locations generally within cities' spheres of influence or designated urban communities. The 2030 General Plan also contains policies to avoid or reduce many adverse environmental effects that could occur with the construction of infrastructure necessary to serve planned growth. Additionally, future plans for new (school or) library facilities would be evaluated on a case-by-case basis, and undergo project-level environmental review, which would ensure that the potential environmental effects of each new facility would be identified. Mitigation measures would also be identified." The PEIR further states that "2030 General Plan policies to minimize the number of new or expanded facilities necessary to maintain adequate levels of service, as well as policies to reduce or avoid environmental effects, coupled with the required subsequent site-specific environmental review of new facilities, would ensure that the construction of new school and library facilities would not result in reasonably foreseeable, substantial adverse physical effects at a programmatic level, thereby resulting in a less-than-significant impact" (County of Merced 2013).

Furthermore, the library system of the campus, which meets the needs of a modern research and teaching institution and provides a large array of library services, would be available to students, staff, and faculty of the campus, as well as the general public on a limited basis. The campus library system would also contribute to Merced County's available library resources, especially adult non-fiction and reference materials, which would permit the County public library system to reallocate resources toward other types of material, including resources for children.

Based on the analyses in the General Plan PEIR, it is reasonable to assume that in the event that new or expanded County libraries are needed, their construction and operation would not result in significant environmental impacts, and the cumulative impact would be less than significant.

Mitigation Measures: No mitigation is required.

Cumulative Impact C-PUB-5: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not result in a cumulative impact related to neighborhood and community parks, but would result in a cumulative impact associated with the deterioration of the Lake Yosemite Regional Park facilities from increased use. The proposed project's contribution would not be cumulatively considerable. (*Less than Significant*)

Because Lake Yosemite Regional Park is a regional park, the study area for a potential cumulative impact on this facility is eastern Merced County.

The cumulative context for an impact on Lake Yosemite Regional Park is the increased use of the park facilities services as a result of residential and non-residential growth in Merced under the adopted City of Merced General Plan and the development of the campus under the 2020 LRDP. As noted earlier, little growth is expected to occur in this portion of unincorporated Merced County. The projected growth in north Merced would be expected to result in the increased use of park facilities.

Lake Yosemite Regional Park is an important regional recreation facility serving thousands of area residents annually. The regional park is extensively used. The peak period begins on Easter Sunday and continues until mid-October. There are approximately 300,000 visits to the park annually. The park is currently at capacity during summer months.

As discussed above, the campus includes an adequate amount of parkland for the proposed increase in population of this area. Therefore, the development of the campus would not result in a cumulative impact on neighborhood and community park facilities in the region. To the extent that other development in north Merced results in an increased demand for neighborhood and community park facilities, the proposed project would not contribute to that demand.

As noted above, the one exception would be the Lake Yosemite Regional Park. As stated in **LRDP Impact PUB-6**, because the park is currently at capacity during summer months, this SEIR conservatively assumes that the use of the park by the campus-related population could accelerate the physical deterioration of the park facilities and contribute to the need for new park facilities. Although new park facilities would be developed in the existing park and would not have significant environmental effects, and it is anticipated that most of the increase in park facility use associated with the campus (i.e., during periods in which the school is in session (i.e., fall until late spring) would generally not coincide with the current peak park use, nonetheless the deterioration of existing park facilities is considered a potentially significant impact associated with the proposed project.

Other development within eastern Merced County would also result in increased use of the regional park and would contribute to its deterioration and the cumulative impact would be potentially significant. However, UC Merced would implement **LRDP Mitigation Measures PUB-6a** through **PUB-6c**, which would render the project's contribution to the cumulative impact cumulatively less than considerable.

Mitigation Measures: No mitigation is required.

4.7.7 References

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4.8 TRANSPORTATION

4.8.1 Introduction

This section of the Recirculated Draft SEIR (SEIR) describes the existing transportation infrastructure that serves the project site and its vicinity and potential impacts to the transportation infrastructure from campus development under the proposed 2020 LRDP. Regulations and policies affecting the transportation in the project area are also summarized. Information presented in this section is based on the Transportation Impact Analysis (TIA) prepared for this project. The TIA is included in **Appendix 4.8**.

The 2009 UC Merced/University Community Plan EIS/EIR (2009 LRDP EIS/EIR) included a transportation impact analysis for a 25,000-student campus and full development of the University Community to the south of the campus. That traffic analysis is no longer relevant because the University is not anticipated to grow to an enrollment level of 25,000 students by 2030. The University has updated its traffic analysis for this SEIR, which assesses a much smaller amount of development: a 15,000-student campus (17,500 students under cumulative conditions, although there are currently no plans nor funding to expand the campus beyond 15,000 students) and no University Community development to the south of the campus (as none was proposed at the time of publication and scoping under the NOP for this SEIR). As such, the traffic impacts, including cumulative impacts with other development throughout the City of Merced and Merced County within and near the campus, are substantially less than those identified in the 2009 LRDP EIS/EIR. With the certification of the 2020 LRDP SEIR and adoption of the 2020 LRDP, the University intends to supersede the mitigation measures previously identified in the 2009 LRDP EIS/EIR with the updated mitigations and improvements identified in the analysis below.

With regard to University Community North, as discussed in **Section 1.0**, the UCLC property to the south of the campus was subdivided in 2017. Some of the land area that made up the University Community North was added to the campus and about 634 acres of the former University Community North lands were transferred to the Virginia Smith Trust (VST). When VST moves forth with land development plans for the 634-acre property, it will obtain land use permits and approvals from the County or the City and will implement mitigation measures that are imposed on the development by the authorizing land use jurisdiction.

4.8.2 Environmental Setting

Roadway Network

The roadway network in the study area is shown in **Figure 4.8-1, Project Study Area**. This figure also shows the study intersections. The study area encompasses the roadway network extending from

Bellevue Road on the north to State Route 99 on the south, and from Highway 59 on the west and Lake Road on the east. Roadway facilities in downtown Merced between V Street and G Street along W 16th Street were also evaluated. The area surrounding the UC Merced campus (hereinafter project site) is largely undeveloped with the exception of development on the campus and rural residences in the surrounding areas. Limited roadway infrastructure is in place. The project site can be accessed by two two-lane rural roads, namely Bellevue Road and Lake Road. Descriptions of the local and regional roadways in the vicinity of the campus that are relevant to the proposed project are provided below.

State Route 99 (hereinafter SR 99 or Highway 99 as it is locally known) is the primary regional facility in the Merced area. Highway 99 provides access to San Francisco and Sacramento to the north, and Fresno and Bakersfield to the south. Through the City of Merced, Highway 99 is a four-lane freeway with two lanes in each direction. Future plans call for improvements to Highway 99 throughout the Central Valley.

State Route 140 (hereinafter Highway 140 or Yosemite Parkway as it is locally known) is a major east-west highway serving recreational and local traffic. Highway 140 is a two-lane rural highway that provides regional access to Yosemite National Park to the east.

State Route 59 (hereinafter Highway 59 as it is locally known) is a north-south facility extending from State Route 152 (near Los Banos) to Snelling, a community located north of the City of Merced. Highway 59 is a two-lane rural highway through Merced.

G Street is a north-south roadway extending from Highway 99 to La Paloma Road, where it turns into Snelling Road (Highway 59). G Street is a four-lane roadway south of Yosemite Avenue with left-turn pockets at major intersections. North of Yosemite Avenue, G Street expands to five lanes, three southbound and two northbound, with left-turn pockets until Mercy Avenue, where G Street narrows to become two lanes. North of Cardella Road, G Street expands back to four lanes until Farmland Avenue, where G Street narrows back to two lanes.

Olive Avenue is an east-west street providing cross-town access. West Olive Avenue connects Highway 59 and R, M, and G Streets. It is a six-lane facility west of G Street, primarily serving a commercial corridor. West of Highway 59, Olive Avenue becomes Santa Fe Drive, connecting the northern portions of Merced to the City of Atwater and Castle Air Force Base. East of G Street, East Olive Avenue transitions from four lanes to two lanes and provides access to one of Merced's largest residential areas.

Yosemite Avenue is an east-west road extending from Highway 59 to its eastern terminus at Arboleda Drive. Yosemite Avenue is a two-lane facility west of Arboleda Drive until Lake Road, where the roadway becomes a four-lane roadway. West of McKee Road, Yosemite Avenue narrows to three travel lanes (two eastbound and one westbound) and expands back to four lanes west of North Gardner Avenue.

Bellevue Road is a two-lane east-west road extending from Fox Road on the west to its eastern terminus at Lake Road and is one of the two access roads to the campus. This roadway currently carries approximately 8,500 vehicles per day, west of Lake Road.

Lake Road is a two-lane north-south road extending from Yosemite Avenue to its northern terminus at Lake Yosemite and is the other access road to the campus. This roadway currently carries approximately 5,600 vehicles per day, south of Bellevue Road.

Scope of Transportation Analysis

The scope of the transportation analysis in this SEIR was determined based on consultation with both the City of Merced and Merced County. It included intersections near the campus which would serve the highest number of project trips; intersections identified as significant impact locations in the 2009 LRDP EIS/EIR; and additional intersections requested by the City of Merced during project scoping, for a total of 19 intersections and six freeway segments. The County did not request an analysis of any other intersections or roadway segments at that time.

Study Intersections

Nineteen intersections within the study area were analyzed for both existing (November 2017) and future conditions, as shown in **Figure 4.8-1** and listed below:

1. West Bellevue Road/ Highway 59
2. Bellevue Road/G Street
3. East Bellevue Road/Lake Road
4. Cardella Road/G Street
5. East Cardella Road/Lake Road
6. West Yosemite Avenue/ Highway 59
7. Yosemite Avenue/G Street
8. East Yosemite Avenue/Parsons Avenue/North Gardner Avenue
9. West Olive Avenue/Highway 59
10. East Yosemite Avenue/McKee Road
11. East Yosemite Avenue/Lake Road
12. West Olive Avenue/R Street
13. West Olive Avenue/M Street
14. Olive Avenue/G Street
15. West 16th Street/Highway 59
16. SR 99 Northbound Ramps/MLK Jr. Way
17. SR 99 Northbound Off-Ramp/West 14th Street/G Street
18. Lake Road/New UC Merced Driveway 1 (2020 Project Driveway)
19. Lake Load/New UC Merced Driveway 2 (2020 LRDP New Driveway)

Freeway Segments

The following freeway segments were analyzed for both existing and future conditions:

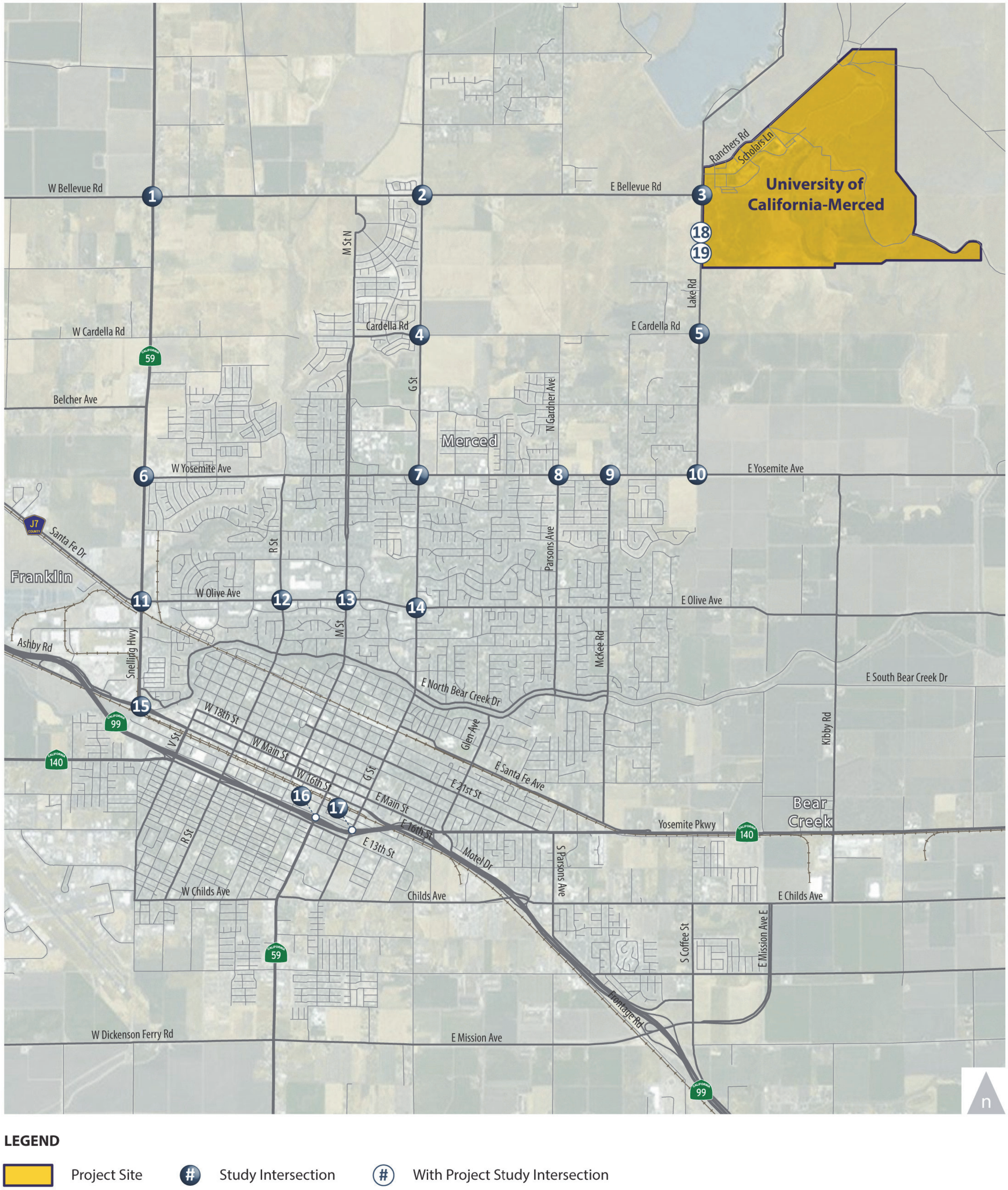
1. SR 99 North of 16th Street
2. SR 99 North of SR 140
3. SR 99 North of MLK
4. SR 99 South of MLK
5. SR 99 South of G Street
6. SR 99 South of Mission Street

Roadway Segments, including Campus Parkway

A roadway segment analysis was determined not to be needed based on the substantially lower traffic forecasts generated by campus development under the 2020 LRDP and other development in the City and County of Merced.

With regard to the section of Campus Parkway between Yosemite Avenue and Bellevue Road, the transportation impact analysis does not analyze the roadway (and instead assigns the traffic to Lake Road between Yosemite Avenue and Bellevue Road) because no funding has been identified by the Merced County Association of Governments nor Merced County for this section and it is not foreseeable that this section would be constructed between 2020 and 2030.

With respect to the Campus Parkway alignment on the campus, the 2020 LRDP reserves space for the potential future construction of Campus Parkway within the UC Merced campus. However, because construction of Campus Parkway north of East Yosemite Avenue currently has no funding identified by the Merced County Association of Governments nor Merced County, and would depend on funding and alignment studies conducted by developers of the properties to the south of UC Merced, the University cannot plan on completion of this roadway within the planning horizon of the 2020 LRDP. Therefore, the University has reserved space for a potential future Campus Parkway facility and the traffic impact analysis assumed that the campus roadway network would function with the public roadway network currently in place.



SOURCE: Fehr & Peers, 2019

FIGURE 4.8-1

Project Study Area

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With regard to impacts on the intersections along Campus Parkway, the TIA assigns between 9 and 116 directional project trips (depending on the analysis period and scenario, 2030 or 2035) to or from East Yosemite Avenue east of Lake Road, reflecting traffic designed to the east and southeast of the city. Some of this traffic would choose Campus Parkway, once it is constructed to East Yosemite Avenue. If all of these trips used Campus Parkway, those trips would constitute about 4 percent to 6 percent of the approximate capacity of the roadway, using an approximate capacity of 1,800 vehicles per hour per direction (900 vehicles per hour per lane). Based on this small proportional use of the roadway's capacity, and the fact that the roadway is already funded and under construction, analysis of the project's impacts on Campus Parkway was determined not to be needed. It is also noted that the Campus Parkway EIR documentation does not provide intersection-level traffic forecasts for new intersections along Campus Parkway, and therefore insufficient data was available to perform an analysis of intersections along the future roadway.

Parking

Analysis of a project's impact on parking, in and of itself, is exempt from CEQA review and is therefore not included in the SEIR. While a lack of parking can result in secondary effects such as localized congestion due to vehicles circling to find parking, that is not a concern for the roadways near the campus.

Traffic Analysis Methodology

The operations of roadway facilities are described with the term "level of service" (LOS). LOS is a qualitative description of traffic flow based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels of service are defined ranging from LOS A (i.e., best operating conditions) to LOS F (worst operating conditions). LOS E corresponds to operations "at capacity." When volumes exceed capacity, stop-and-go conditions result, and operations are designated as LOS F.

Different criteria and methods were used to assess operating conditions for the various types of facilities analyzed in this study, including signalized and unsignalized intersections, and freeway segments. The LOS criteria and methods for each of these facilities are described in the following sections.

Signalized Intersections

Traffic conditions at signalized intersections were evaluated using the method from Chapter 16 of the Transportation Research Board's 2010 *Highway Capacity Manual*. This operations analysis method uses various intersection characteristics (such as traffic volumes, lane geometry, and signal phasing) to estimate the average control delay experienced by motorists traveling through an intersection. Control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. **Table 4.8-1, Signalized Intersection Level of Service Criteria**, summarizes the relationship between average control delay per vehicle and LOS for signalized intersections. In the City of Merced, acceptable operations at signalized intersections are defined as LOS D or better. LOS C is the limit of acceptable operation for intersections in the County. Synchro, version 9.0, was used to calculate signalized intersection LOS.

Table 4.8-1
Signalized Intersection Level of Service Criteria

Level of Service	Description of Traffic Conditions	Average Control Delay (seconds/vehicle)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10.0 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20.0 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and/or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35.0 to 55.0
E	Operations with long delays indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0
F	Operations with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	> 80.0

Source: Highway Capacity Manual (Transportation Research Board 2010).

Unsignalized Intersections

Traffic conditions at unsignalized intersections were evaluated using the method from Chapter 17 of the 2010 *Highway Capacity Manual*. With this method, operations are defined by the average control delay per vehicle (measured in seconds) for each movement that must yield the right-of-way. This incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. For all-way stop-controlled intersections, the average control delay is calculated for the intersection as a whole. At two-way or side street-controlled intersections, the control delay (and LOS) is calculated for each controlled movement, the left-turn movement from the major street, and the entire intersection. For controlled approaches composed of a single lane, the control delay is computed as the average delay of all movements in that lane. The delays for the entire intersection and for the movement or approach with the highest delay are reported. **Table 4.8-2, Unsignalized Intersection Level of Service Criteria**, summarizes the relationship between delay and LOS for unsignalized intersections.

Table 4.8-2
Unsignalized Intersection Level of Service Criteria

Level of Service	Description of Traffic Conditions	Average Control Delay (seconds/vehicle)
A	Little or no delays	< 10
B	Short traffic delays	10 – 15
C	Average traffic delays	15 – 25
D	Long traffic delays	25 – 35
E	Very long traffic delays	35 – 50
F	Extreme traffic delays with intersection capacity exceeded	> 50

Source: Highway Capacity Manual (Transportation Research Board 2010).

Freeway Segments

Freeway segments were analyzed using volume-to-capacity (V/C) ratios. The analysis results are presented as a ratio, which is a measure of traffic operating conditions and compares the volume to the road's capacity based on the number of lanes. A maximum lane capacity of 1,800 vehicles per hour per lane was used to assess the capacity of each freeway segment. A V/C ratio of 1.0 means that the roadway would operate at capacity and some delays and queuing would be expected, while a V/C ratio of 0.85 or less indicates that vehicles would typically not experience noticeable delays. Freeways are considered to operate at an acceptable level when the V/C ratio is 0.90 or less.

Existing Levels of Service

Intersection Levels of Service

Existing (November 2017) operations were evaluated for the weekday AM and PM peak hours at the existing study intersections. **Figure 4.8-2, Existing Peak Hour Intersection Traffic Volumes, Lane Configurations and Traffic Controls**, show the intersection control type, lane geometry, and peak hour volumes for the study intersections. The existing traffic volumes were used with the existing lane configurations and signal phasing/timing as inputs into the LOS calculations. **Table 4.8-3, Existing Intersection Levels of Service**, summarizes the results. Detailed intersection LOS calculation worksheets are presented in **Appendix 4.8**.

Table 4.8-3
Existing Intersection Levels of Service

Intersection	Traffic Control	Peak Hour[1,2]	Delay (Seconds)	LOS
1. West Bellevue Road/Highway 59	AWS	AM PM	**41.3** 13.2	**E** B
2. Bellevue Road/G Street	Signal	AM PM	36.6 21.0	D C
3. East Bellevue Road/Lake Road	AWS[3]	AM PM	53.6 70.8	F F
4. Cardella Road/G Street	Signal	AM PM	11.4 6.8	B A
5. East Cardella Road/Lake Road	SSS	AM PM	0.4 (13.4) 0.2 (12.4)	A (B) A (B)
6. West Yosemite Avenue/ Highway 59	Signal	AM PM	13.1 11.4	B B
7. Yosemite Avenue/G Street	Signal	AM PM	40.1 43.1	D D
8. East Yosemite Avenue/Parsons Avenue/North Gardner Avenue	AWS	AM PM	28.7 21.2	D C
9. East Yosemite Avenue/McKee Road	Signal	AM PM	8.6 8.2	A A
10. East Yosemite Avenue/Lake Road	SSS	AM PM	6.4 (17.3) 10.2 (16.8)	B (C) B (C)
11. West Olive Avenue/ Highway 59	Signal	AM PM	48.4 49.8	D D
12. West Olive Avenue/R Street	Signal	AM PM	46.6 **56.4**	D **E**
13. West Olive Avenue/M Street	Signal	AM PM	48.1 55.0	D D
14. Olive Avenue/G Street	Signal	AM PM	45.5 47.0	D D
15. West 16th Street/ Highway 59	AWS	AM PM	78.7 95.0	F F
16. SR 99 Northbound Ramps/MLK Jr. Way	SSS	AM PM	3.5 (16.5) 2.8 (18.3	A (C) A (C)
17. SR 99 Northbound Off-Ramp/West 14th Street/G Street	SSS	AM PM	2.4 (20.1) 2.0 (22.5)	A (C) A (C)

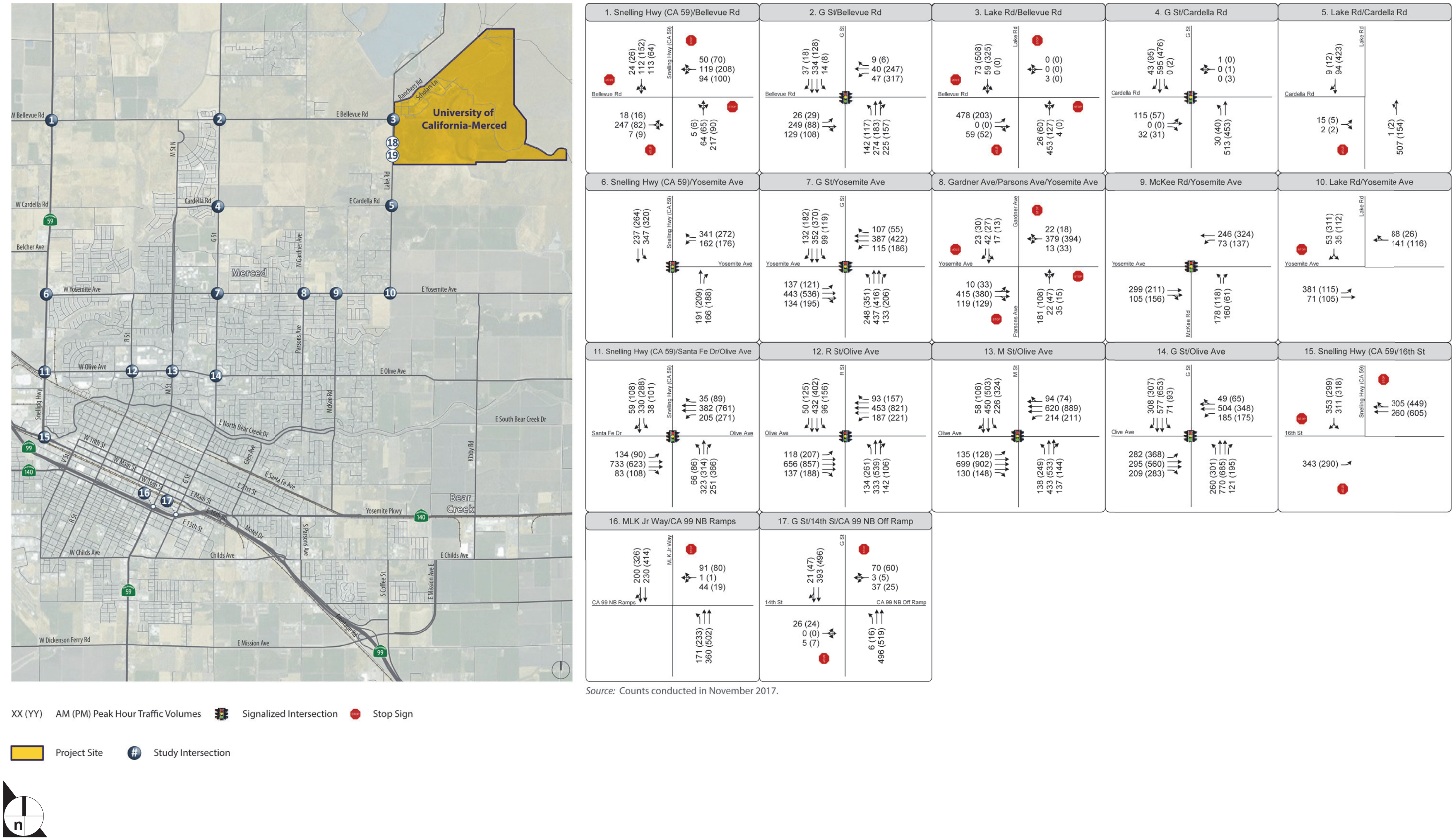
Source: Fehr & Peers August 2019.

1 *Signal = signalized intersection; AWS=all-way stop; SSS=side street stop.*

2 *For side-street stop-controlled intersections, two service levels are listed: Average intersection LOS (LOS for worst side-street movement).*

3 *East Bellevue Road/Lake Road was an all-way stop when traffic counts were taken in November 2017. It was subsequently signalized. It is therefore analyzed as an all-way stop for existing conditions, and as a signal for all other scenarios.*

LOS D is the limit of acceptable intersection operations in the City of Merced and in Merced County. Field observations and the level of service results indicate that, as of November 2017, most intersections operated acceptably during the weekday AM and PM peak hours, with a few exceptions.



Source: Counts conducted in November 2017.

SOURCE: Fehr & Peers, 2019

FIGURE **4.8-2**

Existing Peak Hour Intersection Traffic Volumes, Lane Configurations and Traffic Controls

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During the AM peak hour, the following intersections operated at an overall LOS E or F:

- West Bellevue Road/Highway 59 (LOS E)
- East Bellevue Road/Lake Road (All-way stop) (LOS F)
- West 16th Street/Highway 59 (LOS F)

During the PM peak hour, the following intersections operated at an overall LOS E or F:

- East Bellevue Road/Lake Road (All-way stop) (LOS F)
- West Olive Avenue/R Street (LOS E)
- West 16th Street/Highway 59 (LOS F)

The intersection of East Bellevue and Lake Roads has since been signalized and operates at an acceptable level of service as of 2018.

Traffic Signal Warrants

To assess the need for signalization of stop-controlled intersections, the *California Manual of Uniform Traffic Control Devices* presents nine signal warrants. The Peak Hour Volume Warrant (Warrant 3) is used in this study as a supplemental analysis tool to assess operations at unsignalized intersections.[1] Detailed signal warrant calculations are provided in **Appendix 4.8**. The results of the traffic signal warrant analysis indicate that the peak hour volume traffic signal warrant is currently satisfied (as of November 2017) at the following unsignalized intersections:

- East Bellevue Road/Lake Road
- West 16th Street/Highway 59
- East Yosemite Avenue/Parsons Avenue/Gardner Avenue

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1 Unsignalized intersection warrant analysis is intended to examine the general correlation between existing conditions and the need to install new traffic signals. Existing peak-hour volumes are compared against a subset of the standard traffic signal warrants recommended in the California Manual of Uniform Traffic Control Devices (MUTCD). This analysis should not serve as the only basis for deciding whether and when to install a signal. To reach such a decision, the full set of warrants should be investigated based on field-measured traffic data and a thorough study of traffic and roadway conditions by an experienced engineer. Furthermore, the decision to install a signal should not be based solely on the warrants because the installation of signals can lead to certain types of collisions. The responsible state or local agency should undertake regular monitoring of actual traffic conditions and accident data and conduct a timely re-evaluation of the full set of warrants in order to prioritize and program intersections for signalization.

In addition, it is noted that although the signal warrant is met at the intersection of East Yosemite Avenue/Parsons Avenue/Gardner Avenue, the levels of service are acceptable (LOS C in the AM peak hour and D in the PM peak hour).

Freeway Operations

Existing operations were evaluated for the weekday AM and PM peak hours for the Highway 99 freeway segments through Merced. The results are summarized in **Table 4.8-4, Existing Freeway Levels of Service**. All freeway segments operate with a V/C ratio of 0.51 or lower in the AM peak hour, and 0.61 or lower in the PM peak hour. Based on this assessment, there is excess freeway capacity, and drivers do not experience substantial delays under normal conditions.

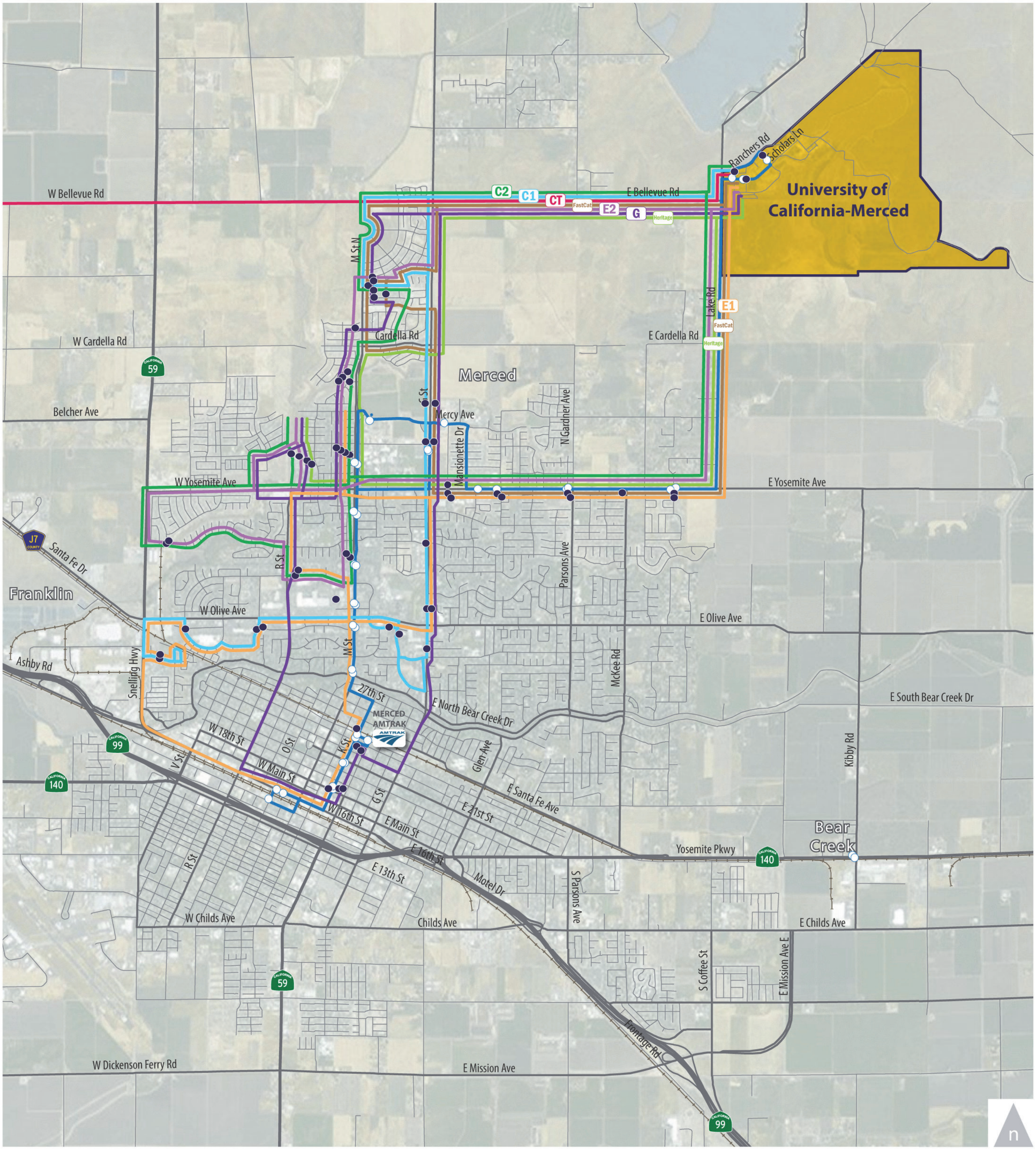
Table 4.8-4
Existing Freeway Levels of Service

Location	Direction	Peak Hour	V/C Ratio
1. SR 99 North of 16th Street	NB	AM PM	0.50 0.61
	SB	AM PM	0.50 0.61
2. SR 99 North of SR 140	NB	AM PM	0.47 0.59
	SB	AM PM	0.50 0.61
3. SR 99 North of MLK	NB	AM PM	0.48 0.59
	SB	AM PM	0.51 0.61
4. SR 99 South of MLK	NB	AM PM	0.51 0.61
	SB	AM PM	0.51 0.60
5. SR 99 South of G Street	NB	AM PM	0.51 0.61
	SB	AM PM	0.51 0.61
6. SR 99 South of Mission Street	NB	AM PM	0.51 0.61
	SB	AM PM	0.38 0.53

Source Fehr & Peers August 2019.

Transit Service

The UC Merced campus is accessible by transit both locally and regionally. **Figure 4.8-3, Transit Routes**, shows the weekday bus routes that currently serve the UC Merced campus.



LEGEND

Project Site	
Merced Transit Authority (The Bus)	
The Bus Stop	
CatTracks Stop	

UC Merced CatTracks

CT CampusTrax	E1 Route E1
C1 Route C1	E2 Route E2
C2 Route C2	G Route G
FastCat	Heritage

SOURCE: Fehr & Peers, 2019

FIGURE **4.8-3**

Transit Routes

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Amtrak provides regional train service to Merced on the *San Joaquins* line with six trains per day operating in each direction. This service connects Merced with the San Francisco Bay Area, Fresno, Bakersfield, and other cities in the Central Valley. Connections are also available to southern California, including San Diego, Oceanside, Santa Ana, and Los Angeles.

The Bus provides transit service for Merced County. The Bus operates 17 routes (13 of which serve Merced), including a UC Merced Route which serves the UC Merced campus. Service to the campus is provided Monday through Friday between 6:10 AM and 8:02 PM.

CatTracks is funded by UC Merced and provides local bus service to the campus. CatTracks connects the campus and surrounding areas, including downtown Merced and research facilities located on the former Castle Air Force base. The following routes are provided when classes are in regular session:

- CampusTrax connects the campus and Castle Research Facilities. Service is provided between 7:30 AM and 6:10 PM Monday – Friday with 50-minute headways. A one-way trip takes 30 minutes.
- Route C-1 connects the campus with retail locations along West Olive Avenue and G Street, and to the Granville Apartments. Service is provided between 5:45 AM and 12:47 AM Monday – Friday with 40-minute headways. A round-trip takes 80 minutes.
- Route C-2 connects the campus with Merced College, retail locations along Yosemite Avenue and Loughborough Drive, and multiple housing locations. Service is provided between 5:25 AM and 11:05 PM Monday – Friday with 60-minute and 80-minute headways. A round-trip takes about 60 minutes.
- Route E-1 connects the campus with Merced College, Amtrak station, retail and entertainment locations in downtown and along Yosemite and Olive Avenues in the city of Merced, and various housing complexes. Service is provided on weekends only, from 11:05 AM to 11:09 PM.
- Route E-2 connects the campus to Merced Mall, retail locations on Yosemite Avenue, and to various housing locations north of Olive Avenue. Service is provided on weekends only, from 11:05 AM to 9:43 PM.
- Route G connects the campus to downtown Merced and Amtrak along O and K Streets and runs on a one-directional loop Monday – Friday between 5:40 AM and 9:09 PM. Six trips are provided in the AM with 70-minute headways, and seven trips in the PM.
- FastCat connects the campus to the Moraga and Bellevue subdivisions, Mercy Hospital, Yosemite Church, and various medical offices. Service is provided Monday – Friday between 5:55 AM and 11:41 PM with 65-minute headways. A round-trip takes 65 minutes.
- Heritage Line is available to Heritage Residents only and connects the campus to the "R" Street Village Apartments. Service is provided Monday – Friday between 5:40 AM and 11:57 PM, and Saturday – Sunday between 10:00 AM and 10:11 PM, with 18-minute and 36-minute headways respectively.

YARTS (Yosemite Area Regional Transportation System) connects the city of Merced to Yosemite National Park. In the eastbound direction, six trips (two AM, four PM) are provided between Yosemite National Park and Merced. In the westbound direction, six trips (four AM, two PM) are provided.

Pedestrian and Bicycle Facilities

Pedestrian facilities include sidewalks, off-street paths, crosswalks, and pedestrian signals. Sidewalks are generally provided in developed areas in Merced and are being added in undeveloped areas as the adjacent parcels are developed. No sidewalks exist along Bellevue Avenue nor Lake Road within two miles of the project site. Crosswalks and pedestrian signals are provided at all signalized study intersections in the area. The trail along Lake Road provides direct access to the UC Merced campus and joins with existing sidewalks along Yosemite Avenue and the Black Rascal Creek trail connector.

Bicycle facilities include the following:

- Bike paths (Class I) – Paved trails that are separated from roadways.
- Bike lanes (Class II) – Lanes on roadways designated for use by bicycles through striping, pavement legends, and signs.
- Bike routes (Class III) – Designated roadways for bicycle use by signs only; may or may not include additional pavement width for cyclists.
- Class IV bikeways (cycle tracks or "separated" bike lanes) - Provide a right-of-way designated exclusively for bicycle travel within a roadway and are protected from other vehicle traffic with devices, including, but not limited to, grade separation, flexible posts, inflexible physical barriers, or parked cars.

Class I bicycle facilities are provided along Fahrens Creek, Cottonwood Creek, Bear Creek, Black Rascal Creek, and Lake Road. Lake Road provides direct access to the UC Merced campus and can be accessed via Class II bicycle lanes along Yosemite Avenue and the recently completed Black Rascal Creek trail connector.

Class II bicycle facilities include many of the arterial streets within the City of Merced, including major sections of G Street, M Street, Yosemite Avenue, and McKee Road. Designated bicycle lanes are provided along R Street, V Street, West Avenue, Main Street, 18th Street, 21st Street, Grogan Avenue, and Parsons Avenue.

Class III bicycle facilities are located on some sections arterials streets and various collector streets, including V Street, 26th Street, Glen Avenue, 13th Street, 14th Street, and Childs Avenue. The nearest Class III bicycle route to the project site is over 2 miles away.

4.8.3 Regulatory Considerations

State Laws and Regulations

Senate Bill 743

Senate Bill 743, passed in 2013, (Steinberg, 2013), required the Office of Planning and Research (OPR) to update *State CEQA Guidelines* to include new transportation impact-related evaluation metrics that are in line with the state's goal of reducing greenhouse gas emissions by developing sustainable communities that are based on denser infill development, reduced reliance on individual vehicles, and improved mass transit. OPR undertook a 5-year long process of revising the *State CEQA Guidelines* and regulatory changes to the *State CEQA Guidelines* that implement SB 743 were approved on December 28, 2018. These changes to the guidelines identify vehicle miles traveled (VMT) as the most appropriate metric to evaluate a project's transportation impacts. With the California Natural Resources Agency's certification and adoption of the changes to the *State CEQA Guidelines*, automobile delay, as measured by "level of service" and other similar metrics, generally no longer constitutes a significant environmental effect under CEQA. (Pub. Resources Code, § 21099, subd. (b)(3).) Although agencies may begin the use of new metrics whenever they so choose, July 1, 2020 is the statewide implementation date. OPR has published a technical advisory that includes suggested thresholds that a lead agency may use to evaluate a project's traffic impact based on VMT (OPR 2018). As the revised guidelines were certified recently, as of the preparation of this SEIR, neither the two local jurisdictions (City of Merced or Merced County) nor the University has developed standards or thresholds for evaluating transportation impacts based on the new metrics. Therefore, this SEIR does not provide an impact evaluation based on VMT.

Local Plans and Policies

The University of California, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by the University that are in furtherance of the University's education purposes. However, the University may consider, for coordination purposes, aspects of local plans and policies for the communities surrounding a UC campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts. This section summarizes the planning and policy documents that relate to the provision of transportation services in Merced County.

2018 Regional Transportation Plan/Sustainable Communities Strategy

The 2018 Regional Transportation Plan/ Sustainable Communities Strategy (RTP/SCS) provides a comprehensive long-range view of transportation issues, opportunities, and needs of Merced County. It establishes the goals, objectives, and policies for future transportation improvements. The plan identifies the actions that should be taken and the funding needs and options available for successful implementation. Some of the relevant policies contained in the 2018 RTP/SCS include:

1. Highways, Streets, and Roads

Goal: Provider a safe and efficient regional road system that accommodates the demand for the movement of people and goods.

Objective 1.1 Maintain a Level of Service D on all regionally significant roads

Objective 1.2 Identify and prioritize improvements to the regional road system.

Objective 1.3 Use the existing street and road system in the most efficient possible manner to improve local circulation.

Objective 1.4 Monitor the impact of development on the regional road system.

2. Transit

Goal: Provide an efficient, effective, coordinated regional transit system that increases mobility for urban and rural populations, including transportation disadvantaged persons.

Objective 2.1 Meet all transit needs that are "reasonable to meet"

Objective 2.2 Increase transit ridership at a rate that exceeds annual population growth rate.

Objective 2.3 Promote citizen participation and education in transit planning.

Objective 2.4 Promote transit ridership to and from Mariposa County and Yosemite National Park.

6. Active Transportation (Bicycle & Pedestrian)

Goal: A regional transportation system for bicyclists and pedestrians. Create a safe, connected, and integrated regional transportation system for bicyclists and pedestrians.

Objective 6.1 Develop and construct bike and walkway facilities in urban areas and other communities where non-motorized systems do not currently exist.

Merced County General Plan

The 2030 Merced County General Plan Circulation Element includes policies to ensure that adequate access is provided and maintained for all county land uses. The following presents the General Plan Circulation Element policies relevant to transportation systems near the proposed campus.

Goal CIR-1: Maintain an efficient roadway system for the movement of people and goods that enhances the physical, economic, and social environment while being safe, efficient, and cost-effective.

Policy CIR-1.5 **County Level of Service Standards.** Implement a Countywide roadway system that achieves the following level-of-service (LOS) standards during peak traffic periods:

a) For roadways located within rural areas: LOS "C" or better.

b) For roadways located outside Urban Communities that serve as connectors between Urban Communities: LOS of "D" or better.

c) For roadways located within Urban Communities: LOS of "D" or better.

Goal CIR-3: Maintain a public transit system that provides an alternative to automobile travel, supports ridesharing, and meets the needs of the entire community.

Policy CIR-3.2 **Transit Improvements.** Continue to support transit efforts by the Merced County Association of Governments, Dial-A-Ride, UC Merced Transit, other public entities, private social service providers, and other various private charter services to improve and expand public transit throughout the County.

Goal CIR-4: Maintain and expand a safe, continuous, and easily accessible bicycle and pedestrian circulation system.

Policy CIR-4.1 **Bicycle and Pedestrian System**. Encourage a complete, safe, and interconnected bicycle and pedestrian circulation system that serves both commuter and recreational travel and provides access to major destinations within and between Urban Communities and cities. Prioritize Class I bicycle paths and separate trails between communities as part of the MCAG Regional Bikeway Plan. To the extent possible, use railroad and canal as right-of-way instead of streets to promote safety.

Merced Vision 2030 General Plan

The City's General Plan Circulation Element includes policies to ensure that adequate access is provided and maintained for all city land uses. Some of the relevant policies contained in the Merced Vision 2030 General Plan include:

Policy T-1.2 Coordinate circulation and transportation planning with pertinent regional, state, and federal agencies.

Policy T-1.6 Minimize adverse impacts on the environment from existing and proposed road systems.

Policy T-2.1 Provide for and Maintain a Major Transitway along "M" Street and Possibly along the Bellevue Road/Merced-Atwater Expressway and Campus Parkway corridors.

Policy T-2.3 Support a Safe and Effective Public Transit System.

Policy T-2.5 Provide Convenient Bicycle Support Facilities to Encourage Bicycle Use. Maintain and expand the community's existing bicycle circulation system.

Merced County Regional Commuter Bicycle Plan

The Merced County Regional Commuter Bicycle Plan, prepared by MCAG in October 2008, is intended to improve and enhance bicycle transportation in Merced County. Relevant goals from the plan include:

Goal 1 – Bicycle Safety: Provide a safe bicycle system as an alternative to vehicular travel. Establish and maintain routes that are designed to ensure safety. Establish a system that is secure for riders.

Objectives: Build and maintain street surfaces to avoid pavement conditions unsafe to bicyclists. As collision events and bicycle injuries/accidents are recorded, identify possible remedial improvements.

Goal 2 – Bicycle Education: Encourage bicycling through education. Provide literature and up-to-date bikeway maps for the public promoting safe bicycle use.

Objectives*:* Promote safe bicycle use to riders as well as car drivers. Cooperate with other agencies and groups to promote and educate the public regarding bicycle facilities in the plan area. Establish helmet programs that educate and encourage safe bicycle use. Support bicycle safety awareness through public information and education programs.

Goal 3 – Connectivity/ Accessibility*:* Accommodate bicycling as part of the County's multi-modal transportation system. Establish and maintain an integrated network of bicycle facilities to support bicycle commuting. Establish and maintain an integrated network of bicycle facilities to support recreational bicycling. Establish and maintain an integrated network that connects to other countries.

Objectives*:* Establish right-of-way requirements that accommodate the complete bikeway system, including sidewalks and multi-use paths throughout Merced County. Maintain a bicycle planning committee to oversee bicycle transportation planning and implementation projects for the purposeful movement of people and goods by the most efficient means available. Plan in coordination with the development of UC Merced. Promote bicycle routes to regional recreational and commuter destinations. Link trip origins and destinations with on-street bikeways designed to serve transportation and recreation purposes. Integrate bicycling into the transit system with bus mounted bicycle carriers. Establish nodes of connectivity to encourage tourism and commuting. Devise lane specifications for specific bicycle rider classifications. Include funding for regular facility expansion, maintenance, and repair, as well as funding to review development and zoning proposals for impact on bicycle mobility in the annual local operations and maintenance budgets. Maintain a local capital improvement plan that provides regular funding for the bicycle program to acquire right of way, to construct new facilities, to retrofit inadequate facilities and to refurbish older facilities.

Short Range Transit Plan

The Short Range Transit Plan, prepared by MCAG in June 2017, has the following purposes: evaluate current transit services; update system goals, objectives, and performance standards; describe future transit needs; and present a service plan and financial plan. The goals and objectives contained in the Plan are listed below.

- Provide increased mobility in Merced County
- Provide safe and high quality service
- Provide cost-effective and efficient service

Existing Local Agreements

UC Merced Chancellor Letter to Merced County, dated April 6, 2009

On April 6, 2009, UC Merced Chancellor sent a letter to the County (Kang Letter), summarizing the terms and conditions for certain future roadway improvements as part of campus development under the 2009 LRDP. The Kang Letter identifies specific improvements for which the University would fund its proportional share, based on specified triggering events related to impacts identified in the 2009 LRDP EIS/EIR that would have resulted from the build-out of the 2009 LRDP. In addition, the Kang Letter states "[t]he premise of the financial commitments to these specific roadway and intersection improvements is that it is in the mutual interest of the University, the City and the County that these adjacent infrastructure improvements are planned and funded as their need arises."

Merced County Roadway Repair Agreement, dated October 21, 2016

The University entered into a Roadway Repair Agreement with Merced County on October 21, 2016, relating to an encroachment permit issued to the University for temporary construction access connecting to Lake Road to accommodate construction of the UC Merced 2020 Project.

UC Merced Revised 2020 Project Transportation Improvement Funding Agreement

The University is subject to the *UC Merced Revised 2020 Project Transportation Improvement Funding Agreement* (Transportation Agreement), entered into by the University and the City of Merced in 2016. The Transportation Agreement provides that the University shall fully pay the cost of intersection improvements at Lake/Bellevue Road and Lake Road/Yosemite Avenue, when LOS D is reached, design is approved, and the notice to proceed with construction is issued. Improvements at both intersections include installation of a traffic signal. The University has completed its mitigation obligation for the Lake/Bellevue Road intersection and a traffic signal has been installed.

The Transportation Agreement also includes an obligation that the University pay for the University Community Properties' share of engineering and environmental analysis for the widening of Bellevue Road, subject to future reimbursement once that area develops. This obligation will be triggered when the average daily traffic (ADT) on Bellevue Road reaches 9,000 vehicles and the City comes forth with a Bellevue widening project.

With regard to Campus Parkway Phase I (SR 99 to E. Childs Avenue), the University agreed to and paid $750,000 in 2016. With regard to Campus Parkway Phase II (E. Childs Avenue to SR 140), the University committed to paying its proportionate share, less any grant funding. Construction of that segment of the roadway has been fully funded by the State.

Notwithstanding the above, the University will not be responsible for the payment of any other proportionate fees for transportation improvements that were included in the mitigation measures for the 2009 LRDP EIS/EIR, as those mitigation measures are superseded by the transportation mitigation measures in this SEIR. In addition, the Transportation Agreement does not address the University's obligations for additional transportation improvements that may be needed for development beyond the Revised 2020 Project.

4.8.4 Impacts and Mitigation Measures

Significance Criteria

This SEIR uses significance criteria derived from Appendix G of the *State CEQA Guidelines.* For the purposes of this SEIR, impacts related to transportation would be significant if implementation of the 2020 LRDP would result in any of the following: Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities. For the purposes of this SEIR, the following criteria are applied.

Roadway System

- Cause the deterioration of a signalized intersection from LOS D or better under baseline conditions to LOS E or LOS F under With Project conditions;

- Cause an increase in average delay of 5 or more seconds for a signalized intersection operating at LOS E or LOS F under baseline conditions;

- At all-way stop controlled intersections, cause deterioration of the intersection from LOS D or better to E or F; or, if the intersection is already operating at LOS E or F without the Project, add five or more seconds of delay;
- At side-street stop-controlled intersections, cause the worst approach to deteriorate from LOS D or better to E or F; or, if the worst approach is already operating at LOS E or F without the Project, add five or more seconds of delay to the worst approach;
- Increase the volume-to-capacity ratio by more than 0.01 on a freeway segment operating at LOS E (V/C=0.90) or worse;

Transit System

- Disrupt existing transit services or facilities, interfere with planned transit services or facilities, or conflict with adopted transit system plans.

Bicycle System

- Disrupt existing bicycle facilities, interfere with planned bicycle facilities, or conflict with adopted bicycle system plans.

Pedestrian System

- Disrupt existing pedestrian facilities, interfere with planned pedestrian facilities, or conflict with adopted pedestrian system plans.
- Conflict or be inconsistent with *State CEQA Guidelines* Section 15064.3, subdivision (b). For the purposes of this SEIR, this impact criteria is not assessed because the referenced *State CEQA Guidelines* section is not required to be implemented prior to July 1, 2020 and neither the City of Merced, Merced County, nor the University have developed standards or thresholds for VMT impact evaluation.
- Substantially increase hazards due to a geometric design feature (e.g. sharp curves or dangerous intersections) or incompatible uses.
- Result in inadequate emergency access.

Methodology

Baseline for Transportation Analysis

CEQA requires that the impacts of a project be evaluated relative to the conditions that exist at the time that CEQA review for the project is commenced, which is typically when the notice of preparation of the EIR is published. However, courts have held that a lead agency may elect to forego analyzing the project's impact against existing conditions in favor of a more appropriate future year condition, as long as the lead agency can demonstrate that an analysis based on existing conditions would be uninformative or misleading to the decision makers and the public (*Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* 2013). The 2020 LRDP is a long-range planning document which plans for the development of the campus between 2020 and 2030. The plan provides for the development of 1.83 million gross square feet of building space that would accommodate the projected growth in enrollment and employment. However, this space would not be built immediately upon approval of the LRDP. In fact, at this time, there are no specific projects that UC Merced plans to implement soon after the 2020 LRDP is approved. The building space would be developed over time, taking into account space needs, availability of funding, and other constraints. Further, there is no guarantee that all of the space would be built or the planned enrollment growth would occur. An analysis of the 2020 LRDP's transportation impacts relative to existing conditions in 2019 would not be meaningful and would in fact be misleading. Therefore, consistent with the guidance set forth by the *Smart Rail* ruling, the transportation impacts of the 2020 LRDP are analyzed by adding the project-related traffic to the background traffic that would exist in 2030, to determine the change in the traffic conditions due to the project.

Campus Development Phases

Traffic associated with three phases of campus development is estimated and evaluated in the analysis below.

- Campus development that is currently underway and is planned to be completed by 2020 is referred to below as the "2020 Project." Upon completion of the 2020 Project, although the campus will have facilities to accommodate an enrollment level of about 10,000 students, based on enrollment projections, about 9,700 students are projected to be enrolled at UC Merced by 2020.

- Campus development under the 2020 LRDP anticipated to occur between 2020 and 2030 is referred as the "LRDP Project." With the implementation of the 2020 LRDP, the campus will have facilities to accommodate an enrollment level of about 15,000 students.

- Campus development between 2030 and 2035 (year of cumulative impact analysis) is referred to as the "2035 Campus Scenario." For purposes of analysis of cumulative impacts, this SEIR assumes that by 2035, the campus will have facilities to accommodate an enrollment level of about 17,500 students.

Project Trip Generation

Trip generation for campus development through 2030 was estimated in the 2009 UC Merced LRDP/University Community EIS/EIR (2009 LRDP EIS/EIR) using trip generation rates from other campuses deemed similar to the future UC Merced, as well as ITE Trip Generation Manual rates. This is because at that time, the UC Merced campus was relatively small at only 2,500 students, and trip rates derived directly from traffic counts entering and leaving the campus were not thought to be sufficiently representative of the future campus' vehicle trip generating characteristics. A daily trip generation rate of

2.08 trips per student was used in the 2009 LRDP EIS/EIR, derived from comparable campus trip rates (UC Davis and UC Santa Cruz), and peak hour traffic was calculated with the MCAG's travel demand model.

In 2017, at almost 8,000 enrolled students, trip generation rates based on actual campus traffic counts are a more reliable predictor of future characteristics at 15,000 and 17,500 students. Therefore, trip generation rates were derived from peak period counts taken in November 2017 at the intersection of East Bellevue Road/Lake Road. These counts were adjusted to screen out trips to and from Lake Yosemite, using multi-day counts from March 2017 on Lake Road north of Bellevue Road, Ranchers Road, and Scholars Lane. The total campus trip generation was then split into estimated trips generated by commuter students, resident students, and by faculty/staff, using parking lot-specific counts to capture the rough proportion of trips generated by these three groups. The campus trip generation rates are shown below:

Commuter Student Trip Rates

- Daily: 1.57 trips per student (50 percent inbound, 50 percent outbound)
- AM Peak Hour: 0.14 trips per student (86 percent inbound, 14 percent outbound)
- PM Peak Hour: 0.15 trips per student (27 percent inbound, 73 percent outbound)

Resident Student Trip Rates

- Daily: 0.52 trips per student (50 percent inbound, 50 percent outbound)
- AM Peak Hour: 0.04 trips per student (12 percent inbound, 88 percent outbound)
- PM Peak Hour: 0.05 trips per student (72 percent inbound, 28 percent outbound)

Faculty/Staff Trip Generation Rates

- Daily: 2.42 trips per faculty/staff member (50 percent inbound, 50 percent outbound)
- AM Peak Hour: 0.21 trips per faculty/staff member (90 percent inbound, 10 percent outbound)
- PM Peak Hour: 0.23 trips per faculty/staff member (26 percent inbound, 74 percent outbound)

Table 4.8-5, 2020 Project Remaining Development Trip Generation Estimates, summarizes the daily and peak hour trips for the campus with an enrollment level of 9,700 students in 2020. **Table 4.8-6, LRDP Project (2030) Trip Generation Estimates**, presents the daily and peak hour trips for the LRDP project (growth from 9,700 students to 15,000 students). **Table 4.8-7, 2035 Campus Scenario Trip Generation Estimates**, presents the daily and peak hour trips for the projected campus growth from 2030 to 2035 (from 15,000 students to 17,500 students). Detailed trip generation calculations are provided in **Appendix 4.8**.

Table 4.8-5
2020 Project Remaining Development Trip Generation Estimates

Population	AM Peak Hour			PM Peak Hour			Daily
	In	Out	Total	In	Out	Total	
New Student Commuters	(31)	(4)	(36)	(11)	(28)	(39)	(395)[a]
New Student Residents	10	74	84	66	26	92	1,036
New Faculty/Staff	35	5	40	12	31	44	459
Total	14	74	89	67	30	97	1,101

Source Fehr & Peers August 2019.
Notes:
This table presents trip generation associated with student enrollment growth from 7,967 students to 9,700 students.
See the Technical Appendix for detailed trip generation calculations.
a. There are negative commuter trips in the 2020 Project trip generation because that portion of the development builds enough housing to serve some existing commuting students.

Table 4.8-6
LRDP Project (2030) Trip Generation Estimates

Population	AM Peak Hour			PM Peak Hour			Daily
	In	Out	Total	In	Out	Total	
New Student Commuters	358	51	409	127	320	447	4,540
New Student Residents	13	89	101	80	32	111	1,252
New Faculty/Staff	200	28	229	71	179	250	2,614
Total	571	168	739	277	531	808	8,406

Source Fehr & Peers August 2019.
Notes:
This table presents trip generation associated with student enrollment growth from 9,700 students to 15,000 students.
See the Technical Appendix for detailed trip generation calculations.

Table 4.8-7
2035 Campus Scenario Trip Generation Estimates

Population	AM Peak Hour			PM Peak Hour			Daily
	In	Out	Total	In	Out	Total	
New Student Commuters	161	23	183	57	144	200	2,035
New Student Residents	6	44	51	40	16	56	626
New Faculty/Staff	104	15	119	37	93	130	1,364
Total	271	82	353	134	253	387	4,025

Source Fehr & Peers August 2019.
Notes:
This table presents trip generation associated with student enrollment growth from 15,000 students to 17,500 students.
See the Technical Appendix for detailed trip generation calculations.

It is noted that, based on the counts at the intersection of Lake Road and East Bellevue Road, the campus traffic peak hours are slightly different than the citywide traffic peak hours as seen in the study area intersection counts: the campus peak hours are 8:00 – 9:00 AM and 4:45 – 5:45 PM, whereas the citywide peak hours are generally 7:45 – 8:45 AM and 4:30 – 5:30 PM. However, for purposes of the intersection impact analysis, the campus peak hour trip generation is overlaid on the citywide peak hour traffic volumes to ensure a conservative analysis.

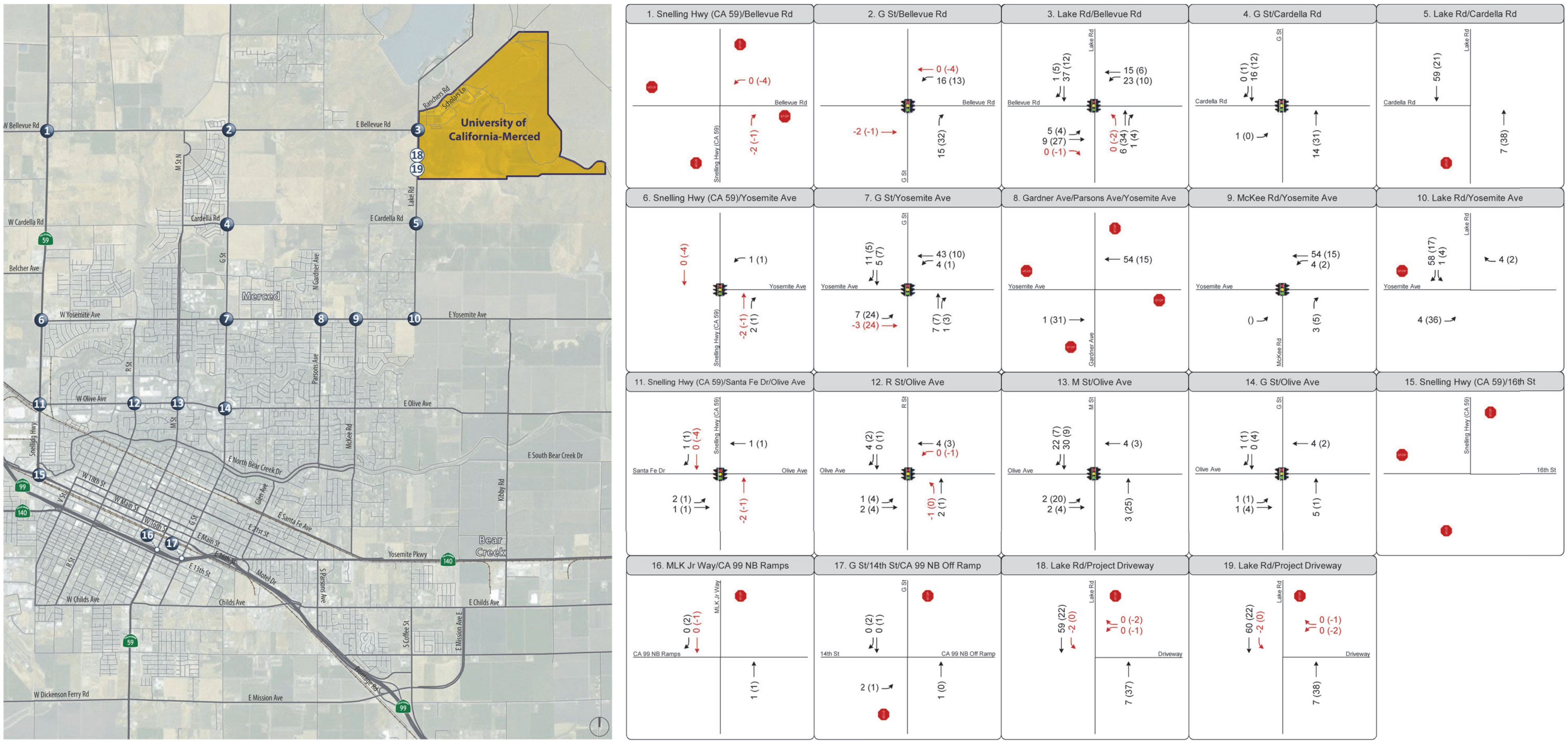
Trip Distribution and Assignment

The trip distribution for the LRDP Project and the 2035 Campus Scenario is based on a GIS analysis of the locations of student and staff residences within Merced and the greater region, provided by UC Merced staff. The estimated student and staff trips were distributed to/from the various residence locations, using a Vistro trip assignment model. Trips were distributed 30 percent to Bellevue Road and 70 percent to Lake Road for both inbound and outbound trips, based on the expected use of the two roadways given residence patterns, the relative congestion on the two roadways in the vicinity of the campus, and the two additional access points on Lake Road south of Bellevue Road which are planned under the 2020 LRDP (one of which will be completed as part of the 2020 Project). Trips were further distributed to various zones within the City and in other areas outside the City, based on the residence data. The residential data is provided in **Appendix 4.8**.

Trips were assigned to the four campus access points based on the traffic consultant's best estimate of the relative parking accessibility via each access point under the LRDP Project (note that parking distribution under the 2020 LRDP has not been defined):

- Ranchers Road/Scholars Lane: 50 percent of residential trips, 50 percent of commuter trips using East Bellevue Road, 25 percent of commuter trips using Lake Road
- East Bellevue Road Extension: 50 percent of residential trips, 50 percent of commuter trips using East Bellevue Road, 25 percent of commuter trips using Lake Road
- Driveway #1 (intersection 18): 25 percent of commuters using Lake Road
- Driveway #2 (intersection 19): 25 percent of commuters using Lake Road

The resulting vehicle trips generated by the 2020 Project are shown in **Figure 4.8-4, 2020 Project Trip Assignment**, and the vehicle trips generated by the LRDP Project (post-2020 Project growth to 15,000 students) are shown in **Figure 4.8-5, LRDP Project (2020-2030 Growth) Trip Assignment**. The vehicle trips generated by the projected additional growth to 17,500 students by the year 2035 are shown in **Figure 4.8-6, 2035 Campus Project (2030-2035 Growth) Trip Assignment**.



Note: This figure shows the trips associated with completion of the 2020 Project, with growth from 7.967 enrolled students to 9,700 enrolled students.

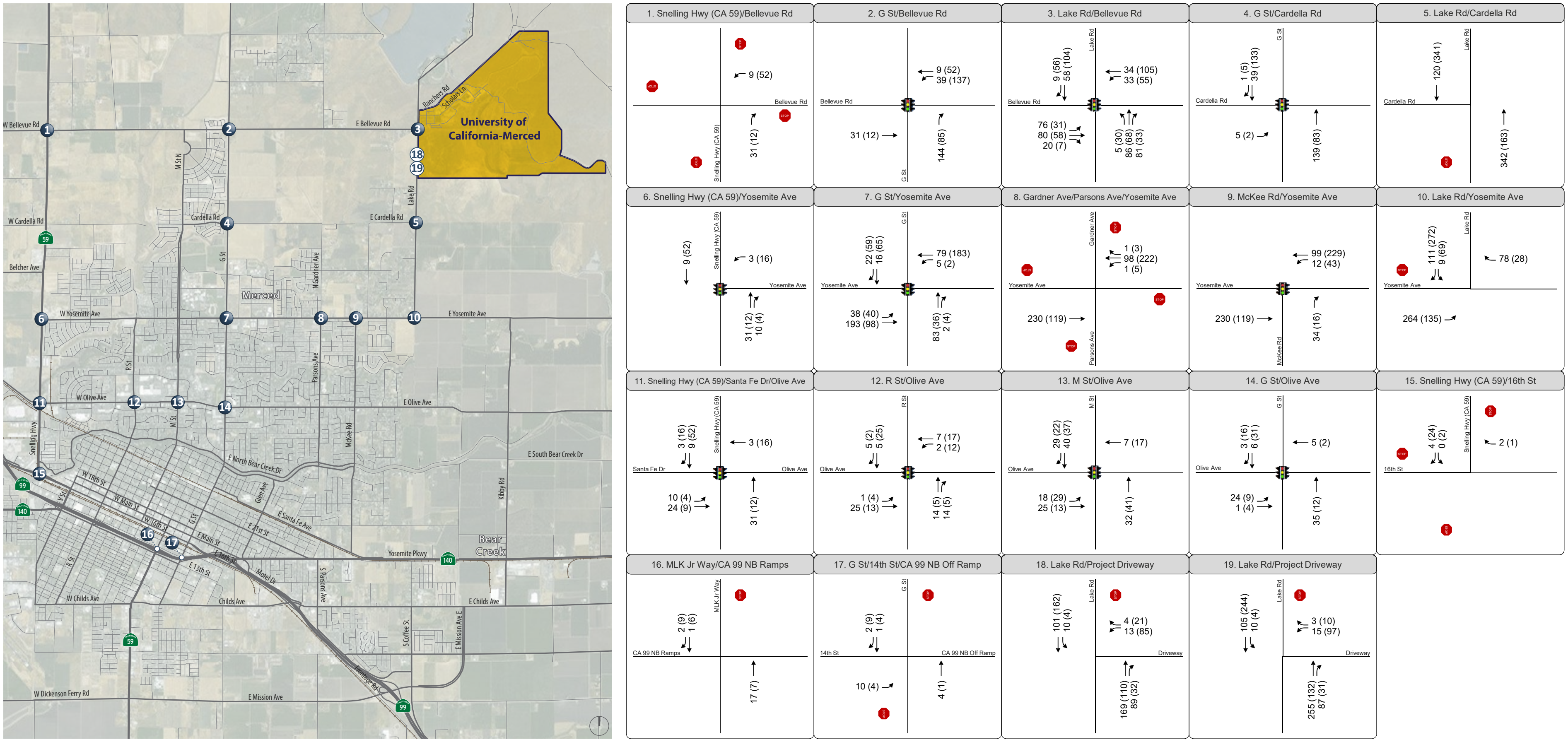
XX (YY) AM (PM) Peak Hour Traffic Volumes   Signalized Intersection   Stop Sign

Project Site   Study Intersection

SOURCE: Fehr & Peers, 2019

FIGURE **4.8-4**

2020 Project Trip Assignment



Note: This figure shows the trips associated with growth from 9,700 students (at completion of the 2020 Project) to 15,000 students.

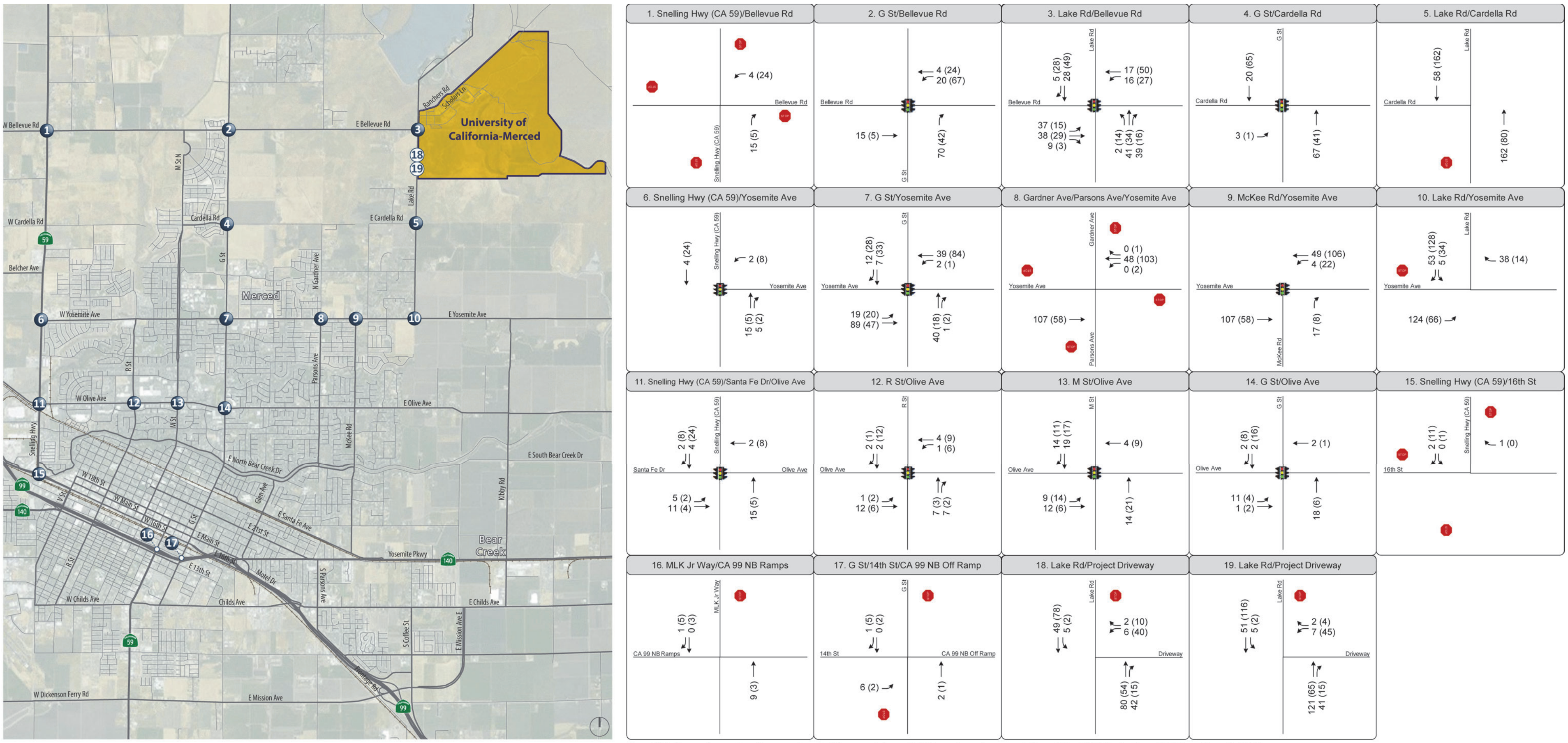
XX (YY) AM (PM) Peak Hour Traffic Volumes — Signalized Intersection — Stop Sign

Project Site — Study Intersection

SOURCE: Fehr & Peers, 2019

FIGURE **4.8-5**

LRDP Project (2020-2030 Growth) Trip Assignment



Note: This figure shows the trips associated with growth from 15,000 students (at completion of the LRDP Project) to 17,500 students in 2035.

XX (YY) AM (PM) Peak Hour Traffic Volumes | Signalized Intersection | Stop Sign

Project Site | Study Intersection

SOURCE: Fehr & Peers, 2019

FIGURE **4.8-6**

2035 Campus Project (2030-2035 Growth) Trip Assignment

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4.8.5 LRDP Impacts and Mitigation Measures

LRDP Impact TRANS-1: Implementation of the 2020 LRDP would significantly affect study area intersections during peak commute hours under 2030 plus project conditions. ***(Significant; Significant and Unavoidable)***

Campus development through 2020 is currently underway under the 2020 Project which will develop adequate additional facilities to accommodate an enrollment level of 9,700 students. The proposed 2020 LRDP is designed to guide the development of the campus between 2020 and 2030, so that by 2030, the campus can accommodate an enrollment level of 15,000 students. Further, the 2020 LRDP is a plan to guide campus development, and not a development project. Assuming that campus enrollment increases as currently projected, the full effects of the 2020 LRDP would be experienced by 2030 when campus enrollment increases to 15,000 students. Therefore, the transportation impacts of the 2020 LRDP on the study area intersection operations are evaluated under 2030 conditions below.

Background Traffic Growth from Approved and Anticipated Development

As a first step, growth in background traffic from existing conditions through cumulative year 2035 was estimated. The City of Merced and Merced County provided a list of approved and planned projects expected to be constructed by 2035. A list of these projects is provided in **Table 4.0-1**. Vehicle trip generation for the approved and anticipated development was estimated using average trip generation rates and trip generation equations for the proposed land uses from ITE's Trip Generation (9th Edition), and, where available, the transportation impact assessments prepared for specific developments. The total trip generation of the approved and anticipated development through the year 2035 is estimated at 3,860 AM peak hour trips and 7,053 PM peak hour trips. To estimate the total trip generation in the year 2030, a straight-line assumption was used between the year 2017 (when the existing conditions counts were taken) and 2035 (when all development would be constructed). Thus, the total trip generation for approved and anticipated development in 2030 is estimated at 2,730 AM peak hour trips and 4,980 PM peak hour trips.

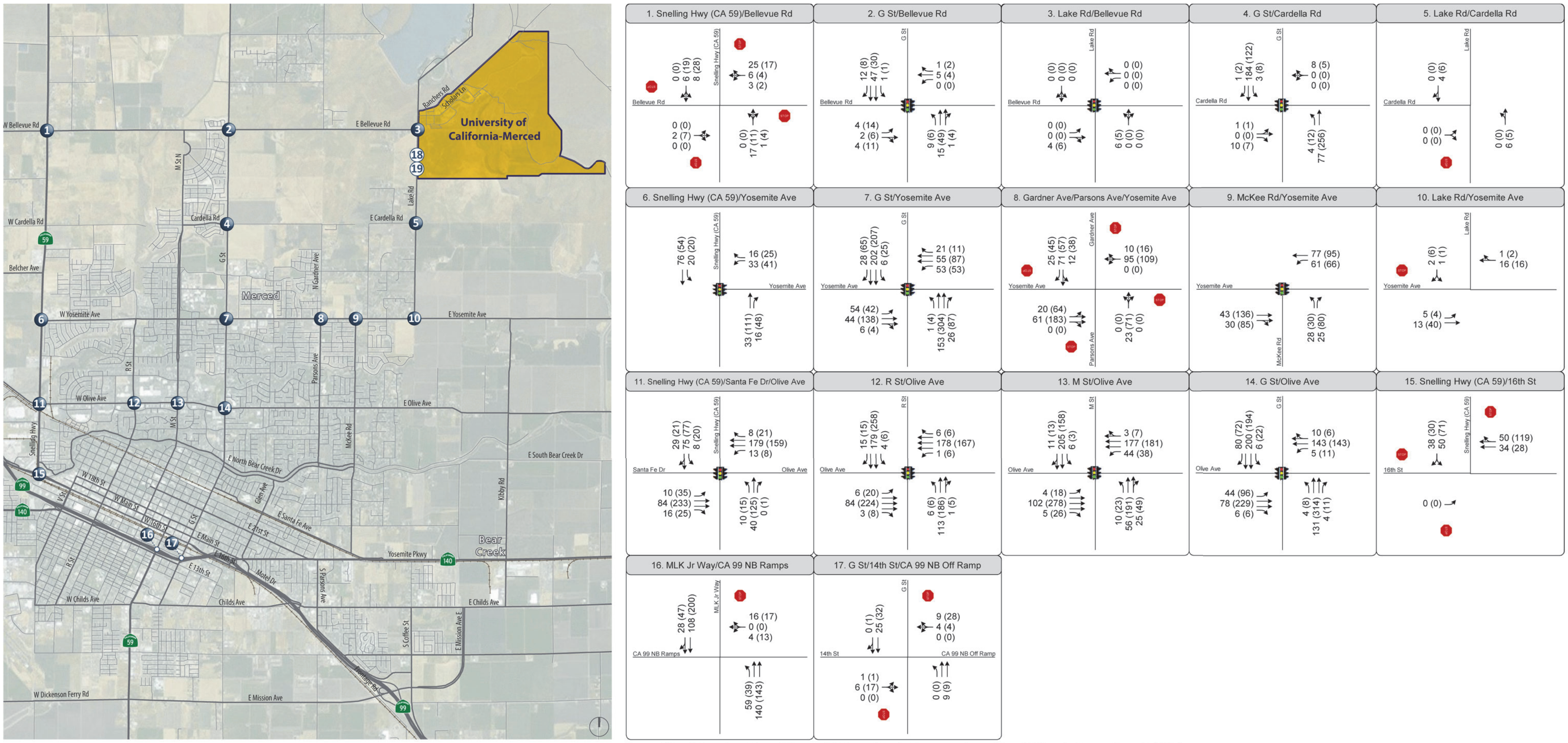
Traffic generated by the approved and anticipated development through the year 2030 was assigned to the roadway network based on trip distribution information derived from the MCAG Travel Demand Model. Specifically, several 'select zone' runs were used to determine the general distribution of traffic from residential and commercial traffic analysis zones; these distribution patterns were then manually applied to the approved/anticipated development traffic, using the manual traffic assignment software Vistro. The estimated peak hour intersection turning movements resulting from approved and anticipated development to 2030 are shown in **Figure 4.8-7, Year 2030 Approved/Anticipated Development Trip Assignment**.

It is important to note that the trip generation and assignment process in this analysis is conservative for the following reason: it is expected that some of the new trips from housing development in the City will be made by new Campus commuters. This analysis does not take a credit for this fact, but instead assigns all new development trips to the network along with all LRDP Project (campus) trips. This essentially leads to some trips being double counted. The extent of the double counting is difficult to estimate. It should therefore simply be noted that the analysis is clearly conservative.

2030 Roadway Network

In addition to the signalization of East Bellevue Road/Lake Road which was completed in 2018, the 2030 roadway network includes the completion of Campus Parkway from its current terminus at East Childs Avenue north to East Yosemite Avenue. The construction of the segment to SR 140 ("Segment 2") has commenced, and the segment from SR 140 to Yosemite Avenue ("Segment 3") is in the construction bidding process. It is not anticipated that Campus Parkway would extend north of Yosemite Avenue by 2030 or 2035, the years of analysis used in this SEIR. It should be noted that Merced County 2018 RTP/SCS Tier I Project List includes only Segments 2 and 3 of the Campus Parkway and does not include the segment north of Yosemite Avenue (MCAG 2018). The analysis is based on the assumption that Lake Road will continue to be a through road up to Bellevue Road and to Lake Yosemite Regional Park and would continue to be used to access the campus from the south.

Based on the estimated campus trip distribution and assignment, which in turn is based on a GIS analysis of the locations of student and staff residences within Merced and the greater region, relative few campus trips are expected to use Campus Parkway – generally fewer than 50 peak hour/peak direction trips. Most of these trips would be through trips at the intersections along Campus Parkway connecting to SR 99, which generally affect intersection capacity to a lesser degree than turning movements. The forecasted intersection operations with completion of Campus Parkway up to East Yosemite Avenue were projected to be LOS D or better in the *Merced Campus Parkway FEIR* (2005). Due to the low number of campus trips expected to use Campus Parkway, and the projected acceptable operations for the major intersections along Campus Parkway, intersections along Campus Parkway were not selected for analysis in this document.



Source: City of Merced and Merced County. 2030 growth projections were derived from 2035 projections, using a straight-line assumption, by Fehr & Peers.

XX (YY) AM (PM) Peak Hour Traffic Volumes | Signalized Intersection | Stop Sign

Project Site | Study Intersection

SOURCE: Fehr & Peers, 2019

FIGURE **4.8-7**

Year 2030 Approved/Anticipated Development Trip Assignment

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For the 2030 With Project case, two new access intersections are assumed on Lake Road, approximately 750 feet and 1,500 feet south of the Bellevue Road intersection, respectively, consistent with the LRDP circulation diagram. At both of these intersections, it was assumed that a 300-foot long southbound left-turn pocket lane would be provided, and that separate left-turn and right-turn lanes would be provided on the westbound approach.

2030 No Project and With LRDP Project Traffic Volumes

Figure 4.8-8, Year 2030 No Project Traffic Volumes, Lane Configurations and Traffic Controls, shows the 2030 No Project traffic volumes, which result from adding the volumes from approved/anticipated development to existing traffic volumes. **Figure 4.8-9, Year 2030 With LRDP Project Traffic Volumes, Lane Configurations and Traffic Controls**, shows the 2030 With LRDP Project traffic volumes, which result from adding 2020 Project volumes and LRDP Project volumes to Year 2030 No Project volumes.

2030 Intersection Levels of Service

Peak hour intersection operations for the 2030 with LRDP Project scenario are shown in **Table 4.8-8 Intersection Levels of Service – 2030 No Project and 2030 with LRDP Project.** The following intersections are projected to operate deficiently in at least one peak hour:

- Intersection #1: West Bellevue Road/Highway 59
- Intersection #2: Bellevue Road/G Street
- Intersection #3: East Bellevue Road/Lake Road
- Intersection #7: G Street/Yosemite Avenue
- Intersection #8: East Yosemite Avenue/Parsons Avenue/North Gardner Avenue
- Intersection #10: East Yosemite Avenue/Lake Road
- Intersection #13: West Olive Avenue/M Street
- Intersection #14: Olive/G Street
- Intersection #15: West 16th Street/Highway 59

At intersections #8, #15 and #16, the peak hour signal warrants are met under 2030 No Project conditions in one or both peak hours and would continue to be met under 2030 With LRDP Project conditions. At intersection #10, the addition of LRDP Project traffic causes the peak hour signal warrant to be met in both peak hours.

Table 4.8-8
Intersection Levels of Service - 2030 No Project and 2030 with LRDP Project

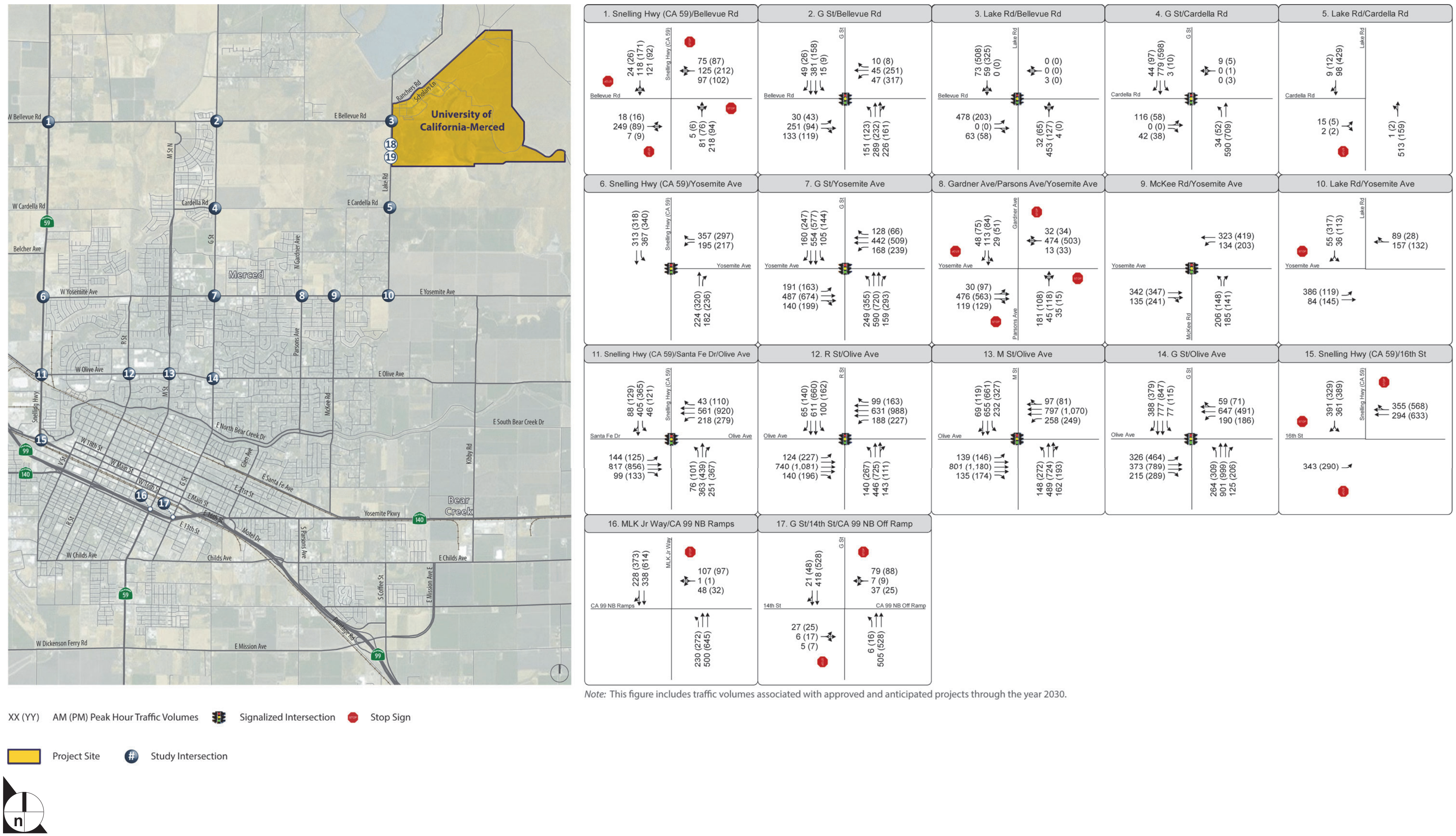
Intersection	Traffic Control	Peak Hour[1,2]	2030 No Project Conditions[3]		2030 with LRDP Project Conditions[3]	
			Delay (Seconds)	LOS	Delay (Seconds)	LOS
1. West Bellevue Road/Highway 59	AWS	AM PM	**77.6** 14.2	**F** B	**83.4** 16.4	**F** C
2. Bellevue Road/G Street	Signal	AM PM	40.7 22.0	D C	**60.8** 26.8	**E** C
3. East Bellevue Road/Lake Road	Signal	AM PM	10.9 9.4	B A	37.5 **>120**	D **F**
4. Cardella Road/G Street	Signal	AM PM	21.1 7.4	C A	30.5 7.9	C A
5. East Cardella Road/Lake Road	SSS	AM PM	0.4 (13.5) 0.2 (12.6)	A (B) A (B)	0.4 (24.9) 0.2 (21.2)	A (C) A (C)
6. West Yosemite Avenue/Highway 59	Signal	AM PM	16.2 13.8	B B	17.3 14.2	B B
7. Yosemite Avenue/G Street	Signal	AM PM	36.7 48.7	D D	41.9 **56.6**	D **E**
8. East Yosemite Avenue/Parsons Avenue/North Gardner Avenue	AWS	AM PM	**71.9** **75.5**	**F** **F**	**>120** **>120**	**F** **F**
9. East Yosemite Avenue/McKee Road	Signal	AM PM	10.3 10.7	B B	11.4 12.8	B B
10. East Yosemite Avenue/Lake Road	SSS	AM PM	6.3 (17.1) 10.3 (18.4)	A (C) B (C)	34 **(>120)** **>120(>120)**	**D (F)** **F (F)**
11. West Olive Avenue/ Highway 59	Signal	AM PM	48.3 50.5	D D	49.5 51.1	D D
12. West Olive Avenue/R Street	Signal	AM PM	47.5 **61.3**	D **E**	47.6 **62.2**	D **E**
13. West Olive Avenue/M Street	Signal	AM PM	50.9 **63.0**	D **E**	53.9 **68.0**	D **E**
14. Olive Avenue/G Street	Signal	AM PM	**61.2** **67.9**	**E** **E**	**66.7** **71.9**	**E** **E**
15. West 16th Street/Highway 59	AWS	AM PM	**108.0** **>120**	**F** **F**	**109.9** **>120**	**F** **F**
16. SR 99 Northbound Ramps/MLK Jr. Way	SSS	AM PM	5.1 (32.5) 6.1 **(68.2)**	A (D) A **(F)**	5.2 (34.4) 6.3 **(73.0)**	A (D) A **(F)**
17. SR 99 Northbound Off-Ramp/West 14th Street/G Street	SSS	AM PM	2.7 (21.7) 3.0 (30.6)	A (C) A (D)	3 (23.4) 3.2 (32.6)	A (C) A (D)
18. Lake Road/Project Driveway #1	SSS	AM PM	--	--	0.4 (17.6) 2.6 (11.4)	A (C) A (B)
19. Lake Road/Project Driveway #2	SSS	AM PM	-	--	0.4 (24.5) 2.4 (13.1)	A (C) A (B)

Source: Fehr & Peers August 2019.

1 *Signal = signalized intersection; AWS=all-way stop; SSS=side street stop.*

2 *For side-street stop-controlled intersections, two service levels are listed: Average intersection LOS (LOS for worst side-street movement).*

3 ***Bold** indicates below-standard service level. Shaded indicates a significant impact.*

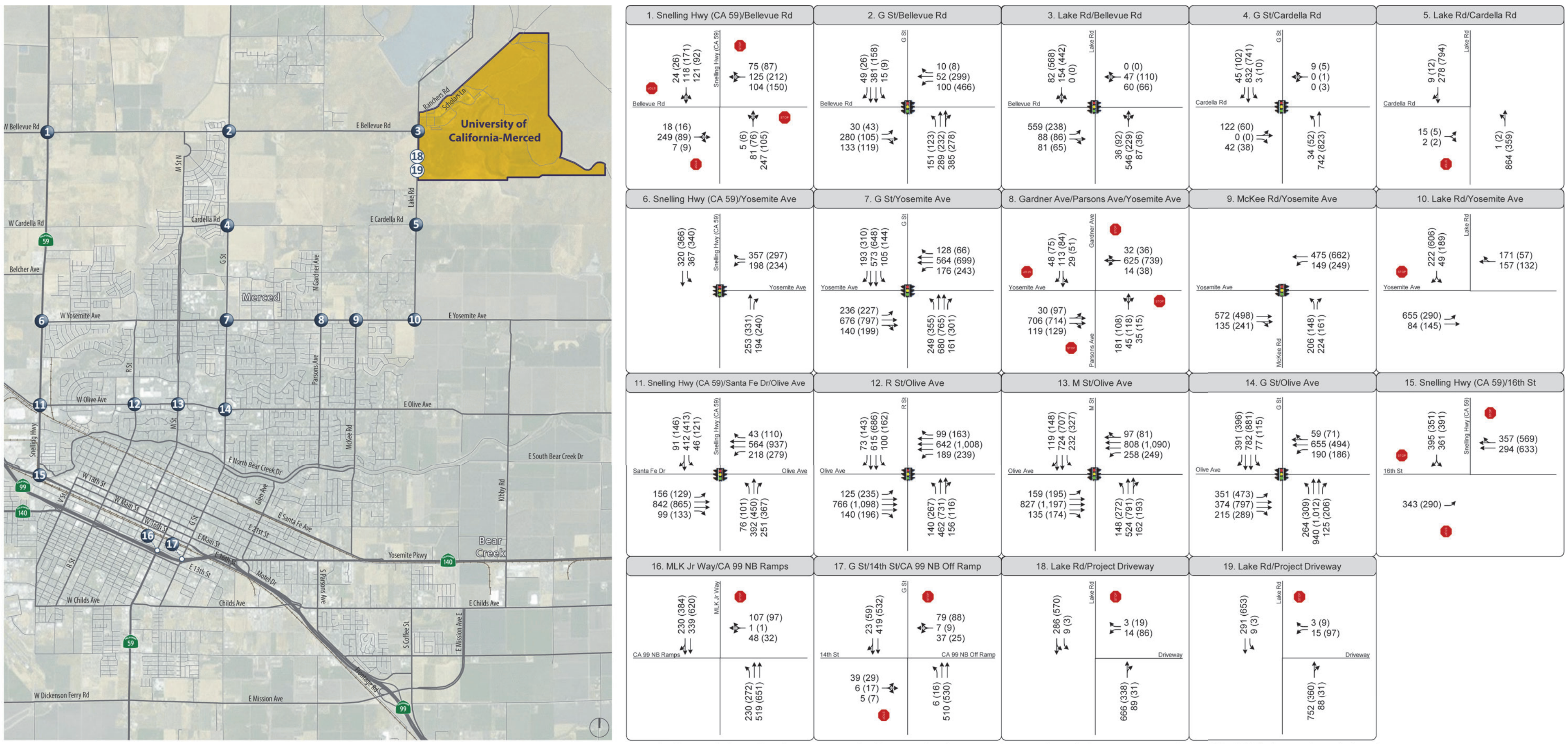


Note: This figure includes traffic volumes associated with approved and anticipated projects through the year 2030.

SOURCE: Fehr & Peers, 2019

FIGURE **4.8-8**

Year 2030 No Project Traffic Volumes, Lane Configurations and Traffic Controls



Note: This figure includes traffic volumes associated with approved and anticipated projects through the year 2030, completion of the 2020 Project, and completion of the LRDP Project (additional campus growth to 15,000 students).

XX (YY) AM (PM) Peak Hour Traffic Volumes — Signalized Intersection — Stop Sign

Project Site — # Study Intersection — (#) With Project Study Intersection

SOURCE: Fehr & Peers, 2019

FIGURE **4.8-9**

Year 2030 With LRDP Project Traffic Volumes, Lane Configurations and Traffic Controls

Based on the significance thresholds presented above in **Section 4.8.4**, the following nine intersections would be significantly affected by the traffic added by the project:

- **Intersection #1, West Bellevue Road/Highway 59.** As shown in **Table 4.8-8**, the intersection of West Bellevue Road and Highway 59 would operate at LOS F without the proposed project during the AM peak hour and the addition of project traffic would add more than five seconds to the intersection delay.
- **Intersection #2, Bellevue Road/G Street.** As shown in **Table 4.8-8**, the addition of traffic from the proposed project would cause the operation of the intersection of Bellevue Road/G Street to deteriorate from LOS D in the AM peak hour to LOS E.
- **Intersection #3, East Bellevue Road/Lake Road.** As shown in **Table 4.8-8**, the addition of traffic from the proposed project would cause the operation of the intersection of East Bellevue Road/Lake Road to deteriorate from LOS A in the PM peak hour to LOS F.
- **Intersection #7, Yosemite Avenue/G Street.** As shown in **Table 4.8-8**, the addition of traffic from the proposed project would cause the operation of the intersection of Yosemite Avenue/G Street to deteriorate from LOS D in the PM peak hour to LOS E.
- **Intersection #8, East Yosemite Avenue/Parsons Avenue/North Gardner Avenue.** As shown in **Table 4.8-8**, the intersection of East Yosemite Avenue/Parsons Avenue/North Gardner Avenue would operate at LOS F without the proposed project during the AM and PM peak hours and the addition of project traffic would add more than five seconds to the intersection delay.
- **Intersection #10, East Yosemite Avenue/Lake Road**. As shown in **Table 4.8-8**, the addition of traffic from the proposed project would cause the worst approach to fall from LOS C to LOS F at the intersection of East Yosemite Avenue/Lake Road during the AM and PM peak hours.
- **Intersection #13, West Olive Avenue/M Street**. As shown in **Table 4.8-8**, the intersection of West Olive Avenue/M Street would operate at LOS E without the proposed project during the PM peak hour and the addition of project traffic would add more than five seconds to the intersection delay.
- **Intersection #14, G Street/Olive Avenue**. As shown in **Table 4.8-8**, the intersection of G Street/Olive Avenue would operate at LOS E without the proposed project during the AM peak hour and the addition of project traffic would add more than five seconds to the intersection delay.
- **Intersection #15, West 16th Street/Highway 59**. As shown in **Table 4.8-8**, the intersection of West 16th Street/Highway 59 would operate at LOS F without the proposed project during the PM peak hour and the addition of project traffic would add more than five seconds to the intersection delay.

Physical improvements can be made to all affected intersections to address the impact of 2030 traffic, including the traffic due to the LRDP Project. **Table 4.8-9, Affected Intersections and Recommended Capacity Improvements,** below presents the recommended improvements for each of the affected intersections. Based on a review of aerial photographs of the affected intersections, there are no existing structures or obstructions in the areas of the recommended improvements. Therefore, these improvements are considered feasible.

Table 4.8-9
Affected Intersections and Recommended Capacity Improvements (2030 Conditions)

Intersection	Delay (seconds)	LOS before Mitigation	Recommended Improvement	Fair Share of Improvement	Delay (seconds)	LOS after Mitigation
Intersection #1, West Bellevue Road/ Highway 59	**83.4** 16.4	**F** C	Add a northbound right turn pocket lane	33%	24.5 12.5	C B
Intersection #2, Bellevue Road/ G Street	**60.8** 26.8	**E** C	Add an eastbound right turn pocket lane	58%	36.1 22.5	D C
Intersection #3, East Bellevue Road/ Lake Road	44.7 **>120**	D **F**	Add northbound and southbound right turn pocket lanes	72%	33.5 15.0	C B
Intersection #7, Yosemite Avenue/ G Street	41.9 **56.6**	D **E**	Remove westbound right turn pocket lane and add westbound left turn pocket lane	29%	40.4 48.3	D D
Intersection #8, East Yosemite Avenue/ Parsons Avenue/ North Gardner Avenue	**>120** **>120**	**F** **F**	Install a signal and widen the westbound approach to provide one left/through lane and one through/right lane	43%	9.2 7.7	A A
Intersection #10, East Yosemite Avenue/ Lake Road	34 **(>120)** **>120(>120)**	D **(F)** **F (F)**	Install a signal, widen the southbound approach to provide separate left turn and right turn lanes, add a second eastbound left turn lane, and widen the northbound departure to provide two acceptance lanes	73%	14.0 11.2	B B
Intersection #13, West Olive Avenue/ M Street	53.9 **68.0**	D **E**	Construct a second southbound left turn lane	12%	49.4 59.5	D E
Intersection #14, G Street/Olive Avenue	**66.7** **71.9**	**E** **E**	Add an overlap phase for the southbound right turn	9%	63.0 68.2	E E
Intersection #15, West 16th Street/ Highway 59	**109.9** **151.1**	**F** **F**	Modify the geometry of the southbound right turn lane to provide a full 200 feet of storage, such that the southbound right turn queues do not interfere with vehicles in the left turn lane	8%	39.2 121.6	E F

Source: Fehr & Peers August 2019.
***Bold** indicates below-standard service level. Shaded indicates a significant impact.*

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they would not cause the campus population to increase and thereby result in increased traffic, and their effect on intersection operations would be less than significant. To the extent a small project would add employees to the campus, those new employees are accounted for in the trip generation analyzed above, and the effect would be mitigated as discussed below.

LRDP Mitigation Measure TRANS-1 is set forth below to mitigate the impact of the LRDP Project on the study area intersections. Because the impacts identified above are the result of cumulative traffic growth along with project traffic, the University will minimize its traffic growth to the extent feasible by further expanding its TDM program (for the existing TDM program, see **Section 4.3.3.5**); monitoring the campus traffic increase; and making a fair-share contribution to the cost of the identified improvements, based on its proportion of traffic growth at each intersection in the year 2030. As noted above, the University is subject to the *UC Merced Revised 2020 Project Transportation Improvement Funding Agreement*, established between the University and the City of Merced in 2016.

Mitigation Measures:

LRDP MM TRANS-1: **Campus Traffic Mitigation Program (CTMP).** The Campus Traffic Mitigation Program (CTMP) is a program to monitor trip generation, reduce peak-hour trips, and participate in roadway improvements to mitigate impacts at off-campus intersections, and adjacent roadway segments in the case of Lake Road, determined to be affected by the development of the campus under the 2020 LRDP. CEQA provides that an agency can mitigate its contribution to local and regional environmental impacts by contributing its proportional share of funding to mitigation measures designed to alleviate the identified impact (*State CEQA Guidelines* §15130(a)(3)).

The CTMP will consist of the following elements/measures:

Measure TRANS-1a: Travel Demand Management. To reduce on- and off-campus vehicle trips and resulting impacts, the University will continue to implement and expand a range of Transportation Demand Management (TDM) strategies. TDM strategies will include measures to encourage transit and shuttle use and alternative transportation modes including bicycle transportation, implement parking polices that reduce demand, and implement other mechanisms that reduce vehicle trips to and from the campus. The University shall monitor the performance of campus TDM strategies through annual surveys.

Measure TRANS-1b: Transit Enhancement. To enhance transit systems serving the campus, the University will work cooperatively with the City of Merced, County of Merced, CatTracks, The Bus, Yosemite Area

Regional Transportation System (YARTS), and other local agencies to coordinate service routes with existing and proposed shuttle and transit programs.

Measure TRANS-1c: Sustainability and Monitoring. The University will review individual projects proposed under the 2020 LRDP for consistency with UC Sustainable Practices Policy and UC Merced TDM strategies set forth in the 2020 LRDP to ensure that bicycle and pedestrian improvements, alternative fuel infrastructure, transit stops, and other project features that promote alternative transportation are incorporated in the project.

Measure TRANS-1d: Campus Traffic Impact Monitoring. The University will monitor trip generation resulting from the campus development under the 2020 LRDP to track the actual trip generation relative to the projections in this SEIR. The University will conduct traffic cordon counts of the campus with each 2,000-person increase in student population, measured by three-term average headcount enrollment increases with 2019 – 2020 as the base academic year. If this monitoring determines that traffic attributable to the campus contributes to a significant traffic impact at any of the intersections listed in **Table 4.8-9,** the University will implement measures to reduce vehicle trips contributing to the impact or provide its proportional share of funding for improvements at the impacted intersections presented in **Table 4.8-9**.

Measure TRANS-1e: Proportional Share Determination. At the time a significant impact is identified pursuant to the monitoring under Measure TRANS-1d, the University's actual percent contribution to the total traffic volume at pertinent intersections and roadway segments will be calculated and used as the basis for determining the University's mitigation obligation, or proportional share of funding for the traffic improvements listed in the table.

Measure TRANS-1f: Mitigation Payments. The amount of the University's mitigation funding will be based on the University's proportional share of the affected jurisdiction's actual cost of the relevant traffic improvement(s) at the time of final bid/contract documents. The amount will be calculated by applying the University's proportional share determined in Measure TRANS-1e to the total cost of the improvement. Funding will be internally committed by the University at the time the traffic impact is triggered pursuant to the results of monitoring under Measure TRANS-1d. Payments will be made to the appropriate jurisdiction at the time a Notice to Proceed with the construction of the improvements is issued. If improvements are constructed before the impact is triggered, the University will pay its proportional share at the time that the impact is triggered, based on the University's monitoring under Measure TRANS-1d. Mitigation payments will be made only after the University has been provided the opportunity to review the scope and budget of the improvement project. As Intersection #3, Lake/Bellevue Road intersection, directly serves the campus, the University will be responsible for the entire cost of improvements at this intersection.

Significance after Mitigation: With the improvements listed in **Table 4.8-9** above, all impacts to affected intersections would be reduced to a less than significant level. However, because the implementation of the improvements depends on funding from other sources and implementation by the responsible agencies (the City of Merced, Merced County, and/or Caltrans), the impacts would remain significant and unavoidable with mitigation.

LRDP Impact TRANS-2: Implementation of the 2020 LRDP would not significantly impact study area freeway segments under 2030 plus project conditions. *(Less than Significant)*

Traffic impacts on study area freeway segments were evaluated under 2030 No Project and 2030 with LRDP Project conditions for the weekday AM and PM peak hours using the methodology described above. Project trips were manually added to the 2030 freeway segment volumes. The results are summarized in **Table 4.8-10, Freeway Operations - 2030 No Project and 2030 with LRDP Project Conditions**.

Table 4.8-10
Freeway Operations - 2030 No Project and 2030 with LRDP Project Conditions

Location	Direction	Peak Hour	2030 No Project Conditions V/C Ratio	2030 with LRDP Project Conditions V/C Ratio
1. SR 99 North of 16th Street	NB	AM PM	0.59 0.68	0.59 0.70
	SB	AM PM	0.54 0.72	0.55 0.72
2. SR 99 North of SR 140	NB	AM PM	0.54 0.65	0.54 0.66
	SB	AM PM	0.54 0.72	0.55 0.72
3. SR 99 North of MLK	NB	AM PM	0.55 0.66	0.55 0.67
	SB	AM PM	0.56 0.73	0.57 0.73
4. SR 99 South of MLK	NB	AM PM	0.55 0.65	0.55 0.66
	SB	AM PM	0.54 0.67	0.55 0.67
5. SR 99 South of G Street	NB	AM PM	0.55 0.66	0.55 0.67
	SB	AM PM	0.56 0.69	0.56 0.69
6. SR 99 South of Mission Street	NB	AM PM	0.53 0.64	0.53 0.64
	SB	AM PM	0.40 0.56	0.40 0.56

Source Fehr & Peers August 2019.

Under 2030 No Project conditions, all freeway segments are projected to operate with a V/C ratio of 0.59 or lower in the AM peak hour, and 0.73 or lower in the PM peak hour. Under 2030 with LRDP Project conditions, the V/C ratio increases on some freeway segments in the AM and PM peak hours with the addition of project traffic. However, all freeway segments are projected to operate with a V/C ratio of 0.59 or lower in the AM peak hour, and 0.73 or lower in the PM peak hour. For these reasons, there would be excess freeway capacity, and drivers under typical conditions would not experience substantial delays. All segments would operate at better than LOS E (V/C = 0.90), so no significant freeway impacts would occur. This impact is considered less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they would not cause the campus population to increase and thereby result in increased traffic, and their effect on freeway operations would be less than significant. To the extent a small project would add employees to the campus, those new employees are accounted for in the trip generation analyzed above, and as the analysis shows, the effect on freeway operations would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact TRANS-3: Implementation of the 2020 LRDP would not significantly impact transit facilities. ***(Less than Significant)***

The 2020 LRDP does not propose any changes to transit service or infrastructure provided by non-University operators. UC Merced will continue to make improvements to CatTracks to serve the enrolled students, faculty and staff and will continue to work with transit providers to coordinate service with the campus-provided service. Therefore, the project's impact on transit facilities would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact TRANS-4: Implementation of the 2020 LRDP would not significantly impact pedestrian and bicycle facilities. ***(Less than Significant)***

The 2020 LRDP does not propose any infrastructure changes outside the campus and, thus, would not disrupt existing facilities, interfere with existing or planned pedestrian and bicycle facilities, nor conflict with adopted plans. The 2020 LRDP includes a new entrance into the campus off Lake Road and incorporates another new entrance off Lake Road that was constructed as part of the 2020 Project. The entrance constructed as part of the 2020 Project does not interfere with the off-street multi-use path that runs along the east side of Lake Road. The second new entrance will also be appropriate designed to avoid any impact on the off-street multi-use path. The project's impact on pedestrian and bicycle facilities would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact TRANS-5: The campus road network system would be adequately sized and designed to facilitate emergency access vehicles. ***(Less than Significant)***

The transportation facilities, including connections to the off-campus facilities, anticipated under the 2020 LRDP will be constructed according to State of California design standards for roadway and intersection design and operations. In addition, no infrastructure changes outside the campus are proposed under the

2020 LRDP. For these reasons, implementation of the 2020 LRDP would not substantially increase hazards due to a design feature or incompatible uses nor would it result in inadequate emergency access. This impact is considered less than significant.

Mitigation Measures: No mitigation is required.

4.8.6 Cumulative Impacts and Mitigation Measures

Cumulative Impact C-TRANS-1: **Implementation of the 2020 LRDP would significantly impact study area intersections during peak commute hours under 2035 plus project conditions.** ***(Significant; Significant and Unavoidable)***

The year of analysis for the cumulative impact analysis is 2035, which provides a longer-term scenario in which to identify transportation impacts and mitigation measures. Although 2030 is used in this SEIR as the horizon year for the analysis of the campus development impacts of the 2020 LRDP, it is anticipated that the campus will continue to grow beyond 2030, although the rate and manner of that growth is not known at this time. For purposes of the cumulative impact analysis in this SEIR, it is assumed that enrollment and campus development will continue to increase at approximately the same annual rate as is currently projected between 2020 and 2030. Based on this assumption, the campus is expected to add an additional 2,500 students between 2030 and 2035, and enrollment is projected to increase to about 17,500 students. Faculty and staff are projected to increase to 2,975 employees by 2035. Campus development through 2035 is referred to as the "2035 Campus Scenario" in the analysis below.

Traffic Growth from Approved and Anticipated Development

As noted earlier in this section, the County and City of Merced provided a list of approved projects expected to be constructed by 2035. The vehicle trip generation for the approved and anticipated development through 2035 was estimated using average trip generation rates and trip generation equations for the proposed land uses from ITE's Trip Generation (9th Edition), and, where available, the traffic impact assessments prepared for specific developments. The total trip generation of the approved and anticipated development is estimated at 3,860 AM peak hour trips and 7,053 PM peak hour trips in 2035. **Appendix 4.8** contains the detailed trip generation calculations.

Traffic generated by the approved and anticipated development was assigned to the roadway network based on trip distribution information derived from the MCAG Travel Demand Model. Specifically, several 'select zone' runs were used to determine the general distribution of traffic from residential and commercial traffic analysis zones; these distribution patterns were then manually applied to the approved/anticipated development traffic, using the manual traffic assignment software Vistro. The appendix contains detailed information on the trip assignment process.

The estimated peak hour intersection turning movements resulting from approved and anticipated development in 2035 are shown in **Figure 4.8-10, 2035 Approved/Anticipated Development Trip Assignment**.

As explained earlier, the trip generation and assignment process in this analysis is conservative in that it does not discount for the fact that some of the new trips generated by the new housing development in the City will be made by the new faculty, staff and students who would occupy some of the new housing and would make daily vehicle trips to the campus.

2035 Roadway Network

In addition to the signalization of East Bellevue Road/Lake Road which was completed in 2018, the 2035 roadway network includes the completion of Campus Parkway from its current terminus north to Yosemite Avenue. The construction of the roadway segment has begun. As noted earlier, relatively few campus trips (less than 50 per direction per peak hour) are expected to use Campus Parkway; therefore, intersections along Campus Parkway were not selected for analysis.

2035 No Project and With Project Traffic Volumes

Figure 4.8-11, 2035 No Project Peak Hour Intersection Traffic Volumes, Lane Configurations and Traffic Controls, shows the intersection volumes which result from adding the 2035 approved/anticipated development volumes to the existing volumes. **Figure 4.8-12, 2035 With 2035 Campus Scenario Intersection Traffic Volumes, Lane Configurations and Traffic Controls**, shows the 2035 With 2035 Campus Scenario traffic volumes, which result from adding the 2020 Project volumes, LRDP Project volumes, and volumes associated with campus growth between 2030 and 2035.

2035 Intersection Levels of Service

Peak hour intersection operations for the 2035 with 2035 Campus Scenario are shown **Table 4.8-11, Intersection Levels of Service – 2035 No Project and 2035 with 2035 Campus Scenario.** The following intersections are projected to operate deficiently in at least one peak hour:

Intersection #1: West Bellevue Road/Highway 59

Intersection #2: Bellevue Road/G Street

Intersection #3: East Bellevue Road/Lake Road

Intersection #4: G Street/Cardella Road

Intersection #7: Yosemite Avenue/G Street

Intersection #8: East Yosemite Avenue/Parsons Avenue/North Gardner Avenue

Intersection #10: East Yosemite Avenue/Lake Road

Intersection #11: West Olive Avenue/Highway 59

Intersection #13: West Olive Avenue/M Street

Intersection #14: Olive/G Street

Intersection #15: West 16th Street/Highway 59

Intersection #16: SR 99 Northbound Ramps/MLK Jr. Way

Intersection #17: SR 99 Northbound Off-Ramp/West 14^{th} Street/G Street

Intersection #18: Lake Road/Project Driveway #1

Intersection #19: Lake Road/Project Driveway #2

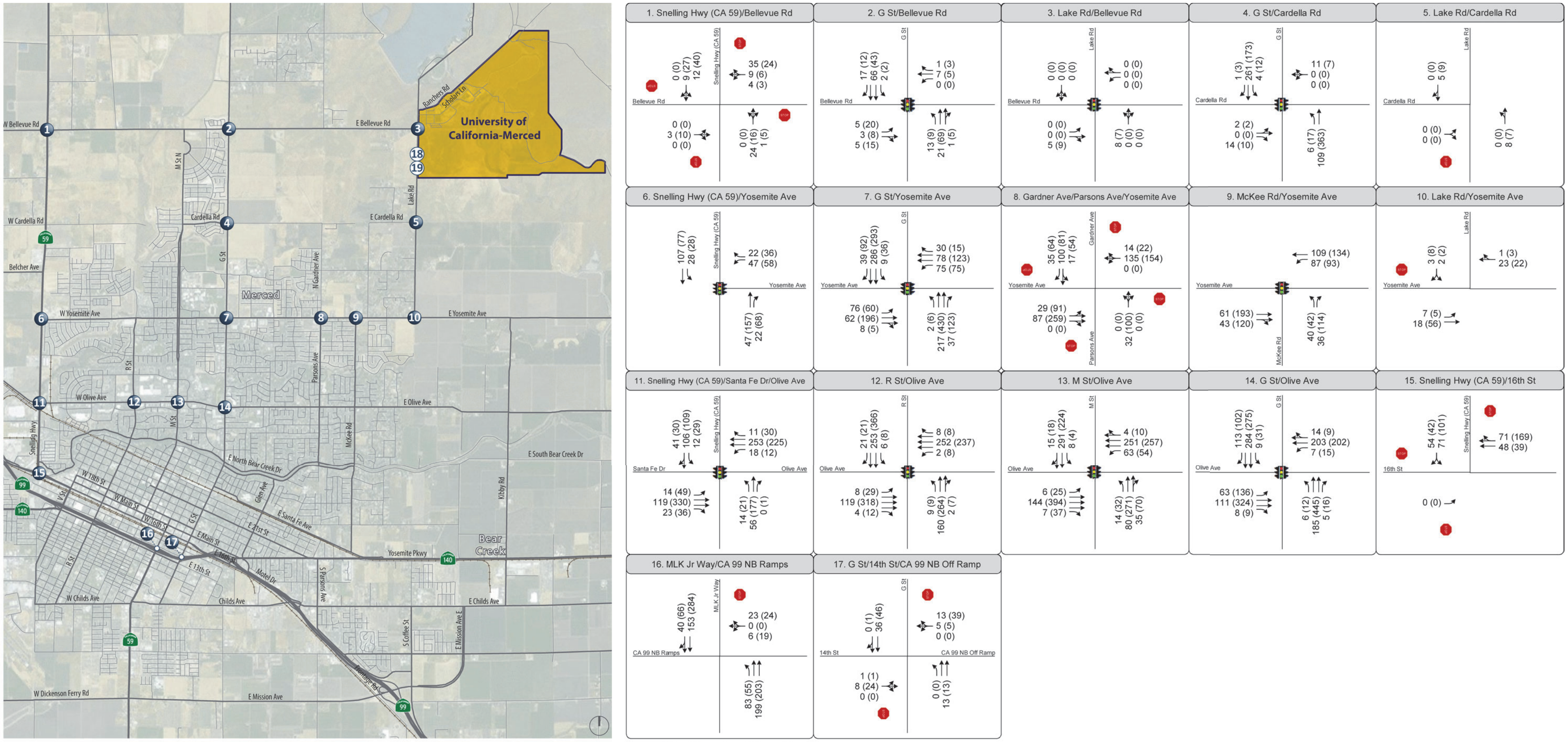
At intersections #8, #15, and #16, the peak hour signal warrants are met under 2035 No Project conditions in one or both peak hours and would continue to be met under 2035 With 2035 Campus Scenario conditions. At intersections #10, #17, #18, and #19, the addition of project traffic would cause the peak hour signal warrant to be met.

Based on the significance thresholds presented above in **Section 4.8.4**, the following 15 intersections would operate poorly, and the 2035 Campus Scenario would make a cumulatively considerable contribution to the cumulative impact at these locations:

- **Intersection #1, West Bellevue Road/Highway 59.** As shown in **Table 4.8-11**, the intersection of West Bellevue Road and Highway 59 would operate at LOS F without the 2035 Campus Scenario during the AM peak hour and the addition of project traffic would add more than five seconds to the intersection delay.

- **Intersection #2, Bellevue Road/G Street.** As shown in **Table 4.8-11**, the addition of traffic from the 2035 Campus Scenario would cause the operation of the intersection of Bellevue Road/G Street to deteriorate from LOS D in the AM peak hour to LOS E.

- **Intersection #3, East Bellevue Road/Lake Road.** As shown in **Table 4.8-11**, the addition of traffic from the 2035 Campus Scenario would cause the operation of the intersection of East Bellevue Road/Lake Road to deteriorate from LOS B and A in the AM and PM peak hours, respectively, to LOS E and F, respectively.



Source: City of Merced and Merced County.

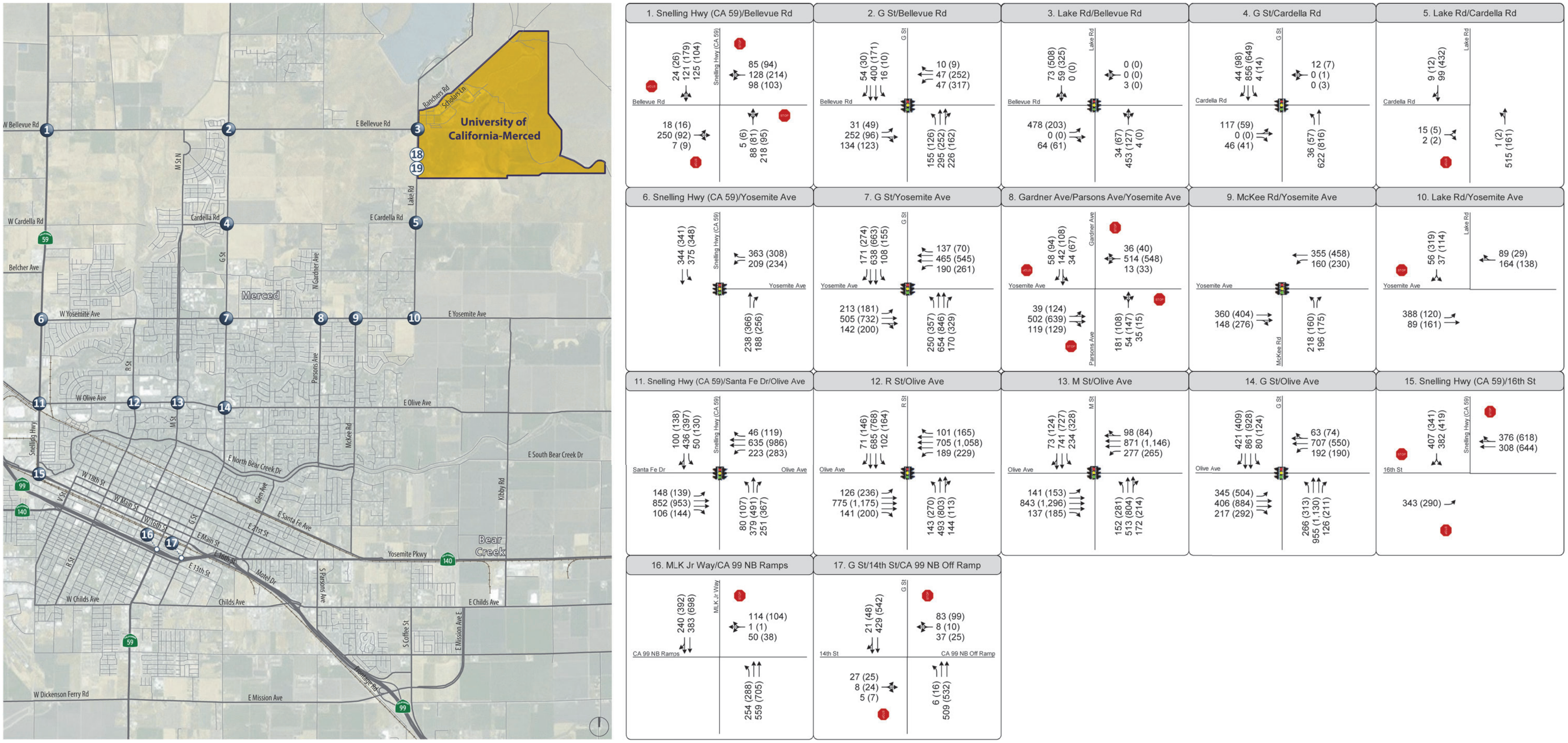
XX (YY) AM (PM) Peak Hour Traffic Volumes | Signalized Intersection | Stop Sign

Project Site | # Study Intersection

SOURCE: Fehr & Peers, 2019

FIGURE **4.8-10**

2035 Approved/Anticipated Development Trip Assignment



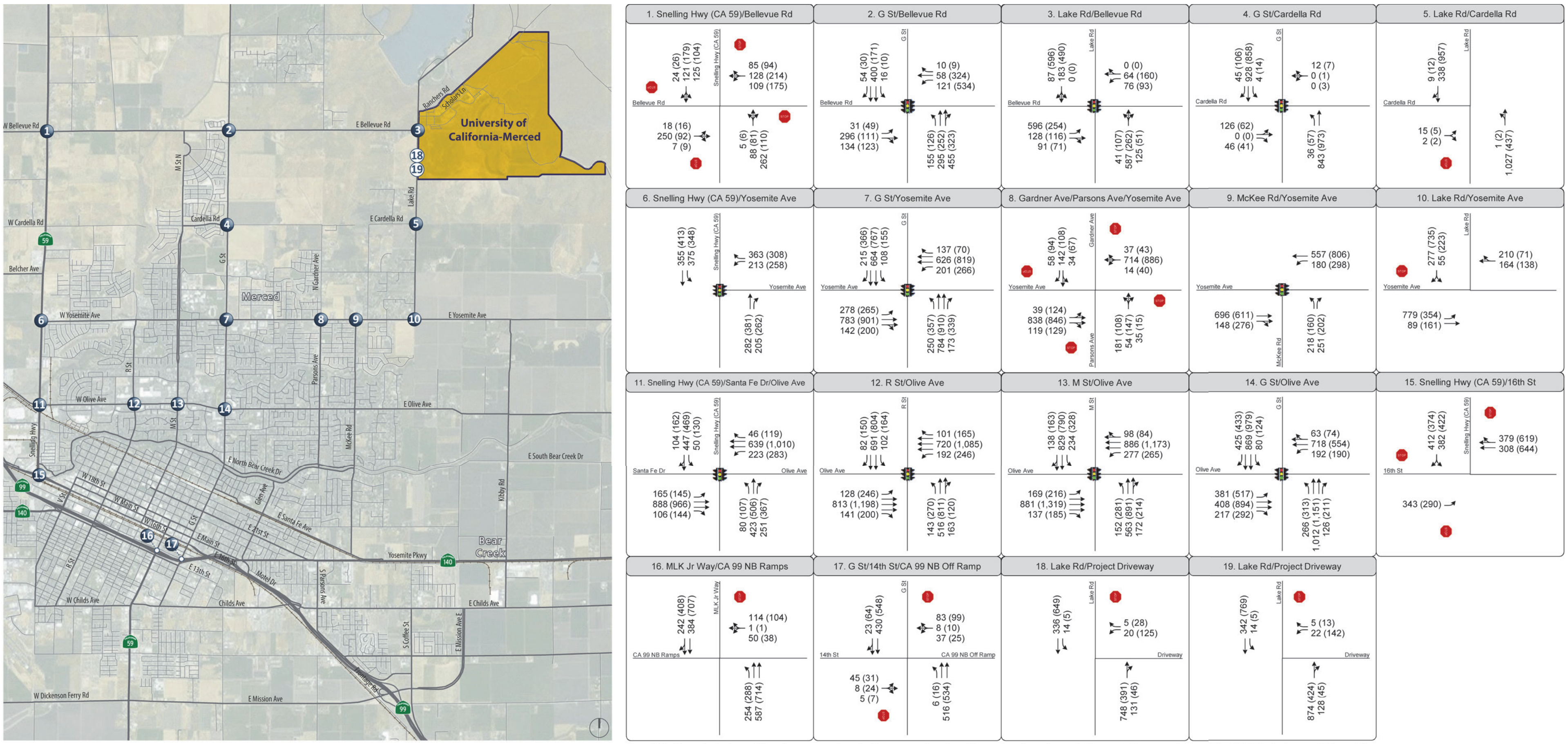
Note: This figure includes traffic volumes associated with approved and anticipated projects through the year 2035.

XX (YY) AM (PM) Peak Hour Traffic Volumes
Signalized Intersection
Stop Sign
Project Site
Study Intersection

SOURCE: Fehr & Peers, 2019

FIGURE **4.8-11**

2035 No Project Peak Hour Intersection Traffic Volumes, Lane Configurations and Traffic Controls



Note: This figure includes traffic volumes associated with approved and anticipated projects through the year 2035, completion of the 2020 Project, completion of the LRDP Project (additional campus growth to 15,000 students), and additional growth to 17,500 students.

XX (YY) AM (PM) Peak Hour Traffic Volumes — Signalized Intersection — Stop Sign

Project Site — Study Intersection — With Project Study Intersection

SOURCE: Fehr & Peers, 2019

FIGURE **4.8-12**

2035 With 2035 Campus Scenario Intersection Traffic Volumes, Lane Configurations and Traffic Controls

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Table 4.8-11
Intersection Levels of Service - 2035 No Project and 2035 with 2035 Campus Scenario

Intersection	Traffic Control	Peak Hour[1,2]	2035 No Project Conditions[3] Delay (Seconds)	2035 No Project Conditions[3] LOS	2035 with 2035 Campus Scenario Conditions[3] Delay (Seconds)	2035 with 2035 Campus Scenario Conditions[3] LOS
1. West Bellevue Road/Highway 59	AWS	AM PM	83.5 15.2	F C	**103.0** 20.2	**F** C
2. Bellevue Road/G Street	Signal	AM PM	42.7 22.4	D C	**75.6** 30.6	**E** C
3. East Bellevue Road/Lake Road	Signal	AM PM	10.9 9.4	B A	**58.0** **>120**	**E** **F**
4. Cardella Road/G Street	Signal	AM PM	33.0 8.0	C A	**57.8** 9.8	**E** A
5. East Cardella Road/Lake Road	SSS	AM PM	0.4 (13.6) 0.2 (12.6)	A (B) A (B)	0.4 (34.5) 0.1 (28.1)	A (D) A (D)
6. West Yosemite Avenue/ Highway 59	Signal	AM PM	17.7 15.3	B B	19.4 16.3	B B
7. Yosemite Avenue/G Street	Signal	AM PM	41.2 57.1	D E	53.8 **76.4**	D **E**
8. East Yosemite Avenue/Parsons Avenue/North Gardner Avenue	AWS	AM PM	101.9 118.9	F F	**>120** **>120**	**F** **F**
9. East Yosemite Avenue/McKee Road	Signal	AM PM	11.1 12.2	B B	13.3 15.2	B B
10. East Yosemite Avenue/Lake Road	SSS	AM PM	6.3 (17.5) 10.5 (19.1)	A (C) B (C)	**>120 (>120)** **>120 (>120)**	**F (F)** **F (F)**
11. West Olive Avenue/Highway 59	Signal	AM PM	48.7 50.7	D D	54.5 **56.4**	D **E**
12. West Olive Avenue/R Street	Signal	AM PM	48.1 63.5	D E	48.6 **64.9**	D **E**
13. West Olive Avenue/M Street	Signal	AM PM	53.5 69.8	D E	**59.3** **79.7**	**E** **E**
14. Olive Avenue/G Street	Signal	AM PM	75.9 90.9	E F	**86.4** **102.3**	**F** **F**
15. West 16th Street/Highway 59[4]	AWS	AM PM	>120 >120	F F	**>120** **>120**	F **F**
16. SR 99 Northbound Ramps/MLK Jr. Way	SSS	AM PM	7.3 (55.8) 15.3 (>120)	A (F) C (F)	7.6 **(60.2)** 16.8 **(>120)**	A (F) C **(F)**
17. SR 99 Northbound Off-Ramp/West 14th Street/G Street	SSS	AM PM	2.9 (22.8) 3.5 (34.5)	A (C) A (D)	3.3 (25.6) 3.8 (38.0)	A (D) A **(E)**
18. Lake Road/Project Driveway #1	SSS	AM PM	-	-	0.6 (25.4) 5.1 **(40.9)**	A (D) A **(E)**
19. Lake Road/Project Driveway #2	SSS	AM PM	-	-	0.7 (31.3) 10.6 **(94.8)**	A (D) B **(F)**

Source: Fehr & Peers August 2019.

1 *Signal = signalized intersection; AWS=all-way stop; SSS=side street stop.*

2 *For side-street stop-controlled intersections, two service levels are listed: Average intersection LOS (LOS for worst side-street movement).*

3 ***Bold** indicates below-standard service level. Shaded indicates a significant impact.*

4 *AM impact is not significant because the delay change with the project is less than 5 seconds.*

- **Intersection #4, G Street/Cardella Road.** As shown in **Table 4.8-11**, the addition of traffic from the 2035 Campus Scenario would cause the operation of the intersection of G Street/Cardella Road to deteriorate from LOS C in the AM peak hour to LOS E.
- **Intersection #7, Yosemite Avenue/G Street.** As shown in **Table 4.8-11**, the addition of traffic from the 2035 Campus Scenario would cause the operation of the intersection of Yosemite Avenue/G Street to deteriorate from LOS D in the PM peak hour to LOS E.
- **Intersection #8, East Yosemite Avenue/Parsons Avenue/North Gardner Avenue.** As shown in **Table 4.8-11**, the intersection of East Yosemite Avenue/Parsons Avenue/North Gardner Avenue would operate at LOS F without the 2035 Campus Scenario during the AM and PM peak hours and the addition of project traffic would add more than five seconds to the intersection delay.
- **Intersection #10, East Yosemite Avenue/Lake Road**. As shown in **Table 4.8-11**, the addition of traffic from the 2035 Campus Scenario would cause the worst approach to deteriorate from LOS C to LOS F at the intersection of East Yosemite Avenue/Lake Road during the AM and PM peak hours.
- **Intersection #11, West Olive Avenue/Highway 59.** As shown in **Table 4.8-11**, the addition of traffic from the 2035 Campus Scenario would cause the operation of the intersection of West Olive Avenue/Highway 59 to deteriorate from LOS D in the PM peak hour to LOS E.
- **Intersection #13, West Olive Avenue/M Street**. As shown in **Table 4.8-11**, the addition of traffic from the 2035 Campus Scenario would cause the operation of the intersection of West Olive Avenue/M Street to deteriorate from LOS D in the AM peak hour to LOS E. In addition, the intersection of West Olive Avenue/M Street would operate at LOS E without the 2035 Campus Scenario during the PM peak hour and the addition of project traffic would add more than five seconds to the intersection delay.
- **Intersection #14, G Street/Olive Avenue**. As shown in **Table 4.8-11**, the intersection of G Street/Olive Avenue would operate at LOS E and F without the 2035 Campus Scenario during the AM and PM peak hours, respectively, and the addition of project traffic would add more than five seconds to the intersection delay.
- **Intersection #15, West 16th Street/Highway 59**. As shown in **Table 4.8-11**, the intersection of West 16th Street/Highway 59 would operate at LOS F without the 2035 Campus Scenario during the PM peak hour and the addition of project traffic would add more than five seconds to the intersection delay.
- **Intersection #16, Martin Luther King, Jr. Way/SR 99 Northbound Ramps**. As shown in **Table 4.8-11**, the worst approach to the intersection of Martin Luther King, Jr. Way/SR 99 Northbound Ramps would operate at LOS F without the 2035 Campus Scenario during the PM peak hour and the addition of project traffic would add more than five seconds to the intersection delay.
- **Intersection #17, G Street/14th Street/SR 99 Northbound Off-Ramp.** As shown in **Table 4.8-11**, the addition of traffic from the 2035 Campus Scenario would cause the operation of the intersection of G Street/14th Street/SR 99 Northbound Off-Ramp to deteriorate from LOS D in the PM peak hour to LOS E.

- **Intersection #18, Lake Road/Project Driveway #1.** As shown in **Table 4.8-11**, the addition of traffic from the 2035 Campus Scenario would cause the worst approach to operate at LOS E in the PM peak hour.

- **Intersection #19, Lake Road/Project Driveway #2.** As shown in **Table 4.8-11**, the addition of traffic from the 2035 Campus Scenario would cause the worst approach to operate at LOS F in the PM peak hour.

Capacity improvements set forth in **Table 4.8-12, Affected Intersections and Recommended Capacity Improvements (2035 Conditions)**, would improve traffic operations at the study intersections listed above. Based on a review of aerial photographs of the affected intersections, there are no existing structures or obstructions in the areas of the recommended improvements. Therefore, these improvements are considered feasible.

Table 4.8-12
Affected Intersections and Recommended Capacity Improvements (2035 Conditions)

Intersection	Delay (Seconds)	LOS before Mitigation	Recommended Improvement	Fair Share of Improvement	Delay (Seconds)	LOS after Mitigation
Intersection #1, West Bellevue Road/ Highway 59	**103.0** 20.2	**F** C	Add a northbound right turn pocket lane	38%	27.3 13.1	D B
Intersection #2, Bellevue Road/ G Street	**75.6** 30.6	**E** C	Add an eastbound right turn pocket lane	62%	43.1 26.6	D C
Intersection #3, East Bellevue Road/ Lake Road	**70.4** **>120**	**E** **F**	a) Add northbound and south-bound right turn pocket lanes b) If determined to be necessary based on annual monitoring of traffic congestion, and in conjunction with the improve-ments identified at intersec-tions #3(a), #18 and #19, widen Lake Road to provide four through lanes between East Bellevue Road and the southern campus boundary, to facilitate traffic flow between the intersections providing campus access on Lake Road	79%	38.4 19.9	D B
Intersection #4, G Street/Cardella Road	**57.8** 9.8	**E** A	Optimize signal timing	36%	34.4 9.1	C A
Intersection #7, Yosemite Avenue/ G Street	53.8 **76.4**	D **E**	Remove westbound right turn pocket lane and add westbound left turn pocket lane, and add an eastbound left turn pocket lane	31%	42.5 57.3	D E
Intersection #8, East Yosemite Avenue/ Parsons Avenue/ North Gardner Avenue	**>120** **>120**	**F** **F**	Install a signal and widen the westbound approach to provide one left/through lane and one through/right lane	46%	10.6 10.3	B B

Table 4.8-12
Affected Intersections and Recommended Capacity Improvements (2035 Conditions)

Intersection	Delay (Seconds)	LOS before Mitigation	Recommended Improvement	Fair Share of Improvement	Delay (Seconds)	LOS after Mitigation
Intersection #10, East Yosemite Avenue/ Lake Road	**>120 (>120)** **>120 (>120)**	**F (F)** **F (F)**	Install a signal, widen the southbound approach to provide separate left turn and right turn lanes, add a second eastbound left turn lane, and widen the northbound departure to provide two acceptance lanes	78%	15.5 13.0	B B
Intersection #11, West Olive Avenue/ Highway 59	54.5 **56.4**	D **E**	Add a southbound right turn pocket lane.	13%	48.0 48.7	D D
Intersection #13, West Olive Avenue/M Street	59.3 **79.7**	**E** **E**	Construct a second southbound left turn lane	17%	53.9 66.7	D E
Intersection #14, G Street/Olive Avenue	**86.4** **102.3**	**F** **F**	Add an overlap phase for the southbound right turn	9%	79.8 95.2	E F
Intersection #15, West 16th Street/ Highway 59	**>120** **>183.7**	**F** **F**	Modify the geometry of the southbound right turn lane to provide a full 200 feet of storage, such that the southbound right turn queues do not interfere with vehicles in the left turn lane	10%	47.0 147.8	E F
Intersection #16, Martin Luther King, Jr. Way/SR 99 Northbound Ramps	7.6 **(60.2)** 16.8 **(>120)**	A **(F)** C **(F)**	Install a signal	4%	12.6 14.7	B B
Intersection #17, G Street/14th Street/ SR 99 Northbound Off-Ramp	3.3 (25.6) 3.8 **(38.0)**	A (D) A **(E)**	Install a signal	16%	9.1 8.8	A A
Intersection #18, Lake Road/Project Driveway #1	0.6 (25.4) 5.1 **(40.9)**	A (D) A **(E)**	Install a signal; See also Intersection #3 improvement measure (b)	76%	3.7 5.8	A A
Intersection #19, Lake Road/Project Driveway #2	0.7 (31.3) 10.6 **(94.8)**	A (D) B **(F)**	Install a signal; See also Intersection #3 improvement measure (b)	87%	6.5 7.4	A A

Source: Fehr & Peers August 2019.
***Bold** indicates below-standard service level. Shaded indicates a significant impact.*

LRDP Mitigation Measure C-TRANS-1 is set forth below to mitigate the cumulative impact of campus traffic growth on the study area intersections under 2035 conditions. Because the impacts identified above are the result of cumulative traffic growth along with campus traffic, the University will minimize its traffic growth to the extent feasible by further expanding its TDM program; monitoring the traffic increase; and making a fair share contribution to the cost of the identified improvements based on its proportion of traffic growth at each intersection in the year 2035.

Mitigation Measures:

Cumulative MM C-TRANS-1: The University will implement **LRDP Mitigation Measure TRANS-1** to reduce vehicle trips, monitor traffic growth, and make fair share contributions to address the project's contribution to cumulative impacts under 2035 conditions.

Certain improvements in **Table 4.8-12** are the same as, or similar to, improvements identified in **Table 4.8-9** for the 2030 with LRDP Project scenario; therefore, as and when fair share is calculated for these intersection improvements, the calculation shall take into account the redundant improvements.

As Intersections #3, #18 and #19 would directly serve the campus, the University will be responsible for the entire cost of improvements at these three intersections.

Significance after Mitigation: With the improvements described in **Table 4.8-12** above, all impacts to affected intersections would be reduced to a less than significant level. However, because the implementation of the improvements depends on the responsible agencies (the City of Merced, Merced County, and/or Caltrans), the impacts would remain significant and unavoidable with mitigation.

Cumulative Impact C-TRANS-2: **Implementation of the 2020 LRDP would not significantly affect study area freeway segments under 2035 plus project conditions.** ***(Less than Significant)***

Traffic impacts on study area freeway segments were evaluated under 2035 No Project and with 2035 Campus Scenario conditions for the weekday AM and PM peak hours using the methodology described above. Project trips were manually added to the freeway segment volumes. The results are summarized in **Table 4.8-13, Freeway Operations – 2035 No Project and 2035 with 2035 Campus Scenario**.

Table 4.8-13
Freeway Operations – 2035 No Project and 2035 with 2035 Campus Scenario

Location	Direction	Peak Hour	2035 No Project Conditions V/C Ratio	2035 with 2035 Campus Scenario Conditions V/C Ratio
1. SR 99 North of 16th Street	NB	AM	0.62	0.62
		PM	0.71	0.74
	SB	AM	0.56	0.57
		PM	0.76	0.76
2. SR 99 North of SR 140	NB	AM	0.56	0.56
		PM	0.67	0.69
	SB	AM	0.56	0.57
		PM	0.76	0.76
3. SR 99 North of MLK	NB	AM	0.57	0.58
		PM	0.68	0.70
	SB	AM	0.58	0.60
		PM	0.77	0.78
4. SR 99 South of MLK	NB	AM	0.56	0.56
		PM	0.67	0.68
	SB	AM	0.56	0.56
		PM	0.69	0.70
5. SR 99 South of G Street	NB	AM	0.57	0.57
		PM	0.68	0.69
	SB	AM	0.57	0.58
		PM	0.72	0.72
6. SR 99 South of Mission Street	NB	AM	0.54	0.54
		PM	0.66	0.66
	SB	AM	0.41	0.40
		PM	0.57	0.57

Source: Fehr & Peers August 2019.

Under 2035 No Project conditions, all freeway segments would operate with a V/C ratio of 0.62 or less in the AM peak hour, and 0.77 or less in the PM peak hour. Under 2035 with 2035 Campus Scenario conditions, the V/C ratio increases on some freeway segments in the AM and PM peak hours with the addition of project traffic. However, all freeway segments would operate with a V/C ratio of 0.62 or less in the AM peak hour, and 0.78 or less in the PM peak hour. For these reasons, there would be excess freeway capacity, and drivers would not experience substantial delays under typical conditions. All segments would operate at better than LOS E (V/C = 0.90), so no significant freeway impacts are identified. This impact is considered less than significant.

Mitigation Measures: No mitigation is required.

4.8.7 References

Fehr and Peers. 2019. *UC Merced 2020 LRDP Transportation Impact Analysis*. August.

Merced County Council of Governments. 2018. *2018 Regional Transportation Plan/Sustainable Communities Strategy for Merced County.*

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4.9 TRIBAL CULTURAL RESOURCES

4.9.1 Introduction

This section of the Recirculated Draft SEIR (SEIR) evaluates the potential impacts to Tribal Cultural Resources (TCRs) from the implementation of the proposed 2020 LRDP. TCRs are sites, features, places, cultural landscapes, sacred places and objects with cultural value to a California Native American tribe. As detailed later in this section, potential impacts of campus development under the 2020 LRDP on TCRs are evaluated based on consultation with interested Native American tribes pursuant to Assembly Bill (AB) 52.

4.9.2 Environmental Setting

Prehistory

Detailed information regarding the prehistoric occupation of the campus vicinity is presented in Section 4.5, Cultural Resources, in the 2009 LRDP EIS/EIR. As noted in Section 4.5.2.1 of the EIS/EIR, although few archaeological sites demonstrate evidence of human occupation of the San Joaquin Valley during the late Pleistocene and early Holocene epochs (12,000–6000 B.C.), this is likely a product of the archaeological record itself rather than lack of human habitation in the valley. Most Pleistocene- and Holocene-epoch archaeological sites are deeply buried in accumulated gravels and silts or have eroded away (UC Merced 2009).

The earliest sites in the San Joaquin Valley are believed to be the Farmington Complex sites in San Joaquin and Stanislaus Counties, the Tranquility site in Fresno County , and the Witt site in Kings County. Archaeologists have identified fluted projectile points on the margin of Tulare Lake. The points, which are morphologically similar to Clovis points, may date as early as 11,000–12,000 years ago. No fluted projectile points have been reported in the Merced vicinity to date (UC Merced 2009).

The closest-available prehistoric chronology for the project area comes from the west side of the San Joaquin Valley as a result of the excavations at several sites during archaeological efforts for reservoir construction of the San Luis, Los Banos, and Little Panoches Reservoirs. Four cultural complexes were identified in the archaeological data collected during these excavations. These complexes are assigned to timespans for the development of a cultural chronology for the area and are represented by archaeological assemblages that are summarized here. The Positas Complex (5200–4600 B.P.) is characterized by small, shaped mortars; cylindrical pestles; millingstones; perforated flat cobbles; small flake scrapers; handstones; and spire-lopped *Olivella* beads. The perforated cobbles resemble the cog-stones documented at many southern Californian archaeological sites, prompting some researchers to posit a cultural relationship between the Positas Complex and southern Californian cultures. To date, archaeologists have not identified burials or structures associated with the Positas Complex (UC Merced 2009).

The Pacheco Complex (4600–1600 B.P.) consists of two subcomplexes: Pacheco Complex A (3600–1600 B.P.) and Pacheco Complex B (4600–3600 B.P.). Pacheco Complex B is characterized by foliate bifaces, rectangular shell ornaments, flexed burials, and thick rectangular *Olivella* beads. Sites attributed to Pacheco Complex A exhibit spire-ground *Olivella* beads, perforated canine teeth, bone awls, whistles, grass saws, large stemmed and side-notched points, flexed burials, millingstones, mortars, and pestles. Domestic structure remnants attributed to Pacheco Complex A were probably circular in outline and 10-12 feet in diameter (UC Merced 2009).

The Gonzaga Complex (1600–1000 B.P.) is characterized by extended and flexed burials; bowl mortars; shaped pestles; squared and tapered-stem points; few bone awls; distinctive shell ornaments; and thin rectangular, split-punched, and oval *Olivella* beads. Projectile points are rare in comparison to the Pacheco Complex and are predominantly made from silicate stones. Archaeologists have reported a few fragmentary serrated projectile points fashioned from obsidian. Architectural features from the Gonzaga Complex are larger than those reported from earlier complexes. Archaeologists hypothesize that the Gonzaga Complex marks the arrival of the Yokuts in the San Joaquin Valley (UC Merced 2009).

The Panoche Complex (400–200 B.P.) is recognized by large circular structures (pits), flexed burials and primary and secondary cremations, varied mortars and pestles, bone awls, whistles, small side-notched points, clamshell disk beads, and other bead types. The Panoche Complex appears to represent Yokuts occupation of the valley (UC Merced 2009).

Ethnography

The aboriginal inhabitants of the area in which the campus is located are known as the Northern Valley Yokuts. "Yokuts" is a term applied to a large and diverse number of peoples inhabiting the San Joaquin Valley and Sierra Nevada foothills of central California. The Yokuts cultures include three primary divisions, corresponding to gross environmental zones: the Southern San Joaquin Valley Yokuts, the Foothill Yokuts, and the Northern San Joaquin Valley Yokuts (UC Merced 2009).

The Yokuts languages, of which there are three subdivisions, belong to the Yokutsan family, Penutian stock. Each of the primary divisions included several dialects. The North Valley Yokuts lived in the northern San Joaquin Valley from around Bear Creek north of Stockton to the bend in the San Joaquin River near Mendota (UC Merced 2009).

There was no Yokuts tribal organization that encompassed the whole of the peoples speaking Yokutsan languages, or even a tribal organization that encompassed an entire primary division, such as Foothill Yokuts. These are linguistic and geographic designations only. Similar to most Native American groups in California, the largest political entity among the Yokuts was that of the tribelet. A tribelet consisted of a large village and a few smaller surrounding villages. Larger villages and tribelets had a chief or headman—an advisory position that was passed from father to son (UC Merced 2009).

In general, the Yokuts were seasonally mobile hunter-gathers with semi-permanent villages. Seasonal movements to temporary camps would occur to exploit food resources in other environmental zones. The primary difference between the various Yokuts groups rests largely on the differences in available resources in their territory. The North Valley Yokuts relied heavily on acorns as a food staple, which was processed into a thick soup, along with salmon and other fish, grass seeds and tule roots (which were processed into meal), and probably water fowl, tule elk, and pronghorn (UC Merced 2009).

Principal settlements were located on the tops of low mounds, on or near the banks of the larger watercourses. Settlements were composed of single-family dwellings, sweathouses, and ceremonial assembly chambers. Dwellings were small and lightly constructed, semi-subterranean and oval. The public structures were large and earth covered. Sedentism was fostered by the abundance of riverine resources in the area (UC Merced 2009).

The Yokuts first came into contact with Europeans when Spanish explorers visited the area in the late 1700s, possibly followed by expeditions to recover Native Americans who had escaped from the missions. The North Valley Yokuts were far more affected by the missions than were other groups. The loss of individuals to the missions, the influence of runaway neophytes, various epidemics in the 1800s, and the arrival of settlers and miners all contributed to the disintegration of Yokuts culture. Although nearly obliterated, the descendants of the Northern Valley Yokuts still live in Merced County today and continue to rebuild their cultural identity (UC Merced 2009).

4.9.3 Regulatory Considerations

Federal Laws and Regulations

There are no federal laws or regulations related to TCRs. Although the Native American Graves Protection and Repatriation Act (NAGPRA) concerns the disposition of Native American cultural items and human remains, the law applies to Federal agencies and institutions that receive Federal funding (including, but not limited to, museums, colleges and universities, state or local agencies and their subdivisions), as well as the ownership or control of cultural items and human remains discovered on Federal or tribal lands after November 16, 1990. NAGPRA is not applicable to the campus.

State Laws and Regulations

Assembly Bill (AB) 52

AB 52, which was approved in September 2014 and became effective on July 1, 2015, requires that CEQA lead agencies consult with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of a proposed project, if so requested by the tribe. A provision of the bill, chaptered in CEQA Section 21084.12, also specifies that a project with an effect that may cause a substantial adverse change in the significance of a TCR is a project that may have a significant effect on the environment.

Defined in Section 21074(a) of the Public Resources Code, TCRs are:

1. Sites, features, places, cultural landscapes, sacred places and objects with cultural value to a California Native American tribe that are either of the following:

    a. Included or determined to be eligible for inclusion in the California Register of Historical Resources; or

    b. Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.

2. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

TCRs are further defined under Section 21074 as follows:

a. A cultural landscape that meets the criteria of subdivision (a) is a TCR to the extent that the landscape is geographically defined in terms of the size and scope of the landscape; and

b. A historical resource described in Section 21084.1, a unique archaeological resource as defined in subdivision (g) of Section 21083.2, or a "non-unique archaeological resource" as defined in subdivision (h) of Section 21083.2 may also be a TCR if it conforms with the criteria of subdivision (a).

Mitigation measures for TCRs must be developed in consultation with the affected California Native American tribe, pursuant to Section 21080.3.2, or according to Section 21084.3. Section 21084.3 identifies mitigation measures that include avoidance and preservation of TCRs and treating TRCs with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource.

California Register of Historical Resources

The State Historical Resources Commission has designed this program for use by state and local agencies, private groups and citizens to identify, evaluate, register and protect California's historical resources. The Register is the authoritative guide to the state's significant historical and archeological resources.

The California Register program encourages public recognition and protection of resources of architectural, historical, archeological and cultural significance, identifies historical resources for state and local planning purposes, determines eligibility for state historic preservation grant funding and affords certain protections under the California Environmental Quality Act. The criteria for designation include:

- Associated with 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 (Criterion 1)
- Associated with the lives of persons important to local, California or national history (Criterion 2)
- Embodies the distinctive characteristics of a type, period, region or method of construction or represents the work of a master or possesses high artistic values (Criterion 3)
- Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California or the nation (Criterion 4)

4.9.4 Impacts and Mitigation Measures

Significance Criteria

This SEIR uses significance criteria derived from Appendix G of the *State CEQA Guidelines*. For the purposes of this SEIR, impacts related to TCRs resulting from the implementation of the proposed 2020 LRDP would be considered significant if the proposed project would 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:
  - listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resource Code Section 5020.1(k); or
  - 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.

Issues Not Discussed Further

At the time the 2009 LRDP EIS/EIR was prepared, CEQA did not require an analysis of impacts to TCRs due to project implementation. Therefore, impacts on TCRs are analyzed below, consistent with the significance criteria set forth above.

Methodology

Although AB 52 requires the Native American tribes to request notification of projects that involve an EIR or a Mitigated Negative Declaration (MND), the University proactively reached out to the Native American Heritage Commission (NAHC) and requested a list of Native American tribes with traditional lands or cultural places located within the region of each campus. Using the list of tribes identified by the NAHC for the campus, UC Merced sent out eight letters to representatives of the identified tribes on September 17, 2018, informing them of the commencement of CEQA review of the proposed 2020 LRDP and asking them if they wished to consult regarding this proposed project pursuant to AB 52. Pursuant to AB 52, the tribes have 30 days from the receipt of the letter to request consultation with UC Merced. No requests for formal consultation were received by UC Merced from the tribes as of the publication of this SEIR.

4.9.5 LRDP Impacts and Mitigation Measures

LRDP Impact TCR-1: The proposed project would not cause a substantial adverse change in the significance of a tribal cultural resource as defined in Section 21074. (*Less than Significant*)

As noted above, UC Merced sent out notification letters on September 17, 2018, to eight tribes identified by the NAHC for the region around the Merced campus and no requests for formal consultation were received by UC Merced as of the publication of this SEIR.

Based on surveys conducted prior to and in conjunction with the preparation of the 2009 LRDP EIS/EIR, no known prehistoric sites are located within the campus site. Furthermore, no cultural resources have been encountered during grading and excavation conducted on the campus site since 2002 when the construction of the campus was commenced. Therefore, the campus is not expected to contain any TCRs. Furthermore, as noted in **Section 3.0, Project Description**, the proposed 2020 LRDP is a land use plan to guide the development of the campus and is not a project proposal. Therefore, no earthmoving activities would occur as a direct result of the approval of the 2020 LRDP. Earthmoving activities that could potentially disturb previously undiscovered buried archaeological resources, including human remains, which could be considered TCRs, would occur only when specific development projects are proposed by

UC Merced under the 2020 LRDP. While those projects would have the potential to inadvertently affect TCRs, all projects under the 2020 LRDP would be required to implement **2009 LRDP Mitigation Measures CUL-2** and **CUL-3** to ensure that should cultural resources, including human remains, be encountered, they would be protected, documented, and preserved, as appropriate. In summary, the proposed project would not result in a significant impact on TCRs.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they would be unlikely to affect TCRs. Further, UC Merced will require the projects to implement **2009 LRDP Mitigation Measures CUL-2** and **CUL-3** which would ensure that any impact on TCRs would not be significant.

Mitigation Measures: No mitigation is required.

4.9.6 Cumulative Impacts and Mitigation Measures

Cumulative Impact C-TCR-1: **Implementation of the proposed 2020 LRDP would not result in a significant cumulative impact on tribal cultural resources. (*Less than Significant*)**

An evaluation of potential impacts on TCRs was not required at the time that the 2009 LRDP EIS/EIR was prepared. Therefore, the 2009 LRDP EIS/EIR does not contain an evaluation of the potential for campus development under the 2009 LRDP to result in a cumulative impact on TCRs. The 2009 LRDP EIS/EIR however contains an analysis of the cumulative impact of campus development under the 2009 LRDP along with other foreseeable development in Merced County and the City of Merced on cultural resources and human remains under Cumulative Impact CUL-1, and that analysis concludes that the cumulative impact on cultural resources and human remains would be less than significant because campus projects would be required to implement appropriate mitigation measures to avoid or minimize impacts to significant resources (UC Merced 2009). Because the same measures would avoid and minimize impacts to TCRs, it is reasonable to conclude that the cumulative impacts of campus development under the 2020 LRDP would result in a less than significant cumulative impact on TCRs. Furthermore, in compliance with CEQA, if UC Merced prepares another EIR or a Mitigated Negative Declaration for a future project under the 2020 LRDP, it will again initiate consultation with Native American tribes pursuant to AB 52. The proposed project would not make a cumulatively considerable contribution to a cumulative impact on TCRs. There would be a less than significant impact.

Mitigation Measures: No mitigation is required.

4.9.7 References

UC Merced. 2009. UC Merced/University Community Final Environmental Impact Statement/Environmental Impact Report, SCH No. 2005012113.

4.10 UTILITIES AND SERVICE SYSTEMS

4.10.1 Introduction

This section of the Recirculated Draft SEIR (SEIR) describes the existing environmental conditions pertaining to the public utility systems on the project site and its vicinity. A discussion of the regulatory setting follows the description of the environmental setting. The section discusses the demand for utilities associated with the development of the campus under the proposed 2020 LRDP and evaluates the environmental consequences from the construction and operation of utility improvements needed to serve the campus. The primary concerns related to utilities and service systems are environmental effects of supplying the project with potable water, irrigation water, wastewater disposal, solid waste disposal, electricity, and natural gas.

4.10.2 Environmental Setting

The campus is located within incorporated Merced County. However, the campus site is within the City's SOI and receives water and wastewater services from the City of Merced under an extraterritorial Urban Services agreement. The agreement states that the City will serve a campus population of up to 10,000 Full Time Equivalent (FTE) students.

Water Service

Water service to the campus is provided by the City of Merced. Much of the water in Merced County, including that provided by the City of Merced, is drawn from groundwater sources. Discussion of the size and status of the underground aquifer that provides this water is presented in **Section 4.4, Hydrology and Water Quality.** There are 25 urban water and irrigation districts that serve most of Merced County. These districts pump groundwater and divert water from the Merced River and out-of-county sources, including the Central Valley Project (CVP) and the State Water Project (SWP). The largest district is the Merced Irrigation District (MID), which diverts water from the Merced River for agricultural purposes. MID currently serves some of the area near the campus. However, the campus is not within the service area of MID. The City of Merced provides potable water service within the city limits of Merced. In order to provide for future growth, the City of Merced and MID have entered into a cooperative water supply and management agreement.

Water Supply

The City of Merced's water supply is drawn from 20 active production wells with a combined capacity of 54,100 gallons per minute (gpm). All of the wells pump directly into the distribution system and have chlorination facilities for disinfection.

The City of Merced provides potable water to the campus via its distribution system. The water is primarily supplied by a 16-inch water line that was constructed within the roadway alignment of Bellevue Road. The City also produces potable water used to serve the campus from Well 17, which is located on the campus. Well Number 17 is a City-owned facility located on UC land deeded to the City. Ninety percent of the water from this well is supplied to the campus, with the remaining flow contributing to the City's distribution system. This well is capable of pumping 2,500 gallons per minute (gpm) (City of Merced 2017). An on-campus distribution system delivers potable water to each building within the campus. Irrigation water for the campus is also obtained from the City of Merced supply. In addition, UC Merced also owns a pump station and a large aboveground 250,000-gallon water storage tank near Well 17 that provides operational and emergency storage for the campus.

Recycled Water

Water recycling is the use of treated wastewater to meet non-potable water demands. Outdoor water demands (e.g., landscape irrigation) are ideally suited for water recycling. Water treated to certain standards established in Title 22 of the California Administrative Code can be used for irrigation of landscaped areas, and for toilet flushing. Water recycling not only reduces the amount of potable water needed, but also results in less wastewater requiring disposal. A recycled water distribution system serving portions of the campus has been installed although it is not connected to the City's recycled water distribution system as no existing recycled water facilities are located in the vicinity of the campus. It is presently connected to the City's potable water distribution system.

Wastewater

The City of Merced owns and operates a municipal wastewater treatment system and provides service to all areas within city limits and also to some unincorporated areas outside the city limits, including the campus. The City's system consists of wastewater conveyance pipelines and a wastewater treatment plant (WWTP) located approximately 3 miles south of the city.

Wastewater Conveyance

The campus is currently connected to the City of Merced wastewater collection and treatment system. To serve the campus, a 27-inch sanitary sewer line was installed in Bellevue Road that connects to the City of Merced's sewer system via a connection to a 27-inch sewer main in G Street.

Wastewater Treatment

Wastewater generated on the campus is treated at the City of Merced WWTP. The WWTP currently has a tertiary treatment capacity of 12 million gallons per day (mgd). The WWTP currently treats an average flow of 8.2 mgd (Osmer 2018). In 2006, the City certified an EIR (SCH No. 2005101135) for the expansion of the WWTP to a design capacity of 20 mgd. The additional capacity would be installed in phases and would include several facility upgrades.

According to the City, the WWTP expansion would accommodate wastewater flows from the approved 1997 Specific Urban Development Plan (SUDP) that would generate approximately 17.1 mgd of wastewater, in addition to 2.25 mgd of wastewater flows expected from the full development of the campus (City of Merced 2006), based on the University's 2002 estimates of the wastewater that would be generated by the campus.

Municipal Solid Waste

Merced County Regional Waste Management Authority (MCRWMA) oversees solid waste transportation and disposal operations of Class III municipal solid waste in Merced County. There are two landfills in the county. Waste from the campus is sent to the Merced County Highway 59 Landfill, located at 6049 North Highway 59.

Although the Highway 59 Landfill has a design capacity of 36.4 million cubic yards, it has a permitted capacity of approximately 30 million cubic yards. About 22.6 million cubic yards of capacity remains at the present time (Lawrie 2018). The landfill is also permitted to receive up to 1,500 tons of waste on a daily basis, which translates to a maximum of 459,000 tons per year; however, the average daily and annual tonnage received is substantially less. The estimated closure date for the facility is 2065 (MCRWMA 2016).

Solid waste is collected by the City of Merced within the city limits, and by franchise hauling companies throughout the unincorporated areas of Merced County. The City and these companies also pick up some recyclable materials for a fee. The City picks up cardboard from businesses for a reduced fee. There is no sorting or recycling plant in Merced County, but some recyclable material is accepted at the landfills, which is then taken to a recycling plant in Turlock.

Electricity

The campus site is a part of the California Independent System Operator's Fresno local area. Currently, PG&E provides electricity to the City of Merced and to the campus. Current electricity demand for the campus is approximately 2.5 megawatts per year. The campus site is within PG&E's Wilson 115-kilovolt (kV) subarea. There are three PG&E transmission lines near the campus site: the 230-kV Belotta-Herndon line that originates at the Wilson Substation south of Childs Avenue and terminates north of Bellevue and west of Highway 59; the 115-kV Wilson-Atwater line; and the 70-kV Merced-Merced Falls line.

Natural Gas

PG&E currently supplies Merced County, including the campus, with natural gas. The main pipeline serving the City of Merced is an 8-inch-diameter transmission pipeline that parallels Highway 99 through Merced. The campus is connected to the regional natural gas distribution system via a pipeline aligned along Lake Road. Additional distribution lines and hook-ups are generally constructed on an "as-needed" basis. Current natural gas demand for the campus is approximately 571,482 therms per year.

4.10.3 Regulatory Considerations

State Laws and Regulations

Urban Water Management Planning Act

California State Assembly Bill 797 (California Water Code Section 10610, et seq.), adopted in 1983, requires every urban water supplier providing water for municipal purposes to more than 3,000 customers or more than 3,000 acre-feet of water on an annual basis to prepare an Urban Water Management Plan (UWMP). The intent of the UWMP is to assist water supply agencies in water resource planning over at least a 20-year planning period given their existing and anticipated future demands. UWMPs must be updated every five years in years ending in zero and five. The City of Merced updated and adopted its current 2015 UWMP in November 2017. The 2015 UWMP projects and analyzes the City's future demand and water supplies through 2035.

Senate Bills 610 and 221

In 2001, the California Legislature passed Senate Bill 610 (Water Code Section 10910 et seq.) and Senate Bill 221 (Water Code Section 66473.7) to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 and SB 221 were companion measures, which sought to promote more collaborative planning between local water suppliers and cities and counties.

SB 610 requires the preparation of a water supply assessment (WSA) for large developments (i.e., more than 500 dwelling units or business establishments employing 1,000 persons or 500,000 feet of floor space). SB 221 prohibits approval of subdivisions consisting of more than 500 dwelling units unless there is verification of sufficient water supplies for the project from the applicable water supplier(s) and only applies to residential projects. SB 610 requires cities and counties to prepare a WSA for large developments. SB 221 requires a verification of an adequate water supply for large residential subdivisions before a final subdivision map may be recorded. Additionally, when a city or county determines that a "project" as defined by SB 610 (Water Code Section 10912) is subject to CEQA, the city or county must comply with the provisions of SB 610; this information must be included in environmental review under CEQA.

SB 610 and SB 221 apply only to cities and counties, and not to the University of California, a constitutionally established public entity. Nevertheless, although preparation of a Water Supply Assessment is not required for University projects, in order to evaluate the 2020 LRDP's impact on water supply, UC Merced voluntarily prepared a Water Supply Evaluation (WSE) that conforms with the required elements of a Water Supply Assessment prepared pursuant to SB 610. The WSE is included in **Appendix 4.10** and was used in the preparation of this section.

Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act of 2014 (SGMA) became law on January 1, 2015, and applies to all groundwater basins in the state (Wat. Code, § 10720.3). Pursuant to SGMA, any local agency that has water supply, water management, or land use responsibilities within a groundwater basin may elect to be a "groundwater sustainability agency" for that basin (Wat. Code, § 10723). Local agencies were given until January 1, 2017, to elect to become or form a groundwater sustainability agency. In the event a basin is not within the management area of a groundwater sustainability agency, the county within which the basin is located will be presumed to be the groundwater sustainability agency for the basin. However, the county may decline to serve in this capacity (Wat. Code, § 19724).

Any established groundwater sustainability agency would have additional powers under the SGMA to manage groundwater within the basin, including, for example, the powers to conduct investigations of the basin, to require registration of groundwater extraction facilities and metering of groundwater extractions; to regulate groundwater extractions from individual groundwater wells or wells generally;

and to assess fees on groundwater extractions (see generally Wat. Code, § 10725 et seq.). In exercising its authority under the SGMA, a groundwater sustainability agency must consider the interests of holders of overlying groundwater rights, among others, and may not make a binding determination of the water rights of any person or entity (Wat. Code, §§ 10723.2, 10726.8). The SGMA also provides local agencies with additional tools and resources designed to ensure that the state's groundwater basins are sustainably managed.

The SGMA also requires the California Department of Water Resources (DWR) to categorize each groundwater basin in the state as high-, medium-, low-, or very low priority (Wat. Code, §§ 10720.7, 10722.4). All basins designated as high- or medium-priority basins must be managed by a groundwater sustainability agency under a groundwater sustainability plan that complies with Water Code Section 10727 et seq. In lieu of preparation of a groundwater sustainability plan, a local agency may submit an alternative that complies with the SGMA no later than January 1, 2017 (Wat. Code, § 10733.6). On December 15, 2014, DWR announced its official "initial prioritization" of the state's groundwater basins for purposes of complying with the SGMA, and this priority list became effective on January 1, 2015 (DWR 2014).

Assembly Bill 939 and Senate Bill 1016

The California Integrated Waste Management Act of 1989, or Assembly Bill 939, established the Integrated Waste Management Board, required the implementation of integrated waste management plans, and mandated that local jurisdictions divert at least 50 percent of all solid waste generated (from 1990 levels), beginning January 1, 2000, and divert at least 75 percent by 2010. Projects that would have an adverse effect on waste diversion goals are required to include waste diversion mitigation measures to assist in reducing these impacts to less than significant levels. With the passage of Senate Bill 1016 (the Per Capita Disposal Measurement System) in 2006, only per capita disposal rates are measured to determine if a jurisdiction's efforts are meeting the intent of Assembly Bill 939.

California Universal Waste Law

This legislation went into effect in February 2006. Universal wastes are a wide variety of hazardous wastes such as batteries, fluorescent tubes, and some electronic devices, that contain mercury, lead, cadmium, copper or other substances hazardous to human and environmental health. Universal waste may not be discarded in solid waste landfills, but instead are recyclable and (to encourage recycling and recovery of valuable metals) can be managed under less stringent requirements than those that apply to other hazardous wastes.

Government Code Section 54999

Government Code Section 54999 provides for the payment of fees in certain specific enumerated situations for capital improvements for utilities actually serving the University. A capital facilities fee that is imposed must be nondiscriminatory and the amount must not exceed the amount actually necessary to provide capital facilities to the University.

Local Plans and Policies

UC Sustainable Practices Policy

As with all UC campuses, UC Merced is required to implement the UC Sustainable Practices Policy. The following are specific policies designed to address water conservation and solid waste.

Sustainable Water Systems

With the overall intent of achieving sustainable water systems and demonstrating leadership in the area of sustainable water systems, the University has set the following goals applicable to all locations:

1. In line with the Federal Government's Executive Order, locations will reduce growth-adjusted potable water consumption 20 percent by 2020 and 36 percent by 2025, when compared to a three-year average baseline of FY2005/06, FY2006/07, and FY2007/08. Locations that achieve this target early are encouraged to set more stringent goals to further reduce potable water consumption. Each Campus shall strive to reduce potable water used for irrigation by converting to recycled water, implementing efficient irrigation systems, drought tolerant planting selections, and/or by removing turf.

2. Each location will develop and maintain a Water Action Plan that identifies long term strategies for achieving sustainable water systems. The next update of the plan shall be completed in December 2016.

   A. Campuses will include in this update quantification of total square feet of used turf and under-used turf areas on campus as well as a plan for phasing out un-used turf irrigated with potable water.

3. Each Campus shall identify existing single pass cooling systems and constant flow sterilizers and autoclaves in laboratories and develop a plan for replacement.

4. New equipment requiring liquid cooling shall be connected to an existing recirculated building cooling water system, new local chiller vented to building exhaust or outdoors, or to the campus chilled water system through an intervening heat exchange system if available.

   A. Once through or single pass cooling systems shall not be allowed for soft plumbed systems using flexible tubing and quick connect fittings for short term research settings.

B. If no alternative to single pass cooling exists, water flow must be automated and controlled to avoid water waste.

Recycling and Waste Management

1. The University prioritizes waste reduction in the following order: reduce, reuse, and then recycle.
2. The University's goal for diverting municipal solid waste from landfills is as follows:
   - 50 percent as of June 30, 2008
   - 75 percent as of June 30, 2012
   - Ultimate goal of zero waste by 2020

UC Merced Campus Zero Waste Plan

As noted above, the UC Policy on Sustainable Practices requires all UC campuses and medical centers to reach a diversion goal of Zero Waste by June 30, 2020. Diversion refers to the materials directed toward recycling, compost, and re-use rather than being landfilled. (For the purposes of measuring compliance with UC's Zero Waste Goal, campuses need to at least meet or exceed 95 percent diversion of municipal solid waste by 2020. Ultimately, UC's Zero Waste Goal strives for the elimination of all materials sent to the landfill by 2020.) The UC Merced Campus Zero Waste Plan serves as guide to move the UC Merced campus toward its Zero Waste goals.

4.10.4 Impacts and Mitigation Measures

Significance Criteria

This SEIR uses significance criteria derived from Appendix G of the *State CEQA Guidelines*. For the purpose of this SEIR, impacts related to utilities and service systems would be significant if implementation of the 2020 LRDP would:

- Require or result in the relocation or construction of new or expanded water, wastewater treatment facilities or storm water drainage, electric power, natural gas, or telecommunication facilities, the construction or relocation of which could cause significant environmental effects;
- Have insufficient water supplies available to serve the project and reasonably foreseeable development during normal, dry and multiple dry years;
- Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments;

- Generate solid waste in excess of State or local standards, or in excess of the capacity of the local infrastructure, or otherwise impair the attainment of solid waste reduction goals; or
- Fail to comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

Issues Not Discussed Further

Impacts to storm water drainage facilities are discussed in **Section 4.4, Hydrology and Water Quality**. The remaining thresholds that pertain to utilities and service systems are addressed below.

Methodology

The demand for water was estimated based on unit water demand factors developed as part of the Water Supply Evaluation prepared for the 2020 LRDP by West Yost Associates (WYA 2018) (included in **Appendix 4.10**). These factors were derived based on an analysis of historic demand for water by the campus. Wastewater that would be generated was estimated by utilizing the ratio of potable water to wastewater based on 2017 data. Municipal solid waste was estimated based on a campus specific per student rate derived from 2017-2018 data. **Table 4.10-1, Campus Utility Demand**, presents the estimated utility demand of the campus in 2030 with the implementation of the 2020 LRDP. To evaluate potential impacts on utility systems, the proposed project's estimated demand was compared to the available existing and future capacity in the utility systems that serve the campus site.

Table 4.10-1
Campus Utility Demand

	Existing (2017)	2020	2030
Potable Water (AFY)	260	386	623
Wastewater (mgd)	0.14	0.16	0.25
Solid Waste (tons/year)	687	776	1,200
Electricity (MW)	2.5	4.8	10.3
Natural Gas (Therms/hour)	65.2	128.7	276.2

Source: Impact Sciences 2019; West Yost 2019.

4.10.5 LRDP Impacts and Mitigation Measures

LRDP Impact UTL-1: Implementation of the 2020 LRDP would generate demand for potable water for which sufficient water supplies would be available in normal, dry, and multiple dry years. (*Less than Significant*)

The 2009 LRDP EIS/EIR analyzed the potential impacts of campus development under the 2009 LRDP on water supply. The analysis, presented under Impact UTILS-1 in the 2009 LRDP EIS/EIR, was based on the assumption that campus enrollment would increase to 25,000 students by 2030 and that the campus would have an employee population of 6,560 faculty and staff for a total of 31,560 persons. The EIS/EIR estimated a water demand of 2,387 acre-feet per year for the campus by 2030 and compared it to 8,073 acre-feet included in the City's 2005 UWMP for the campus. Given that the campus's demand was estimated to be substantially less than the demand accounted for in the 2005 UWMP, and the UWMP demonstrated that there were adequate supplies to serve the demand, the EIS/EIR concluded that the impact on water supply was less than significant.

As noted in **Section 3.0, Project Description**, UC Merced is now expected to grow at a slower pace than originally anticipated, adding no more than 5,300 additional students between 2020 and 2030, such that by 2030, the enrollment level is expected to be approximately 15,000 students, and the faculty and staff projection for 2030 is also substantially lower than previously projected and analyzed in the 2009 LRDP EIS/EIR. Additionally, in 2015, the City prepared and adopted a new UWMP. Given the change in the proposed project and the conditions in which it would be implemented, an updated analysis of the project's water supply impact is presented below.

The campus receives potable water from the City of Merced pursuant an extraterritorial urban services agreement. The agreement states that the City will serve a campus population of up to 10,000 Full Time Equivalent (FTE) students. The agreement will need to be updated to serve future campus growth under the 2020 LRDP.

Campus development under the 2020 LRDP would result in an increase in campus water demand compared to existing conditions but less than what was analyzed in the 2009 LRDP EIS/EIR. In 2017, the Campus used approximately 260 acre-feet of water. With the completion of the 2020 Project, campus population (students, faculty and staff) is expected to increase to approximately 11,000 by 2020, and water demand is expected to increase to about 386 acre-feet. To estimate UC Merced's projected demand in 2030, a water use factor was developed 575.046 3450288.1 Utilizing this factor and the revised 2030 population projections for the campus, projected water demand for the campus was estimated to be approximately 623 AFY by 2030 (WYA 2018). Refer to **Appendix 4.10,** which presents a Water Supply

Evaluation (WSE) prepared for the proposed project and contains a detailed description of the water demand associated with the campus in 2030. The WSE includes an estimate of the campus' 2030 water demand based on an early (2018) estimate of the 2020 LRDP-related campus population increase. In 2019, UC Merced revised its 2030 population projection down to include a smaller increase in faculty and staff than previously projected in 2018. Please see memorandum in **Appendix 4.10** which shows that based on the revised population projection, the campus's 2030 water demand would be about 612 AFY, and not 623 AFY. As a result, the water demand estimate in the WSE and in the impact analysis below is a conservative estimate.

As described in the April 2017 update to the 2009 LRDP, UC Merced plans to achieve "water neutrality" and reduce water use so that no new water resources are needed to supply the campus. UC Merced has already implemented multiple projects to reduce water use, including:

- Installing an evapotranspiration system that predicts weather conditions and reduces the amount of water needed for irrigation accordingly;
- Reducing irrigation of lawns and other landscaped areas to a level sufficient to minimize the growth of invasive weeds and to keep trees alive;
- Removing annual plants and replacing them with drought resistant species;
- Altering condenser plant operations to more efficiently cool the campus; and
- Developing a system where leaks on water fixtures can be reported by scanning a QR code on the fixture with a mobile device.

While UC Merced recognizes that in the near-term it is not feasible to reduce its net water consumption to zero, it remains committed to reduce water demands as much as possible.

As noted above, the City of Merced updated and adopted its current 2015 UWMP in November 2017. The 2015 UWMP projects and analyzes the City's future demand and water supplies through 2035. That plan estimated and included a demand of 1,406 acre-feet per year for the campus in 2030. That projected demand was based on a projected campus student population of 25,000 students, and associated faculty and staff, and an estimated per capita demand factor of 39 gpcd that was developed in the City's 2015 Water Master Plan based on campus water use from 2007 to 2012.

The total demand of 623 acre-feet per year associated with the campus under the 2020 LRDP is well below 1,406 acre-feet per year anticipated in the 2015 UWMP. The water demand associated with the development of the campus is accounted for in the approved 2015 UWMP. In addition, the 2015 UWMP concluded that the City of Merced has an adequate groundwater supply to meet water demands in its service area through 2035, including the UC Merced water demand, during normal, single-dry, and multi-dry years (WYA 2018). Therefore, there would be sufficient water supplies to serve the proposed project's demand, and the impact of the proposed project on water supply would be less than significant.

As discussed under **LRDP Impact HYD-1**, the three GSAs that manage the Merced Subbasin have completed their GSP which lists priority projects and management actions that the GSAs will implement to reduce water demand, recharge the basin, and increase supply from non-groundwater sources. Plan implementation is to begin in early 2020. As noted earlier, based on modeling of current and projected subbasin conditions, absent implementation of any new supply-side or recharge projects, current agricultural and urban groundwater demand in the Merced Subbasin would need to be reduced by approximately 10 percent in order to balance out the change in groundwater storage over a long-term average condition. On both a per capita basis and total demand basis, the Campus has reduced its demand substantially from previous levels and the reductions are significantly more than the required 10 percent water demand reduction identified in the GSP to bring the groundwater subbasin into balance. The Campus is continuing to implement actions to reduce use of potable water. The Campus will also continue to work with the City and MID to identify other sources of water, including the use of canal water for irrigation and other non-potable uses.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they would not cause the campus population to increase and thereby increase water demand. To the extent a small project would add employees to the campus or increase water demand, those new employees and water demand are accounted for in the analysis above. For the same reasons that are set forth above, the impact of small-scale projects on water supply would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact UTL-2: Implementation of the 2020 LRDP could require the construction of new water supply and conveyance facilities; the construction of these facilities would not result in significant impacts on the environment. (*Less than Significant*)

The 2009 LRDP EIS/EIR analyzed the potential impacts of campus development under the 2009 LRDP on the environment from the construction of new water supply and conveyance facilities. The analysis, presented under Impact UTILS-2 in the 2009 LRDP EIS/EIR, determined that the existing 16-inch water main located in Bellevue Road was adequate to serve the campus through 2030, and that construction of additional water conveyance infrastructure off site would not be required. Similarly, the EIS/EIR found that the on-campus well was adequate to serve the needs of the campus and that construction of additional wells would not be required. The impact related to new water supply and conveyance facilities was determined to be less than significant.

As noted above, the campus's water demand in 2030 would be substantially lower than previously anticipated. Therefore, the existing water main and well are expected to be adequate to serve the campus through 2030. A large water storage tank is located near the campus well. Additional storage tanks may be constructed on the campus as needed to serve the growing campus' fire flow requirements under the 2020 LRDP. The environmental impacts from the development of on-site water infrastructure that may be needed are evaluated in other sections of this SEIR and those impacts that are found to be significant are mitigated by the mitigation measures included in those sections. In summary, the environmental impacts related to water infrastructure are considered less than significant.

Government Code Section 54999 authorizes public utilities to charge the University a limited capital facilities fee under certain circumstances (i.e., a non-discriminatory charge to defray the actual cost of that portion of a public utilities facility actually serving the University). In the event that there are any costs incurred by the City associated with the provision of water to the campus in the future, the University will comply with its obligations as authorized under Section 54999.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they would not increase water demand or the need for water supply and conveyance facilities. To the extent a small project would increase water demand, that increase in water demand and the need for new facilities is accounted for in the analysis above. For the same reasons that are set forth above, the impact of small-scale projects on water supply infrastructure would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact UTL-3: **Implementation of the 2020 LRDP would not require construction of new or expanded wastewater conveyance or treatment facilities; nor would the proposed project result in a determination by the wastewater treatment provider that it has inadequate capacity to serve the project's projected demand in addition to existing commitments. (*Less than Significant*)**

The 2009 LRDP EIS/EIR analyzed the potential impacts of campus development under the 2009 LRDP on the environment from the construction of new or expanded wastewater conveyance and treatment facilities. The analysis, presented under Impact UTILS-3 in the 2009 LRDP EIS/EIR, determined that the existing sewer main in Bellevue Road was adequate to handle wastewater flows from the campus at buildout of the 2009 LRDP (25,000 students and associated faculty and staff); however, the sewer line in G Street had capacity to serve a campus with about 10,000 students. For this reason, the EIS/EIR concluded that off-site improvements to that sewer line would be needed. However, because the capacity expansion would occur within the existing G Street right of way, pipeline construction activities would result in less than significant impacts. With respect to the effect of the campus development on treatment capacity at the City's WWTP, the 2009 LRDP EIS/EIR analysis showed that at full development, the campus would generate 1.13 million gallons per day (mgd) of wastewater for treatment at the WWTP, and that assuming no increases in flows from other sources, there was adequate capacity at the WWTP to handle this flow and an expansion of the facility would not be required. Therefore, the campus's impact on WWTP and wastewater conveyance facilities was determined to be less than significant.

As noted above under **LRDP Impact UTL-1**, UC Merced is now expected to grow at a slower pace than originally anticipated, such that by 2030, the enrollment level is expected to be 15,000 students, and the faculty and staff projection for 2030 is also substantially lower than previously projected and analyzed in the 2009 LRDP EIS/EIR. Given this change in the proposed project and the conditions in which it would be implemented, an updated analysis of the project's impact on wastewater conveyance and treatment capacity is presented below.

As noted earlier, wastewater service is provided to the campus by the City of Merced pursuant an extraterritorial urban services agreement. The agreement states that the City will serve a campus population of up to 10,000 FTE students. The agreement will need to be updated to serve future campus growth under the 2020 LRDP.

As shown in **Table 4.10-2, Wastewater Generation,** in 2017, the campus generated about 52.2 million gallons of wastewater or 0.14 mgd, and with a campus population of approximately 9,500, this equated to approximately 15.1 gpd per person. With the completion of the facilities under 2020 Project and the projected enrollment of 9,700 students by 2020, the campus will accommodate a population of approximately 11,000 persons (students, faculty, and staff). Assuming 15.1 gpd per person, campus wastewater discharge would increase to 0.17 mgd by 2020. Ultimately, with a campus population of approximately 17,700 persons and assuming 15.1 gpd per person, campus wastewater generation would be 0.27 mgd in 2030.

Table 4.10-2
Wastewater Generation

	Existing (2017)	2020	2030
Wastewater Generation (mgd)	0.14	0.17	0.27
Campus Population	9,500	11,000	17,700
Wastewater Generation (gpd)/person	15.1	15.1	15.1

Source: Impact Sciences 2019

Effect on Wastewater Treatment Capacity

Wastewater generated on the campus is currently conveyed to the City's WWTP for treatment and disposal. Wastewater from campus development under the 2020 LRDP would also be discharged to and treated at the City's WWTP. With the addition of 6,700 students, faculty, and staff between 2020 and 2030, the campus would generate an additional 0.10 mgd for a total of 0.27 mgd by 2030. This is substantially lower than 1.13 mgd estimated and analyzed in the 2009 LRDP EIS/EIR.

The WWTP currently treat approximately 8.2 mgd of wastewater. If the projected wastewater flows from the campus development under the 2020 LRDP are added to the existing flows, the WWTP would be required to treat approximately 8.47 mgd. As noted earlier, the City's WWTP is currently has the capacity to treat up to 12 mgd and the City has approved the expansion of the capacity to 20 mgd. This WWTP expansion will be implemented to serve regional population growth with and without the campus. If it is assumed that there are no increases in flows to the WWTP from other sources, the existing WWTP would be adequate to serve the wastewater demands of the campus. Even with increases in flows from other sources, there would be adequate capacity to serve the campus in 2030.

Effect on Conveyance Capacity

Although there would be a substantially lower flow from the campus than previously projected, the existing sewer line on G Street would not be adequate to handle campus flows through 2030. For this reason, the installation of a new line or an upgrade to the existing line on G Street would be needed. These improvements would likely take place within roadway shoulders or under the pavement consistent with current City practice. Because these improvements would be located in already disturbed environments along city roads, the construction of these pipeline improvements would not result in significant environmental impacts. Furthermore, as stated earlier, Government Code Section 54999 authorizes public utilities to charge the University a limited capital facilities fee under certain circumstances. The University will comply with its obligations as authorized under Section 54999. This fee (i.e., a non-discriminatory charge to defray the actual cost of that portion of a public utilities facility actually serving the University) covers UC Merced's share of construction cost, including the cost of mitigation measures to address environmental impacts from the construction of improvements.

In summary, campus development under the 2020 LRDP would not require construction of new or expanded wastewater treatment facilities; nor would the proposed project result in a determination by the wastewater treatment provider that it has inadequate capacity to serve the project's projected demand in addition to existing commitments. Although expansion of conveyance capacity would be needed along G Street, the impact related to wastewater conveyance and treatment facilities would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they are not expected to increase wastewater discharge or contribute to the need for expanded wastewater conveyance facilities. To the extent a small project would result in wastewater discharge, that increase in discharge and the need for new facilities is accounted for in the analysis above. For the same reasons that are set forth above, the impact of small-scale projects on wastewater infrastructure would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact UTL-4: Implementation of the 2020 LRDP would not generate solid waste that is in excess of State or local standards, or in excess of local infrastructure, or otherwise impair attainment of solid waste reduction goals. (*Less than Significant*)

The 2009 LRDP EIS/EIR analyzed the potential impacts of campus development under the 2009 LRDP on the environment from the disposal of municipal solid waste. The analysis, presented under Impact UTILS-4 in the 2009 LRDP EIS/EIR, determined the campus at a 2030 enrollment level of 25,000 students would generate approximately 8,368 tons of solid waste per year, of which about 31 percent or 2,594 tons would be disposed of at the regional landfill, and that the landfill would have adequate capacity to handle this waste and an expansion of the landfill would not be required.

As noted above under **LRDP Impact UTL-1**, UC Merced is now expected to grow at a slower pace than originally anticipated, such that by 2030, the enrollment level is expected to be 15,000 students, and the faculty and staff projection for 2030 is also substantially lower than previously projected and analyzed in the 2009 LRDP EIS/EIR. Given this change in the proposed project and the conditions in which it would be implemented, an updated analysis of the project's impact related to municipal solid waste is presented below.

Based on data provided by UC Merced, in 2017-18, with a student population of about 8,500 students, the campus generated about 678 tons of municipal solid waste. This equates to a rate of approximately 160 pounds per student per year. Of this solid waste, approximately 43 percent was recycled or otherwise diverted and about 57 percent was sent to the Merced County Highway 59 Landfill. With the completion of the 2020 Project under the 2009 LRDP, the campus will accommodate 9,700 students and associated faculty and staff, and assuming 160 pounds per student per year, campus generated solid waste would increase to 773 tons by 2020.

The proposed 2020 LRDP would provide facilities to accommodate an increase of 5,300 students between 2020 and 2030. Based on existing disposal rates, the additional on-campus population in 2030 would generate about 424 tons of additional solid waste per year for a total of about 1,197 tons by 2030, of which about 43 percent would require disposal at Highway 59 Landfill. The University of California Sustainable Practices Policy sets a goal of zero waste by 2020 for UC campuses (meeting zero waste goal means that 90 percent of the waste will be diverted from landfills). The Sustainable Practices Policy also encourages recycling of construction waste. While it is unlikely that the campus would reach the zero waste goal by 2020 given the Campus' 2017 diversion rate of approximately 83 percent for academic and campus operations but a lower rate for housing and dining for a campus-wide average of 43 percent, the Campus would continue to make improvements to its recycling and reuse programs to minimize the amount of solid waste that would go to the County landfill as the campus works to fulfill these goals.

It is anticipated that capacity at the Highway 59 Landfill will be reached in approximately 2065. While full development of the campus would generate more solid waste than existing conditions, it is anticipated that eventually very little solid waste would be disposed of in a landfill in the future. However, in the interim, based on the existing diversion rate of approximately 43 percent, the campus would dispose of about 515 tons of waste per year in the landfill by 2030. This is about 0.11 percent of the permitted annual amount of waste that can be accepted at Highway 59 Landfill, which can accept up to 459,000 tons per year. As the campus anticipates that 90 percent of solid waste would be diverted from the landfill in the future, the amount disposed at the landfill annually would be even lower. As there is adequate capacity available in the landfill, an expansion of the landfill would not be required, and this impact would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they would not generate substantial amounts of solid waste that would require disposal. To the extent a small project would generate solid waste, that increase is accounted for in the analysis above. For the same reasons that are set forth above, the impact of small-scale projects on solid waste infrastructure would be less than significant.

Mitigation Measures: No mitigation is required.

LRDP Impact UTL-5: Implementation of the 2020 LRDP would require on- and off-site improvements to electric transmission lines and natural gas pipelines. (*Less than Significant*)

The 2009 LRDP EIS/EIR analyzed the potential impacts of campus development under the 2009 LRDP on the environment from off-site improvements to electric transmission lines and natural gas pipelines. The analysis, presented under Impact UTILS-4 in the 2009 LRDP EIS/EIR, determined that at full development of the campus in 2030, the campus would require about 18 MW of electricity, and the maximum natural gas demand would be about 1,020 therms/hour. Based on these estimated demands, the EIS/EIR noted that off-site improvements including a 15kV transmission line and potentially a new natural gas pipeline would be required. The EIS/EIR included an evaluation of the programmatic impacts of these off-site improvements and determined that the impacts would be reduced to less than significant levels with mitigation.

As noted above, UC Merced is now expected to grow at a slower pace than originally anticipated, such that by 2030, the enrollment level is expected to be 15,000 students, and the faculty and staff projection for 2030 is also substantially lower than previously projected and analyzed in the 2009 LRDP EIS/EIR. Given this change in the proposed project and the conditions in which it would be implemented, an updated analysis of the project's impact related to off-site electrical and natural gas improvements is presented below. A discussion of the potential impacts associated with the consumption of energy that would result from the implementation of the UC Merced 2020 LRDP project is provided in **Section 4.11, Energy**.

The 2009 LRDP planned for an enrollment of 25,000 students by 2030, and projected that, excluding housing, there would be about 8.9 million square feet of building space on the campus by 2030. The proposed 2020 LRDP plans for a lower enrollment level of 15,000 students by 2030, and excluding housing, the campus is now projected to have about 4.3 million gross square feet of building space by 2030. As a result of the lower amount of building space and population, by 2030, the campus would require 10.3 MW of electricity and the maximum gas demand is projected to be approximately 276 therms/hour.

The estimated maximum electric demand at full development of the campus is based on an "energy efficient scenario," which requires buildings to exceed the basic requirements of Title 24 Energy Code. Given the importance of energy efficiency to Green Building design, the UC Policy on Sustainable Practices sets a goal for all new building projects, other than acute-care facilities, to outperform the required provisions of Title 24 energy-efficiency standards by at least 20 percent. At UC Merced, a more ambitious goal of outperforming Title 24 energy efficiency standards by 30 percent has been set. Current campus buildings, which employ an array of design and technological strategies to minimize and manage campus energy consumption, are using approximately 50 percent less energy than Title 24 standards. The design of new buildings would follow appropriate building design requirements, such as passive solar design, and utilize energy-efficient methods and appliances, such as solar hot water systems and low-flow showerheads. In addition, all new buildings would incorporate energy conservation measures.

Electricity is provided to the campus via a connection to the electrical grid. The campus also has a 1.0 MW ground-mounted solar array and has approved the installation of roof-top solar panels on some of the residence halls on the campus to provide 4.2 MW of power. Another expansion of the ground-mounted solar array is planned. In compliance with UC Policy on Sustainable Practices, power that will be needed by the campus at buildout will be obtained from a number of renewable and alternative technologies, including wind turbines, fuel cells, and photovoltaic systems. In light of the lower estimated demand for electricity in 2030 and the campus initiatives to obtain electricity from on-site renewal sources, no off-site improvements such as additional transmission lines would be required. Similarly, no off-site improvements to provide natural gas to the campus would be required. As a result, there would be no significant environmental effects from the construction of off-site improvements. The impact related to electricity and natural gas would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they would not substantially increase the demand for electricity and/or natural gas. To the extent a small project would increase the demand, that increase is accounted for in the analysis above. For the same reasons that are set forth above, the impact of small-scale projects on energy infrastructure would be less than significant.

Mitigation Measures: No mitigation is required.

4.10.6 Cumulative Impacts and Mitigation Measures

Cumulative Impact C-UTL-1: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not result in a substantial increase in demand for water that would not be served by existing supplies during normal, dry, and multiple dry years. (*Less than Significant*)

The study area for potential cumulative impacts related to provision of water is the City of Merced's service area. The development of the campus under the 2020 LRDP would increase the campus's demand for water compared to existing conditions. As discussed above, the total amount of water needed to serve the campus is well within the amount identified for the campus in the City of Merced UWMP and Water Master Plan. Other past, present, and reasonably foreseeable future development in the City would also place a demand on the City's water supply system. The City's UWMP estimates and reports the projected increase in water demand from 2020 through 2035. The estimated demand is based on past, present, and reasonably foreseeable development within the City's water service area, including the demand associated with the campus.

The City pumps groundwater from the Merced Subbasin (Subbasin 5-22.04), which is located in the San Joaquin Groundwater Basin (Basin Number 5-22). The entire production of the City's well system is derived from this subbasin, which is the primary groundwater aquifer underlying the City. Groundwater from the subbasin is used by the City (including UC Merced), other water districts and private users.

The groundwater aquifer from which the City obtains its water is not adjudicated, and because of this there are no defined legal pumping rights for the City and there are no legal constraints on groundwater pumping. Therefore, as shown by the data in **Table 4.10-3, City of Merced Water Supply and Demand in Normal Years, Single Dry Years, and Multiple Dry Years**, the 2015 UWMP concludes that the City of Merced has an adequate groundwater supply to meet water demands, including the Campus's demand, during normal, single-dry, and multi-dry years.

Table 4.10-3
City of Merced Water Supply and Demand in Normal Years, Single Dry Years, and Multiple Dry Years, AFY[(a)]

	2020	2025	2030	2035
Normal Year				
Supply Totals	31,260	33,287	35,875	37,829
Demand Totals	31,260	33,287	35,875	37,829
Difference	0	0	0	0
Demand Served, %	100%	100%	100%	100%
Single Dry Year				
Supply Totals	33,809	36,034	38,876	41,025
Demand Totals	33,809	36,034	38,876	41,025
Difference	0	0	0	0
Demand Served, %	100%	100%	100%	100%
Multiple Dry Years				
First Year				
Supply Totals	33,809	36,034	38,876	41,025
Demand Totals	33,809	36,034	38,876	41,025
Difference	0	0	0	0
Demand Served, %	100%	100%	100%	100%
Second Year				
Supply Totals	31,260	33,287	35,875	37,829
Demand Totals	31,260	33,287	35,875	37,829
Difference	0	0	0	0
Demand Served, %	100%	100%	100%	100%
Third Year				
Supply Totals	23,614	25,047	26,873	28,241
Demand Totals	23,614	25,047	26,873	28,241
Difference	0	0	0	0
Demand Served, %	100%	100%	100%	100%

Source: City of Merced 2015 UWMP, Tables 7-2, 7-3, 7-4, and 7-5.

However, it is acknowledged that the City's ability to pump groundwater may be impacted in the future due to the Sustainable Groundwater Management Act (SGMA). In 2014, SGMA was signed into law to provide a framework for management of groundwater supplies by local agencies and restricts state intervention, if required. SGMA provides an opportunity for local agencies overlying the basin to form a Groundwater Sustainability Agency (GSA), which is the primary agency responsible for achieving sustainability. As part of the region's compliance with SGMA, as discussed above, three GSAs have been formed to manage the groundwater basin and a GSP has been completed. According to the GSP, sustainability of the Merced Subbasin will be attained through a combination of groundwater management actions and 12 priority projects to increase recharge and secure other sources of water.

The City recognizes that it will need to diversify its water supply and develop sources of water other than groundwater to sustain its projected population growth. The 2015 UWMP notes that the City plans to exchange recycled water for untreated surface water from MID, beginning in 2020. The City's WWTF is capable of producing 12 mgd of tertiary filtered wastewater, which may be used for a variety of non-potable uses. The City currently does not have the infrastructure to distribute the recycled water produced at the WWTF throughout the City. The City would provide recycled water to MID for use primarily by agricultural users. The City would take untreated surface water from MID and use it to irrigate a number of landscaped areas within the City. This exchange would offset the need to construct 12 miles of recycled water pipeline and pump stations from the City's wastewater treatment facility (WWTF). The City's 2014 Water Master Plan also includes a preferred alternative to increase supply that involves the construction of a 10 million gallon per day Surface Water Treatment Plant (SWTP) by 2030 that will receive untreated surface water from MID. The City expects to receive an average of 4,000 AFY from MID. The City's 2015 and future water supplies are presented in **Table 4.10-4, City of Merced Existing and Projected Normal Year Water Supplies,** below**.**

Table 4.10-4
City of Merced Existing and Projected Normal Year Water Supplies, AFY

Supply Source	2015	2020	2025	2030	2035
Groundwater		25,486	27,408	25,901	27,807
Exchanges	-	-	58	105	153
Transfers	-	-	-	4,000	4,000
Recycled Water	4,886	5,774	5,821	5,869	5,869
Total	22,741	31,260	33,287	35,875	37,829

Source: City of Merced 2015 UWMP, Tables 6-11 and 6-12.

There would be a potential for environmental impacts to result from the implementation of these future water supply options. However, there is not sufficient detail available at this time to evaluate the impacts of these options, and any evaluation would involve speculation. Therefore, this SEIR does not attempt to analyze the impacts.

In summary, based on the 2015 UWMP which states that there is adequate groundwater to serve the University's projected demand under normal, single-dry, and multiple dry year conditions, this SEIR concludes that cumulative development would not result in the need for new or expanded water supply entitlements, and the cumulative impact would be less than significant.,

Mitigation Measures: No mitigation is required.

Cumulative Impact C-UTL-2: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not result in a significant cumulative impact on wastewater collection and treatment facilities, such that construction of new or expanded facilities would be required. (*Less than Significant*)

The study area for potential cumulative impacts related to the treatment of wastewater is the City of Merced's service area. As discussed above, the City's WWTP currently has the capacity to treat up to 12 mgd of wastewater and the City has approved the expansion of the capacity of its WWTP to 20 mgd. As noted earlier in this section, according to the City's 2006 WWTP EIR, the WWTP expansion would accommodate wastewater flows from the approved 1997 Specific Urban Development Plan (SUDP) that would generate approximately 17.1 mgd of wastewater, in addition to 2.25 mgd of wastewater flows expected from the full development of the campus based on the University's 2002 estimate of wastewater that would be generated by the campus. As noted under LRDP Impact UTL-2, the wastewater flows from the campus would be about 0.27 mgd in 2030, which is substantially lower than the number used by the City in its plan for the WWTP. The expanded WWTP would be able to serve a population of approximately 174,000 (City of Merced 2011). As a result, with the expansion of the WWTP, there would be enough wastewater treatment capacity to serve growth on the campus (which is less than previously projected for 2030) as well as other past, present, and reasonably foreseeable future development within the City's service area. Therefore, cumulative development within the WWTP's service area would not result in a determination by the wastewater treatment provider that it has inadequate capacity to serve future development in addition to its existing commitments, and the cumulative impact would be less than significant.

As discussed above, implementation of the 2020 LRDP could require the construction of off-site sewer mains. Other development within the City's service area would also require installation of new sewer mains. As new and/or expanded sewer line would be located within street rights-of-way, environmental impacts from these improvements are expected to be minimal and less than significant.

Mitigation Measures: No mitigation is required.

Cumulative Impact C-UTL-3: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not result in a significant cumulative impact on the regional landfill capacity. (*Less than Significant*)

The study area for a potential cumulative impact related to solid waste is the service area of the Highway 59 Landfill, which is eastern Merced County. Implementation of the 2020 LRDP along with other development in eastern Merced County would increase the total amount of municipal solid waste that would require disposal at the Highway 59 Landfill. As discussed above, Highway 59 Landfill has a remaining capacity of 22.6 million cubic yards, and it is estimated that capacity will be reached in approximately 2065. In addition, an expansion of the landfill is planned, which would add approximately 6,857,000 cubic yards capacity and extend the life of the landfill by about 15 years. In 2016, the Merced County Regional Waste Management Authority certified an EIR (SCH No. 2014061081) for the expansion of the Highway 59 Landfill.

While full development of the campus would generate more solid waste than existing conditions, it is anticipated that UC Merced will attain its zero-waste goal and eventually very little solid waste would be disposed of in a landfill. In the event that UC Merced does not meet its zero-waste goal, based on the existing diversion rate of 43 percent, UC Merced would dispose of about 500 tons of waste in the landfill at buildout. Given the relatively small amount of municipal solid waste that would be generated by the proposed project and the large amount of remaining capacity in the landfill, it is anticipated that Highway 59 Landfill would be able to accommodate the solid waste disposal needs of eastern Merced County through 2065. Therefore, cumulative development, including the proposed project, would result in a less than significant cumulative impact on the regional landfill capacity.

Mitigation Measures: No mitigation is required.

Cumulative Impact C-UTL-4: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not result in a significant cumulative impact related to construction of new or expanded electrical and natural gas facilities. (*Less than Significant*)

The study area for a potential cumulative impact related to provision of electrical and natural gas service is eastern Merced County. As discussed above, the campus is a part of the California Independent System Operator's Fresno local area. PG&E provides electricity to the City of Merced and to the campus. There are three PG&E transmission lines near the campus site: the 230-kilovolt (kV) Belotta-Herndon line that originates at the Wilson Substation south of Childs Avenue and terminates north of Bellevue and west of Highway 59; the 115-kV Wilson-Atwater line; and the 70-kV Merced-Merced Falls line.

PG&E currently supplies Merced County, including the existing UC Merced campus, with natural gas. The main pipeline serving the City of Merced is an 8-inch-diameter transmission pipeline that parallels Highway 99 through Merced. The campus is connected to the regional natural gas distribution system via a pipeline aligned along Lake Road. Additional distribution lines and hookups are generally constructed on an as-needed basis.

As discussed above, UC Merced plans to minimize energy use, increase on-site generation of renewable energy, and minimize its dependence on the grid. Campus development under the 2020 LRDP would not require construction of new transmission lines or natural gas pipeline and would not contribute to any environmental impacts from the construction of such facilities.

With respect to environmental impacts from the off-site generation of electricity that would be used by the campus and other new development in eastern Merced County, there is no evidence that the demand would result in the construction of new electric and/or natural gas generating facility, such as a power plant. Because electricity and natural gas can be transmitted for long distances, these can be obtained from a wide range of sources, both in and out of California. As a result of this characteristic, it would be speculative to assume cumulative development would generate the need for a new electric generating facility, or where new facilities would be located, or to evaluate environmental impacts resulting from the construction and operation of new facilities in California. In addition, before new power plants are approved in California, an environmental document would be prepared that analyzes and discloses environmental impacts from the construction and operation of any new power plants and imposes mitigation measures as conditions of project approval to address significant impacts. Therefore, the cumulative impact on electricity generating facilities would be less than significant and is not considered further in this SEIR.

Mitigation Measures: No mitigation is required.

4.10.7 References

City of Merced. 2011. *Merced Vision 2030 General Plan Environmental Impact Report.* July.

City of Merced. 2017. *City of Merced 2015 Urban Water Management Plan*. Prepared by Carollo Engineers, Inc. May.

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4.11 ENERGY

4.11.1 Introduction

This section of the Recirculated Draft SEIR (SEIR) evaluates potential impacts associated with the consumption of energy that would result from the implementation of the proposed UC Merced 2020 LRDP (proposed project).

4.11.2 Environmental Setting

Electricity

Electricity generated within California in 2017 was from natural gas (43 percent), renewable resources (29 percent), large hydroelectric (18 percent), nuclear (9 percent), and coal (<1 percent) (CEC 2018a). The rest of the electricity used in the state was generated within the United States either in the Southwest or Pacific Northwest. The State's power mix, based on in-state generation and out-of-state purchases in 2017 was comprised of natural gas (34 percent), renewable resources (29 percent), large hydroelectric (15 percent), coal (4 percent), nuclear (9 percent), and additional unspecific sources of power (9 percent) (CEC 2018a). In 2017, the total system power generated was 292,039 GWh, which is up about 0.5 percent from 2016's total system electric generation of 290,567 GWh (CEC 2018a).

In 2016-17, the campus used 21.6 million kilowatt hours (kWh) of electricity, with peak daily consumption occurring in November. The monthly usage ranged between 1.4 million kWh and 2.2 million kWh (UCM 2018). Of the electricity used on the campus, about 11 percent (2.3 kWh) were generated on-site by the campus solar array.

The campus is a part of the California Independent System Operator's Fresno local area. Currently, Pacific Gas and Electric (PG&E) provides electricity to the City of Merced and the UC Merced campus. The campus site is within PG&E's Wilson 115-kilovolt (kV) subarea. There are three PG&E transmission lines near the campus site: the 230-kV Belotta-Herndon line that originates at the Wilson Substation south of Childs Avenue and terminates north of Bellevue and west of Highway 59; the 115-kV Wilson-Atwater line; and the 70-kV Merced-Merced Falls line.

Natural Gas

In 2012, natural gas used within California was extracted in the state (9 percent), Canada (16 percent), the Rocky Mountain region of the United States (40 percent), and in the southwest United States (35 percent) (CPUC 2017). In 2012, natural gas was used in California to produce electricity (45.6 percent), in residential uses (21 percent), in industrial uses (25 percent), and in commercial uses (8.6 percent). The total natural gas usage in 2012 was 2,313,000 BBTU/year (CEC 2016a).

In 2017-18, the campus used a total of 571,000 therms of natural gas. PG&E currently supplies Merced County, including the existing UC Merced campus, with natural gas. The main pipeline serving the City of Merced is an 8-inch-diameter transmission pipeline that parallels Highway 99 through Merced. The campus is connected to the regional natural gas distribution system via a pipeline aligned along Lake Road. Additional distribution lines and hook-ups are generally constructed on an "as-needed" basis.

Petroleum Based Fuel

In 2015, 15.1 billion gallons of gasoline (non-diesel) and 1.6 billion gallons of diesel fuel were sold statewide (CEC 2018b). In 2016, 101 million gallons of gasoline were purchased in Merced County, in addition to 59 million gallons of diesel fuel (CEC 2016b). Both gasoline and diesel consumption in 2016 were slightly lower than the California Energy Commission's (CEC) projections.

UC Merced has a transportation fleet of approximately 75 vehicles and 59 golf carts. There is an on-campus fueling station, located in the corporation yard, that is used for grounds equipment only (i.e., not for UC Merced vehicles.

4.11.3 Regulatory Considerations

Federal Regulations

Energy Policy and Conservation Act

Enacted in 1975, this legislation established fuel economy standards for new light-duty vehicles sold in the U.S. The law placed responsibility on the National Highway Traffic and Safety Administration (a part of the U.S. Department of Transportation) for establishing and regularly updating vehicle standards. The U.S. EPA administers the Corporate Average Fuel Economy (CAFE) program, which determines vehicle manufacturers' compliance with existing fuel economy standards. Since the inception of the CAFE program, the average fuel economy for new light-duty vehicles (autos, pickups, vans, and SUVs) steadily increased from 13.1 mpg for the 1975 model year to 27.5 mpg for the 2012 model year and is proposed to increase to 54.5 by 2025.

Energy Policy Act of 2005

On August 8, 2005, the President signed the National Energy Policy Act of 2005 into law. This comprehensive energy legislation contains several electricity-related provisions that aim to:

- Help ensure that consumers receive electricity over a dependable, modern infrastructure;
- Remove outdated obstacles to investment in electricity transmission lines;
- Make electric reliability standards mandatory instead of optional; and
- Give federal officials the authority to site new power lines in Department of Energy-designated national corridors in certain limited circumstances

Vehicle Standards

Other regulations have been adopted to address vehicle standards, including the U.S. EPA and the National Highway Safety Administration (NHTSA) joint rulemaking for vehicle standards.

- On March 30, 2009, the NHTSA issued a final rule for model year 2011 (NHSTA 2009).
- On May 7, 2010, the U.S. EPA and the NHTSA issued a final rule regulating fuel efficiency and GHG emissions pollution from motor vehicles for cars and light-duty trucks for model years 2012–2016 (U.S. EPA 2010).
- On August 9, 2011, U.S. EPA and NHTSA issued a Supplemental Notice of Intent announcing plans to propose stringent, coordinated federal GHG emissions and fuel economy standards for model year 2017-2025 light-duty vehicles (U.S. EPA and NHTSA 2011).
- NHSTA intends to set standards for model years 2022-2025 in a future rulemaking (NHSTA 2012).
- In addition to the regulations applicable to cars and light-duty trucks, on August 9, 2011, the U.S. EPA and the NHTSA announced fuel economy and GHG emissions standards for medium- and heavy-duty trucks that applies to vehicles from model year 2014–2018 (U.S. EPA 2011).
- Energy Independence and Security Act (EISA)
- Among other key measures, the EISA would do the following, which would aid in the reduction of national GHG emissions, both mobile and non-mobile:
- Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
- Prescribe or revise standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

While superseded by NHTSA and U.S. EPA actions described above, EISA also set miles per gallon targets for cars and light trucks and directed the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.

Additional provisions of the EISA address energy savings in government and public institutions, promoting research for alternative energy, additional research in carbon capture, international energy programs, and the creation of “green jobs.”

Regulations for Greenhouse Gas Emissions from Passenger Cars and Trucks and Corporate Average Fuel Economy Standards

In October 2012, U.S. EPA and NHSTA, on behalf of the Department of Transportation, issued final rules to further reduce GHG emissions and improve CAFE standards for light-duty vehicles for model years 2017 and beyond (77 FR 62624). This program would increase fuel economy to the equivalent of 54.5 miles per gallon (mpg) limiting vehicle emissions to 163 grams of carbon dioxide (CO2) per mile for the fleet of cars and light-duty trucks by model year 2025 (77 FR 62630). In January 2017, U.S. EPA Administrator signed a Final Determination to maintain the current GHG emissions standards for model year 2022-2025 vehicles. However, on March 15, 2017, U.S. EPA Administrator, and Department of Transportation Secretary announced that U.S. EPA intends to reconsider the Final Determination. On April 2, 2018, U.S. EPA Administrator officially withdrew the January 2017 Final Determination, citing information that suggests that these current standards may be too stringent due to changes in key assumptions since the January 2017 Determination. According to the U.S. EPA, these key assumptions include gasoline prices and overly optimistic consumer acceptance of advanced technology vehicles. The April 2nd notice is not U.S. EPA’s final agency action. The U.S. EPA intends to initiate rulemaking to adopt new standards. Until that rulemaking has been completed, the current standards remain in effect (U.S. EPA 2017, U.S. EPA 2018).

Energy Star Program

In 1992, the U.S. EPA introduced Energy Star as a voluntary labeling program designed to identify and promote energy-efficient products to reduce greenhouse gas emissions. The program applies to major household appliances, lighting, computers, and building components such as windows, doors, roofs, and heating and cooling systems. Under this program, appliances that meet specifications for maximum energy use established under the program are certified to display the Energy Star label. In 1996, U.S. EPA joined with the Energy Department to expand the program, which now also includes qualifying commercial and industrial buildings, and homes.

State Regulations

Title 24

Title 24, Part 6, of the California Code of Regulations contains the California Energy Commission's (CEC) Energy Efficiency Standards for Residential and Nonresidential Buildings. Title 24 was first established in 1978, in response to a legislative mandate to reduce California's energy consumption. Since that time, Title 24 has been updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods.

On April 23, 2008, the CEC adopted the 2008 standards, which applied to projects that submitted an application for a building permit on or after January 1, 2010. The CEC adopted the 2008 standards for a number of reasons: (1) to provide California with an adequate, reasonably priced, and environmentally sound supply of energy; (2) to respond to Assembly Bill 32 (AB 32; the Global Warming Solutions Act of 2006), which requires California to reduce its greenhouse gas emissions to 1990 levels by 2020; (3) to pursue the statewide policy that energy efficiency is the resource of choice for meeting California's energy needs; (4) to act on the findings of California's Integrated Energy Policy Report, which indicate that the 2008 Standards are the most cost-effective means to achieve energy efficiency, reduce the energy demand associated with water supply, and reduce greenhouse gas emissions; (5) to meet the West Coast Governors' Global Warming Initiative commitment to include aggressive energy efficiency measures in the update of all state building codes; and (6) to meet the Executive Order in the Green Building Initiative to improve the energy efficiency of nonresidential buildings through aggressive standards.[1] In 2013, updates were made to the 2008 Title 24 standards (effective January 1, 2014).

The California Green Building Standards Code, which is Part 11 of the Title 24 Building Standards Code, is commonly referred to as the CALGreen Code. The 2008 edition, the first edition of the CALGreen Code, contained only voluntary standards. The CALGreen Code was last updated in 2016 and became effective January 2017. The CALGreen Code identifies mandatory requirements for new residential and nonresidential buildings (including buildings for retail, office, public schools, and hospitals) throughout California. The CALGreen Code contains requirements for construction site selection, stormwater control during construction, construction solid waste reduction, indoor water use reduction, building material selection, natural resource conservation, site irrigation conservation, and more. Additionally, this code encourages buildings to achieve exemplary performance in the area of energy efficiency.

1 See http://www.energy.ca.gov/title24/2008standards/index.html, 2013.

AB 32, Executive Order S-3-05, Executive Order B-30-15, and SB 32

In addition to Title 24, a number of state laws and regulations, including AB 32, Executive Order S-3-05, Executive Order B-30-15, and SB 32, are anticipated to result in the future regulation of energy resources in California. (See **Section 4.3, Greenhouse Gas Emissions,** for additional information on AB 32, SB 32, Executive Order S-3-05, and Executive Order B-30-15.) In order to achieve the GHG emission reductions targeted under these state laws, it is generally accepted that California will need to improve its overall energy efficiency as well as continue to increase its use of renewable energy resources. Pursuant to AB 32 and SB 32, the California Air Resources Board (CARB) will work with other state agencies (including the CEC), to implement feasible programs and regulations that reduce emissions and improve energy efficiency.[2]

Senate Bill 350

Senate Bill 350 (SB 350) was signed into law in 2015. The legislation requires that, by 2030, 50 percent of all electricity provided by power plants in California must be from renewable sources. SB 350 further requires the CEC to establish annual targets for statewide energy efficiency savings and demand reductions that would achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas by retail customers by 2030. The bill requires the Public Utilities Commission (PUC) to establish efficiency targets for investor-owned electrical and gas corporations consistent with the 2030 goal, and the CEC to establish annual targets for energy efficiency savings and demand reductions for local publicly owned electric utilities consistent with the 2030 goal. Each retailer of electricity must regularly file an integrated resource plan (IRP) for review and approval. This bill requires that the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be at 50 percent of the total sold energy by December 31, 2030.

Other Energy Related Statutes and Executive Orders

Additional legislation and executive orders focused on energy efficiency in California are highlighted briefly below:

- Senate Bill 107: This legislation, which addresses California's Renewables Portfolio Standard (RPS), required retail sellers of electricity to procure 20 percent of retail sales from renewable energy.
- Assembly Bill 1613: This legislation, also known as the Waste Heat and Carbon Emissions Reduction Act, was designed to encourage the development of new combined heat and power systems in California with a generating capacity of up to 20 megawatts (MW).

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2 See http://www.arb.ca.gov/cc/ghgsectors/ghgsectors.htm#electric, September 13, 2013 (highlights targeted improvements for the energy sector).

- Senate Bill 1: This legislation enacted the Governor's Million Solar Roofs program and has an overall objective of installing 3,000 MW of solar photovoltaic systems.
- Senate Bill 1389: This legislation requires the CEC to prepare a biennial integrated energy policy report that contains an assessment of major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety.
- Executive Order S-14-08: This order established accelerated RPS targets—specifically 33 percent by 2020.
- Executive Order S-21-09: This order required CARB to adopt regulations, increasing California's RPS to 33 percent by 2020.
- Senate Bill SBX1-2: This legislation established new RPS goals of 20 percent of retail sales from renewables by the end of 2013, 25 percent by the end of 2016, and 33 percent by the end of 2020.[3]

Local Plans and Policies

University of California Sustainable Practices Policy

The University of California Sustainable Practices Policy, most recently updated in August 2018, is a system-wide commitment to minimize the University's impact on the environment and reduce its dependence on non-renewable energy sources. The Sustainable Practices Policy establishes goals in nine areas of sustainable practices: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice, sustainable water systems. More information on the Sustainable Practices Policy is presented in **Section 4.3, Greenhouse Gas Emissions**.

Sustainability Strategic Plan 2017-2022

The Sustainability Strategic Plan 2017-2022 lays out UC Merced's sustainability goals for the next five years. The plan was designed as a living document to be reviewed annually with a progress report that outlines accomplishments.

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[3] PG&E is currently under contract through 2020 to procure 37 percent of retail sales from renewable energy sources.

The Sustainability Goal is to:

> "Create and institutionalize an ever evolving collection of sustained, supported, and meaningful projects/ actions that develop resiliency and create practical lasting solutions."
>
> This goal was designed to specifically align to five of the UC Merced Campus Vision goals including:
>
> > **Sustainable By Design**: Through the incubation and support of new and emerging sustainability initiatives.
> >
> > **Enriching the Valley By**: Encouraging and supporting collaborative projects and initiative efforts that will impact the Central Valley.
> >
> > **Partnering with an Emerging California**: Supporting collaborative efforts to partner with broad groups of stakeholders throughout California to support UC Merced's sustainability efforts.
> >
> > **Leading Creativity and Innovation**: Demonstrating ingenuity and originality through initiatives that advance campus wide sustainability.
> >
> > **Culture of Inquiry, Discovery and Learning**: Acquiring new knowledge that advances campus sustainability efforts.

4.11.4 Impacts and Mitigation Measures

Significance Criteria

This SEIR uses significance criteria derived from Appendix G of the *State CEQA Guidelines*. For the purposes of this SEIR, implementation of the 2020 LRDP would result in a potentially significant environmental impact if it:

- Involves wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; or
- Conflicts with or obstruct a state or local plan for renewable energy or energy efficiency.

Methodology

CEQA requires the environmental document to report the total energy resources that would be used in association with a proposed project during construction and operation of the project. The methodology used to estimate the construction-phase energy use is described in **LRDP Impact EN-1** below. With respect to energy consumption during occupancy/operation, the increased electricity and natural gas demand due to operation/occupancy of the proposed project were obtained from the project description.

4.11.5 LRDP Impacts and Mitigation Measures

LRDP Impact EN-1: **Construction and operation of campus development under the 2020 LRDP would increase the use of energy resources on the campus but would not result in wasteful, inefficient or unnecessary consumption of energy resources, nor would the increased energy use conflict with a state or local plan for renewable energy or energy efficiency.** ***(Less than Significant)***

Construction

During construction of campus facilities under the 2020 LRDP, energy would be consumed in the form of petroleum-based fuels used to operate off-road construction vehicles and equipment on the project site, construction worker vehicles traveling to and from construction sites, as well as delivery truck trips; and to operate generators to provide temporary power for lighting and equipment. The manufacture of construction materials used by development under the 2020 LRDP would also involve energy use. Due to the large number of materials and manufacturers involved in the production of construction materials (including manufacturers in other states and countries), upstream energy use cannot be reasonably estimated. However, it is reasonable to assume that manufacturers of building materials such as concrete, steel, etc., would employ all reasonable energy conservation practices in the interest of minimizing the cost of doing business. Furthermore, UC Merced has no control over or the ability to influence energy resource use by the manufacturers of construction materials. Therefore, this analysis does not evaluate upstream energy use.

Campus development under the 2020 LRDP would require site preparation; grading; pavement and asphalt installation; building construction; architectural coating; and landscaping and hardscaping. No demolition would be required. All construction would be typical for the region and building type. The total consumption of gasoline and diesel fuel during construction activities under the 2020 LRDP was estimated using the same assumptions and factors from CalEEMod that were used in estimating construction air emissions in **Section 4.1, Air Quality**. The estimated amounts of energy resources that would be consumed are presented in **Table 4.11-1, Construction Period Petroleum Fuel Consumption** below (see **Appendix 4.11** for detailed breakdown).

Table 4.11-1
Construction Period Petroleum Fuel Consumption

Diesel Fuel (in gallons)[a]	Gasoline (in gallons)
630,451	1,946,547

Source: CalEEMod Model Data; Impact Sciences 2019.
[a] *Includes consumption from off-road construction equipment, vendor trips, and hauling trips.*
[b] *Includes consumption from worker trips.*
[c] *Construction period is assumed to be 10 years (2021 to 2030)*

As shown in **Table 4.11-1**, above, off-road construction equipment, vendor trips, and hauling trips would consume approximately 0.63 million gallons of diesel over the entire 2020 LRDP construction period. Worker trips would consume about 1.9 million gallons of gasoline over the 2020 LRDP construction period. These amounts would be consumed over a period of 10 years and would represent a small percentage of the total energy used in the state. More importantly, for reasons presented below, this consumption would not represent a wasteful and inefficient use of energy resources.

There is growing recognition that sustainable construction is not any more expensive than "business as usual" construction methods, and further, that there are long-term significant cost-savings potential in utilizing green building practices and materials. In addition, development under the 2020 LRDP would feature a sustainable design to comply with CALGreen, which would also result in the use of sustainable materials and recycled content that would reduce energy consumption during construction. Construction materials would be products originating from nearby sources to the extent feasible in order to comply with CALGreen and to reduce costs of transporting construction materials long distances.

The project would also be required to comply with CARB's adopted Airborne Toxic Control Measure (ATCM) to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel particulate matter and other toxic air contaminants. This measure prohibits diesel-fueled commercial vehicles greater than 10,000 pounds from idling for more than 5 minutes at any given time, and thereby helps avoid wasteful use of energy. Furthermore, contractors have a strong financial incentive to avoid wasteful, inefficient, and unnecessary consumption of energy during construction.

For the reasons listed above, construction activities under the 2020 LRDP, including the construction of small-scale projects, would not involve the inefficient, wasteful, and unnecessary use of energy during construction and the construction-phase impact related to energy consumption would be less than significant.

Operation

Campus operation under the 2020 LRDP would result in a net new demand of approximately 211 therms of natural gas per year and a net new electricity demand of 7.8 megawatts per year (MW/yr).

Title 24 represents the state policy on building energy efficiency. The goals of the Title 24 standards are to improve energy efficiency of residential and non-residential buildings, minimize impacts during peak energy-usage periods, and reduce impacts on state energy needs. UC Sustainable Practices Policy requires buildings to exceed Title 24 by 20 percent or meet energy performance targets. At UC Merced, a more ambitious goal of outperforming Title 24 energy efficiency standards by 30 percent has been set. Current campus buildings, which employ an array of design and technological strategies to minimize and manage campus energy consumption, are using approximately 50 percent less energy than Title 24 standards. The design of new buildings would follow appropriate building design requirements, such as passive solar design, and utilize energy-efficient methods and appliances, such as solar hot water systems and low-flow showerheads. In addition, all new buildings under the 2020 LRDP would incorporate energy conservation measures.

The University also requires all UC projects to achieve a minimum of a Silver rating under United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) Building Design and Construction (BD+C) v4.0 Green Building Rating System (the LEED Rating System). The campus also has a 1.0 MW ground-mounted solar array and has installed roof-top solar panels on some of the residence halls on the campus to provide 4.2 MW of power. Another expansion of the ground-mounted solar array is planned. In compliance with UC Sustainable Practices Policy, 100 percent of the power that will be needed by the campus at buildout will be obtained from a number of renewable and alternative technologies, including wind turbines, fuel cells, and photovoltaic systems.

Thus, with compliance with Title 24 and consistency with the UC Sustainable Practices Policy, electricity and natural gas use on the campus would not be inefficient, wasteful, and unnecessary, nor would the increased energy use associated with the 2020 LRDP conflict with a state or local plan for renewable energy or energy efficiency. The impact would be less than significant.

With respect to small-scale projects that may be located within lands designated CMU, CBRSL or ROS, due to the location, small size, and nature of these projects, they would not increase demand for electricity or natural gas. To the extent a small project would increase demand, that increase in demand is accounted for in the analysis above. For the same reasons that are set forth above, the impact of small-scale projects on energy resources would be less than significant.

Petroleum-Based Fuel

Implementation of the 2020 LRDP would result in the consumption of petroleum-fuel related to vehicular travel (quantified as vehicle miles travelled (VMT)) to and from the project site. **Table 4.11-2, Estimated Petroleum-based Fuel Usage at Buildout**, below, presents the projected consumption of approximately 447,340 gallons of diesel and 785,340 gallons of gasoline per year, or a total of 1.23 million gallons of petroleum-based fuels per year based on an annual estimate of 17,516,332 VMT[4] obtained from the CalEEMod results for the proposed project.

This level of annual consumption is primarily based on fuel efficiency rates (miles per gallon) shown in **Table 4.11-2**. State laws and regulations will continue to require further improvements in fuel efficiency in motor vehicles produced and/or sold in California as well as a push towards more zero emissions vehicles (ZEV) in the California vehicle mix, and total annual consumption of petroleum-based fuel is expected to decrease over time.

Table 4.11-2
Estimated Petroleum-Based Fuel Usage at Buildout

Source	Fleet Mix [a]	Generation Factor [b, c]	Annual Consumption (in gallons)
Mobile			
Diesel (gallons)	16.6%	17,516,332/6.5 mpg	447,340
Gasoline (gallons)	83.4%	17,516,332/18.6 mpg	785,410
Total			1,232,750

Source: CalEEMod Model Data; Impact Sciences 2019.
mpg = miles per gallon
[a] *Data Source: FHWA OHPI, Highway Statistics, Fuel Consumption by State and Type http://www.fhwa.dot.gov/policyinformation/pubs/hf/pl11028/chapter5.cfm*
[b] *Data Source: California Department of Transportation, 2007 California Motor Vehicle Stock, Travel and Fuel Forecast, http://www.energy.ca.gov/2008publications/CALTRANS-1000-2008-036/CALTRANS-1000-2008-036.PDF*
[c] *Rentar Environmental Solutions, Inc. 2017. Here Are The Diesel Truck Miles Per Gallon (MPG). Available online at: https://rentar.com/diesel-truck-miles-per-gallon-mpg/, accessed August 22, 2018.*

California consumed a total of 15.1 billion gallons of gasoline and 1.6 billion gallons of diesel fuel in the year 2015 (CEC 2018b). As shown in **Table 4.11-2** above, additional automobile use under the 2020 LRDP would result in the consumption of approximately 785,340 gallons of gasoline and 447,340 gallons of diesel. This would represent approximately 0.005 percent of the statewide annual gasoline consumption and less than 0.028 percent of the statewide annual diesel consumption. As the question posed by the significance criteria is whether the use of this energy is inefficient or wasteful, it is notable that the GHG impact evaluation for the proposed project in **Section 4.3** shows that the per capita emissions under the

[4] CalEEMod default trip lengths were used, which is an average trip length of approximately 7.37 miles.

2020 LRDP from all energy use, including petroleum-based fuel use, will not exceed the threshold. Although the total emissions from all energy use would exceed the total emissions threshold, they would be reduced to a less than significant level with mitigation. As shown in in **Section 4.3,** the GHG emissions from development under the 2020 LRDP are driven by the use of energy in vehicles, with approximately 54 percent of emissions from petroleum-based fuel use. Since the GHG analysis concludes that with mitigation, the emissions will be below the established thresholds, it provides support to the conclusion that use of energy by the campus under the 2020 LRDP will not be wasteful or inefficient.

For the reasons listed above, campus development under the 2020 LRDP, including small-scale projects, would not involve the inefficient, wasteful, and unnecessary use of energy during operation nor would it conflict with a state or local plan for renewable energy or energy efficiency. The operation-phase energy impact would be less than significant.

Mitigation Measures: No mitigation is required.

4.11.6 Cumulative Impacts and Mitigation Measures

Cumulative Impact C-EN-1: Implementation of the 2020 LRDP would not contribute substantially to a cumulative impact on energy resources. ***(Less than Significant)***

LRDP Impact EN-1 above estimates and reports the potential increase in energy use that would result from campus development under the 2020 LRDP, both in terms of construction-phase energy use and operational energy use. The analysis above shows that although energy use would increase on the campus as a result of the construction of additional building space and increased campus population, the incremental energy use would not be wasteful or inefficient. Existing campus buildings are using approximately 50 percent less energy than Title 24 standards. At UC Merced, an ambitious goal of outperforming Title 24 energy efficiency standards by 30 percent has been set. All new buildings under the 2020 LRDP would incorporate energy conservation measures and design features to meet or exceed this goal. Similarly, UC Merced will increase the supply of on-campus student housing and continue to expand and improve its TDM program to minimize private automobile use and associated petroleum-based fuel use. Due to the policies and programs that would minimize energy use, the incremental demand that the campus would place on energy resources would not represent a substantial contribution to the cumulative demand for energy resources in the region. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

4.11.7 References

California Energy Commission (CEC). 2016a. *Energy Almanac, Retail Fuel Report and Data for California*. Available online at: http://www.energy.ca.gov/almanac, accessed October 21, 2018.

CEC. 2016b. California Annual Retail Fuel Outlet Report Results (CEC-A15). October.

CEC. 2018a. *2016 Total System Electric Generation in Gigawatt Hours.* Available at: http://www.energy.ca.gov/almanac/electricity_data/total_system_power.html, accessed August 22, 2018.

CEC. 2018b. California Gasoline Data, Facts, and Statistics. Available online at: http://www.energy.ca.gov/almanac/transportation_data/gasoline/, accessed August 22, 2018.

California Public Utilities Commission (CPUC). 2017. *Natural Gas and California*. Available at: http://www.cpuc.ca.gov/natural_gas/, accessed June 26, 2017.

U.S. Environmental Protection Agency (U.S. EPA). 2017. Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emissions Standards for Model Years 2022-2025. Available online at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/midterm-evaluation-lightduty-vehicle-greenhouse-gas, accessed August 15, 2017.

U.S. EPA. 2018. Mid-term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-duty Vehicles. Notice. April 2, 2018. 40 CFR Part 86. Docket No. EPA-HQOAR-2015-0827. Available online at: https://www.epa.gov/sites/production/files/2018- 04/documents/mte-final-determination-notice-2018-04-02.pdf, accessed April 5, 2018.

5.0 ALTERNATIVES

5.1 INTRODUCTION

This section of the Recirculated Draft SEIR (SEIR) presents an analysis of the alternatives to the proposed 2020 LRDP. CEQA requires that an EIR describe a range of reasonable alternatives to the proposed project or to the location of the project that could feasibly avoid or lessen any significant impacts while feasibly attaining most of the basic objectives of the proposed project. An EIR should also evaluate the comparative merits of the alternatives. This section sets forth potential alternatives to the proposed project and evaluates them, as required by CEQA.

Key provisions of the *State CEQA Guidelines* pertaining to the analysis of alternatives are summarized below:

- The discussion of alternatives shall focus on alternatives to the project or its location that are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives or would be more costly.
- The range of alternatives required in an EIR is governed by a "rule of reason." Therefore, the EIR must evaluate only those alternatives necessary to permit a reasoned choice. The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project.
- The No Project alternative shall be evaluated along with its impacts. The analysis of the No Project alternative shall discuss the existing conditions at the time the notice of preparation is published. Additionally, the analysis shall discuss what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.
- For alternative locations, only locations that would avoid or substantially lessen any of the significant effects of the project need be considered for inclusion in the EIR.
- An EIR need not consider an alternative whose effects cannot be reasonably ascertained and whose implementation is remote and speculative.
- The range of feasible alternatives should be selected and discussed in a manner intended to foster meaningful public participation and informed decision-making. Among the factors that may be taken into account when addressing the feasibility of alternatives are environmental impacts, site suitability, economic viability, availability of infrastructure, general plan consistency, regulatory limitations, jurisdictional boundaries, and whether the project proponent could reasonably acquire, control, or otherwise have access to an alternative site.
- The EIR should also identify any alternatives that were considered but rejected as infeasible and briefly explain the reasons underlying the lead agency's determination. Among the factors that may be used to eliminate alternatives from further detailed consideration in an EIR are: (1) failure to meet

most of the basic project objectives; (2) infeasibility; or (3) inability to avoid significant environmental impacts.

- The description of each alternative must be sufficient to allow meaningful evaluation and comparison with the proposed project. The lead agency must also identify the environmentally superior alternative in the Draft EIR.

5.2 PROJECT HISTORY

In 1988, The Regents of the University of California (The Regents) authorized the President of the University to initiate planning for additional campuses to accommodate the student population expected in the latter part of the 20th century and into the 21st century. In 1990, The Regents further determined that the search for the site of the first new campus should focus on the central portion of the Central Valley, specifically the San Joaquin Valley, which was not served by a University of California (UC) campus and where the average university attendance rates for high school graduates were much lower than the state average. More than 85 sites in the Central Valley were considered and, based on a number of factors including but not limited to demographics, transportation, and access to amenities, the University narrowed the list to 20 candidate sites in 1990. In the same year, based on additional evaluation the University further narrowed the potential locations to eight proposed sites. In 1991, three of the eight sites were selected for further analysis and environmental review.

A programmatic EIR was then prepared that presented the impacts from the development of a campus at any of the three sites. That EIR, titled the Site Selection EIR (SCH No. 1994022033), was certified by The Regents in 1995, and the Lake Yosemite site in eastern Merced County was selected by The Regents as the potential location for the development of the 10th UC campus and an associated, contiguous, and supporting community (University Community). The site was located within a 7,000-acre property owned by the Virginia Smith Trust (VST). Within the VST property, the campus site was identified in the Site Selection EIR as 2,000 acres in the northwestern portion of the property and consisted of rolling hills and grasslands. In 2000–01, the University and Merced County commenced the planning and environmental review of the development of the campus and the University Community at the Lake Yosemite site. Concurrent with the planning process, the University initiated early consultation with federal and state regulatory agencies to help expedite the permitting of the proposed campus project. In response to input from the agencies and public concern regarding the potential impact on vernal pools and biological resources from siting the campus on the original 2,000-acre site, in late 2000, the University adjusted the campus site to occupy the southwestern portion of the VST property. This shift in the location of the campus also entailed the relocation of the adjacent University Community to the south of and outside of the VST property. This shift reduced impacts to vernal pools and biological resources by approximately 90 percent and the relocation also resulted in a significant reduction of about 750 acres in the size of both the campus and the University Community.

In 2001 and 2002, the University prepared a Long Range Development Plan (LRDP) to guide the development of the campus at this site, which was located immediately adjacent to Lake Yosemite Regional Park and prepared an EIR to evaluate and disclose the program-level impacts from the implementation of the proposed LRDP. The 910-acre campus site included an existing 200-acre golf course, about 100 acres of which were developed with a clubhouse, roads, and parking and did not contain any wetlands or other sensitive resources. This area was identified as the location of the first phase of campus facilities and was analyzed at a project-level in the 2002 LRDP EIR. At the same time, Merced County commenced the preparation of a University Community Plan (UCP) to guide the development of the University Community and designate the site in its General Plan for this use, and the preparation of an EIR for the UCP.

The UC Merced 2002 LRDP EIR evaluated 10 on-site alternatives and 8 off-site alternatives to the proposed project. It also provided updated information regarding five alternatives that were previously evaluated in the Site Selection EIR and demonstrated that even with more information available at that time regarding the proposed campus, none of those previously considered alternative locations for the campus were feasible. In 2002, The Regents approved the location of the campus on the 910-acre site adjacent to Lake Yosemite Regional Park, including the development of Phase 1 facilities on the former golf course site.

Upon approval of the 2002 LRDP, the University submitted a Section 404 permit application to the U.S. Army Corps of Engineers (USACE) to obtain authorization to fill wetlands and other waters of the U.S. located on the campus site and the northern portion of the adjacent University Community. The USACE initiated the NEPA process in 2002. Prior to completion of a Draft EIS evaluating the proposed action, the University held a series of meetings with the USACE, U.S. EPA, USFWS, and Merced County to determine whether an additional alternative could be developed that avoided additional wetlands while addressing the University's concerns about the practicability of the alternatives suggested by the USACE. These meetings resulted in the development of a revised footprint for the Campus and University Community, which underwent additional refinement in coordination with a coalition of environmental groups. This refined footprint, which included an 815-acre campus site and an 833-acre University Community North site, then became the Proposed Action that was evaluated in a joint EIS/EIR prepared by the University and the USACE in 2008 and 2009. The 2009 LRDP EIS/EIR included the evaluation of two on-site and two off-site alternatives. It also included a project-level analysis of the environmental impacts from the development of Phase 2 of the campus. The EIS/EIR was certified in March 2009. Since 2009, campus development has been guided by the 2009 LRDP. In 2013, and in 2017, the University prepared two addenda to the 2009 LRDP EIS/EIR to modify the land use plan for the campus and make other changes to the previously approved Phase 2 campus project to accommodate what is now known as UC Merced 2020 Project.

5.3 PROJECT OBJECTIVES AND IMPACTS

To develop and evaluate project alternatives, the University, as Lead Agency, considered the project objectives and reviewed the significant impacts of the proposed project, identified those impacts that could be substantially avoided or reduced through an alternative, and determined the appropriate range of alternatives to be analyzed.

5.3.1 Project Objectives

As stated in **Section 3.0, Project Description**, the overarching project objective is to continue the growth of UC Merced as a premier research university, consistent with the University of California's mission of teaching, research, and service excellence, and to provide an up-to-date land use plan to guide the physical planning and development of the next phase of projected campus growth from about 10,000 to 15,000 students, as well as to establish a paradigm for the campus' character.

The following are the specific project objectives that will facilitate accomplishment of the overarching project objective:

- Provide the physical planning framework to guide development that would be needed to accommodate anticipated increases in enrollment demand for the University of California system, both short-term and long-term.
- Reduce the costs of the next phase of campus development.
- Plan for a compact, pedestrian-oriented campus that reduces the need for new infrastructure.
- Plan and develop the campus to facilitate faculty-student interaction, ease and enjoyment of use of academic facilities, and an environment conducive to learning.
- Offer attractive and centrally located on-campus housing, consistent with UC-wide student housing policies.
- Provide opportunities for on-campus academic field research.
- Provide sufficient athletic facilities to offer high quality NCAA, recreational, and club athletic programs commensurate with other premier universities.
- To the extent practicable, plan and develop the campus with sustainable design by incorporating energy efficiency, water conservation, protection of biological resources, waste reduction and minimization, on-site stormwater management, and reduced dependence on automobiles.

- Promote community integration and reflect the landscape, history, resources, and diverse cultures of the San Joaquin Valley in terms of physical development.

5.3.2 Project Impacts

The analysis of the proposed project's environmental impacts is presented in **Section 4.0** of this SEIR**.** The analysis concludes that campus development under the 2020 LRDP would result in significant or potentially significant impacts in seven resource areas: air quality; biological resources; greenhouse gas emissions; hydrology and water quality; noise; public services; and transportation. With the exception of five identified impacts, all of the significant and potentially significant impacts of the proposed project would be reduced to a less than significant level with the incorporation of mitigation measures into the proposed project. The exceptions would be two significant and unavoidable project impacts on air quality, a significant and unavoidable cumulative impact related to hydrology and water quality, and two significant and unavoidable impacts related to transportation. A summary discussion of project impacts under each resource area is presented below based on the analysis in **Section 4.0** of this SEIR.

Air Quality

The analysis in **Section 4.1, Air Quality**, of this SEIR identified two significant air quality impacts. The analysis under **LRDP Impact AQ-2** and **Cumulative Impact C-AQ-1** determined that implementation of the 2020 LRDP would result in operational emissions of ROG and NOx that would exceed applicable thresholds, and therefore would have the potential to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard. The analysis further concluded that despite available mitigation, the emissions would still exceed the thresholds and the impacts on air quality would be significant and avoidable. All other air quality impacts were determined to be less than significant.

Biological Resources

The analysis in **Section 4.2, Biological Resources**, of this SEIR identified two potentially significant impacts on biological resources. The analysis under **LRDP Impact BIO-4** found that the implementation of the 2020 LRDP would result in potentially significant impacts on Crotch bumble bee. However, this impact would be reduced to a less than significant level with mitigation. The analysis under **LRDP Impact BIO-9** found that the implementation of the 2020 LRDP would result in potentially significant adverse impacts on special-status bird species and non-special-status migratory birds and raptors. However, this impact would be reduced to a less than significant level with mitigation. No significant and unavoidable biological resource impacts were identified.

Greenhouse Gas Emissions

The analysis in **Section 4.3, Greenhouse Gas Emission**s, of this SEIR identified three significant impacts related to GHG emissions. The analysis under **LRDP Impact GHG-1** found that the proposed project would generate substantial GHG emissions that would have a significant impact on the environment. The analysis under **LRDP Impact GHG-2** concluded that the project would conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. **Cumulative Impact C-GHG-1** also concluded that the project's emissions would be substantial. However, with mitigation, all three impacts would be reduced to a less than significant level. No significant and unavoidable impacts related to GHG emissions were identified.

Hydrology and Water Quality

The analysis in **Section 4.4, Hydrology and Water Quality,** of this SEIR identified a significant cumulative impact (**Cumulative Impact C-HYD-2**) related to depletion of groundwater supplies, which would not be reduced to a less than significant level with mitigation. All other impacts of the project would be less than significant.

Noise

The analysis in **Section 4.5, Noise**, of this SEIR identified one potentially significant noise impact. The analysis under **LRDP Impact NOI-3** concluded that construction activities associated with development proposed under the 2020 LRDP could expose existing off-site and future on-site noise-sensitive receptors to elevated noise levels, a potentially significant impact which would be reduced to less than significant with mitigation. All other impacts were determined to be less than significant. No significant and unavoidable impacts related to noise were identified.

Population and Housing

The analysis in **Section 4.6, Population and Housing**, of this SEIR found that implementation of the 2020 LRDP would not result in any significant impacts on population and housing. No significant and unavoidable impacts related to population and housing were identified.

Public Services and Recreation

The analysis in **Section 4.7, Public Services and Recreation**, of this SEIR found that implementation of the 2020 LRDP would result in one potentially significant impact (**LRDP Impact PUB-6**) related to the deterioration of Lake Yosemite Regional Park from campus population-related use, which would be reduced to a less than significant level with mitigation. All other impacts on public services and recreational facilities would be less than significant. No significant and unavoidable impacts related to public services and recreation were identified.

Transportation

The analysis in **Section 4.8, Transportation,** of this SEIR found that the proposed project would conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of nine intersections under 2030 conditions (**LRDP Impact TRANS-1**) and 15 intersections under 2035 conditions (**Cumulative Impact C-TRANS-1**). The analysis further concluded that although improvements to the affected intersections would be feasible, because the implementation of the improvements is not within University control and depends on the responsible agencies with jurisdiction over the affected intersections (the City of Merced, Merced County, and/or Caltrans), both impacts would remain significant and unavoidable with mitigation. All other transportation impacts were determined to be less than significant.

Tribal Cultural Resources

The analysis in **Section 4.9, Tribal Cultural Resources**, of this SEIR found that campus development under the 2020 LRDP would not result in any significant impacts on tribal cultural resources (TCR). No significant and unavoidable impacts related to TCRs were identified.

Utilities and Service Systems

The analysis in **Section 4.10, Utilities and Service Systems**, of this SEIR found that implementation of the 2020 LRDP would not result in any significant impacts on utilities and service systems. No significant and unavoidable impacts related to utilities were identified.

Energy

The analysis in **Section 4.11, Energy**, of this SEIR concluded that although the proposed project would increase energy demand compared to existing conditions, it would not result in a wasteful, inefficient or unnecessary consumption of energy resources and the impact would be less than significant. No significant and unavoidable impacts related to energy were identified.

5.4 ALTERNATIVES CONSIDERED BUT NOT EVALUATED IN DETAIL

Section 15126.6(c) of the *State CEQA Guidelines* states that an EIR should briefly describe the rationale for selecting the alternatives to be discussed and the reasons for eliminating alternatives from detailed consideration in an EIR. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR is failure to meet most of the basic project objectives, infeasibility, or inability to avoid or substantially reduce significant environmental impacts. According to Section 15162.6(f)(1) "Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives."

The following alternatives were considered by the University but were not carried forth for detailed evaluation because they were determined not to meet most of the project objectives or were found to be infeasible based on economic viability and inconsistency with project objectives. Each alternative is described below along with a brief explanation of the reasons for its exclusion.

5.4.1 Increased On-Campus Housing

UC Merced considered an alternative that would increase the number of students who would be housed on campus as a means of reducing the significant impacts of the proposed project with respect to daily vehicle trips. Under this Increased On-Campus Housing Alternative, the increase in the total population of the campus (enrollment and employment) would be the same as analyzed for the proposed 2020 LRDP. However, UC Merced would establish a goal to house all 5,300 new students on the campus and plan to provide the necessary student beds. The land use plan under this alternative would be the same as the land use diagram under the 2020 LRDP. The additional housing would be accommodated on campus by increasing the density of student housing within the CMU area in the 2020 LRDP land use diagram or by utilizing the lands designated Campus Building Reserve and Support Land.

This alternative was not carried forth because housing all of the new students on campus would be infeasible. UC housing construction is approved only when the results of demand analysis can support the need for additional housing. National housing enrollment trends and historical trend analysis suggest that the likely demand for University housing is in the range of 50 percent. These trends are driven by several factors that are primarily associated with the preferences of undergraduate students to seek increased levels of independence as they progress into their upper class years as well as the relative cost of housing. Ample housing is available in the City of Merced and other nearby communities and more housing is under construction or planned. The cost of housing off campus is also low. The provision of housing units beyond 50 percent would result in substantial vacancy rates on campus. Further, public institution requirements that mandate on-campus living for students have not been supported by the courts. If housing supply provided under this alternative did prove to be in excess of demand, UC

Merced would be in a position of having to maintain excess, vacant housing, the cost of which would translate directly into increased student housing fees, thus making on-campus housing less attractive and potentially increasing the on-campus vacancy rate further. For these reasons, this alternative was not carried forward for further evaluation in this SEIR.

5.4.2 Accommodate Enrollment Increase through Expanded Distance Learning Programs

UC Merced considered an alternative that would expand distance learning programs as a means of reducing the number of students that would travel to the campus for classes and the associated significant transportation impacts of the proposed project due to an increase in daily and peak hour vehicle trips. UC Merced currently operates limited distance learning programs, including some courses offered online, the Study Abroad program, and UC Merced Washington Program (UCDC). Under this alternative, the existing distance learning programs offered by UC Merced would be expanded to include extensive electronic instruction delivered at remote sites or through personal computers. A substantial undergraduate instructional program would be provided electronically. Strategies to provide instruction at a distance could include the use of televised classes, passive and interactive web sites, and computerized instruction. Some graduate and faculty research and collaboration would also take place via telecommunications and computer networks. Under this alternative, construction of some new building space would be necessary to house facilities and programs for the development and delivery of distance learning programs, and there would be some increase in faculty and staff to develop and deliver the needed programs, but the increase would be much smaller than envisioned under the 2020 LRDP.

This alternative was not carried forth for detailed analysis for a number of reasons. While this alternative would provide some elements of a UC education to a larger population, it would not provide the opportunities for laboratory work, face-to-face discussion and collaboration, or the educational community environment that is provided at a UC campus, and thus would not meet the goal of providing an intellectual and social community. The in-residence educational experience and access to University human capital and facilities are a key part of a UC education. Web-based instruction cannot substitute for in-person collaboration. Because of the relative isolation, lack of access to many of the resources of the campus (such as libraries and research and studio spaces), and the limitations on collaborative research, expanded electronic distance learning would not accommodate the expansion of high-quality research programs or support the depth and breadth of academic and professional degree programs that are goals of the proposed project. For these reasons, this alternative was determined to be infeasible based on inconsistency with project objectives and was not analyzed further in this SEIR.

5.5 ALTERNATIVES EVALUATED IN THIS SEIR

According to the *State CEQA Guidelines*, in addition to considering a "no project" alternative, the discussion of alternatives should focus on alternatives to a project or its location that can avoid or substantially lessen the significant effects of the project, while feasibly attaining most of the basic project objectives. The *State CEQA Guidelines* indicate that the range of alternatives included in this discussion should be sufficient to allow decision makers to make a reasoned choice. The alternative analysis should provide decision makers with an understanding of the merits and disadvantages of the alternatives.

Alternatives considered for detailed evaluation in this SEIR include the mandatory No Project Alternative along with other potential alternate projects that meet most of the project's basic objectives while eliminating or reducing significant environmental impacts of the proposed project. Alternatives considered in this SEIR for detailed evaluation include the following:

- No Project Alternative
- Reduced Development Alternative
- Distributed Employment Location Alternative

Table 5.0-1, Development Program and On-Campus Population under Study Alternatives, below presents the building program and on-campus population under these three alternatives. Additional descriptions of the alternatives are presented below.

5.6 ALTERNATIVE IMPACT ANALYSIS

5.6.1 Alternative 1: No Project Alternative

Description of Alternative

State CEQA Guidelines require the analysis of a No Project Alternative (Section 15126.6(e)). The analysis must discuss existing conditions, as well as what would be reasonably expected to occur in the foreseeable future if the proposed project were not to be approved, based on current plans, site zoning, and consistent with available infrastructure and community services. If a project is a development project on an identifiable site, *State CEQA Guidelines* Section 15126.6(e)(3)(B) provides that the discussion of the No Project Alternative should compare the environmental effects of the site remaining in its existing state against environmental effects which would occur if the project is approved.

The 2020 LRDP is a land use plan and policy document to guide campus development. An LRDP does not limit or induce enrollment growth. Instead, using the enrollment and employment growth projections, the Campus estimates the additional building space (academic, administrative, housing, student services, athletics, and support) that would be needed to accommodate the projected growth. Once the building space is estimated, the Campus prepares an LRDP land use diagram that identifies areas within the campus site where the new building space or facilities could or should be built. Given that the LRDP is only a planning document that plans for but does not cause enrollment growth, if the proposed 2020 LRDP is not approved, enrollment and employment at UC Merced would continue to grow as currently projected, and campus development would be guided by the previously approved 2009 LRDP, as amended in 2013 and 2017.

Table 5.0-1
Development Program and On-Campus Population under Study Alternatives

Program/ Population	Proposed Project/ No Project			Reduced Development Alternative			Distributed Employment Location Alternative		
	By 2020	By 2030	Projected Increase 2020-2030	By 2020	By 2030	Projected Increase 2020-2030	By 2020	By 2030	Projected Increase 2020-2030
Development Program									
Building Space (million gross square feet; gsf)	2.46	4.29	1.83	2.46	3.47	1.01	2.46	4.29	1.83 (1.79 million gsf on campus; 45,000 gsf off campus)
On-campus beds	4,800	7,200	2,400	4,800	6,000	1,200	4,800	7,200	2,400
Acres to be developed	171	274	103	171	228	57	171	273	99
On-Campus Population									
Commuting Students	4,900	7,800	2,900	4,900	6,500	1,600	4,900	7,800	2,900
Resident Student	4,800	7,200	2,400	4,800	6,000	1,200	4,800	7,200	2,400
Subtotal	9,700	15,000	5,300	9,700	12,500	2,800	9,700	15,000	5,300
Faculty	440	786	346	440	655	215	440	786	346
Staff (on-campus)	840	1,625	785	840	1,359	519	840	1,358	518 (267 employees off campus)
Subtotal	1,280	2,411	1,131	1,280	2,014	734	1,280	1,886	606
Total Population	**10,980**	**17,411**	**6,431**	**10,980**	**14,514**	**3,534**	**10,980**	**16,886**	**5,906**

Source: Impact Sciences and Barati Consulting 2019

Building Program

As the campus growth under the No Project Alternative would be the same as that analyzed for the 2020 LRDP, the building program would be comparable, and about 1.83 million gross square feet (gsf) of new building space, including 2,400 student beds, would be added to the campus between 2020 and 2030.

Campus Population

For reasons presented above, under the No Project Alternative, campus enrollment would grow to 15,000 students by 2030, with an increase in faculty and staff of about 1,131 employees.

Land Use Diagram

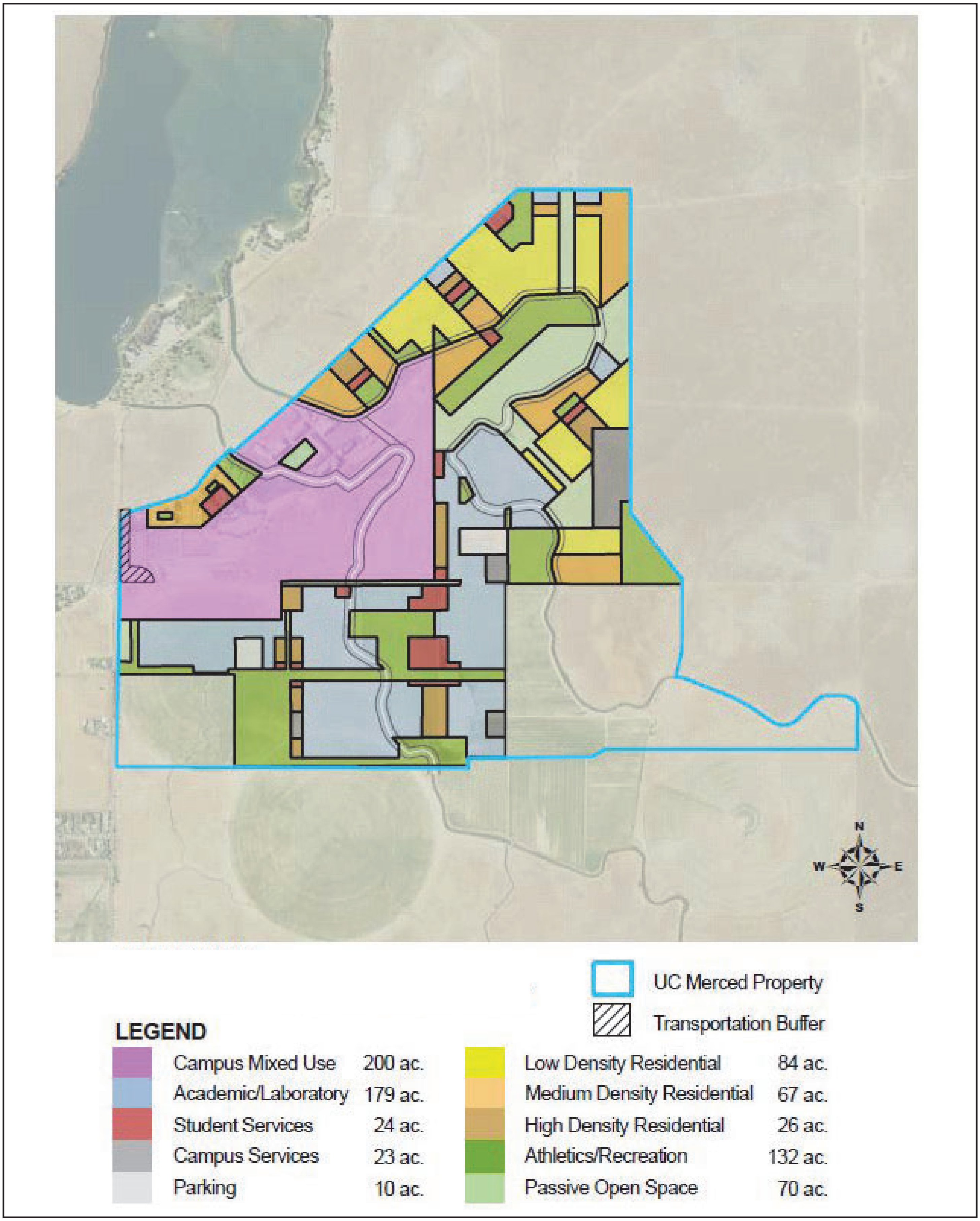
Figure 5.0-1, No Project Alternative Land Use Plan, shows the areas that would be developed with campus facilities under the No Project Alternative. The 2009 LRDP, as amended in 2013 and 2017, includes a land use plan for the 815-acre site but does not include 211 acres that are now a part of the campus. As there is no land use plan to guide the development of new facilities on the newly added 211 acres, projects within the 211-acre area would be developed without the benefit of a land use plan as the University Community Plan is for the development of a mixed-use community on the University Community North site and is not applicable or relevant to campus development. Compared to the 2020 LRDP which limits the siting of new campus buildings to an approximately 274-acre area designated CMU, this alternative would allow campus buildings to be located on all lands except those designated Passive Open Space, and a dispersed and less dense development would likely result under this alternative.

In summary, under the No Project Alternative, the same amount of building space would be constructed on the campus site as under the proposed project, and the campus would continue to grow at a rate similar to the rate of enrollment and employment growth analyzed for the proposed 2020 LRDP. However, the new facilities would be dispersed and would not reflect an efficient use of the land.

Environmental Impacts

Air Quality

As the No Project Alternative would involve the same amount of campus development as the proposed project, it would accommodate the same enrollment and employment increase as the proposed project. Therefore, it would result in the same significant air quality impacts as the proposed project. As with the proposed project, the two significant impacts associated with operational emissions would not be fully mitigated and the alternative would also result in the same significant and unavoidable impacts.



SOURCE: UC Merced, 2019

FIGURE **5.0-1**

No Project Alternative Land Use Plan

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Biological Resources

This alternative would have the potential to result in substantially greater impacts on biological resources than the proposed project. As opposed to the proposed project which would limit the campus's development to the CMU area, under this alternative campus facilities could be located over a larger area and therefore this alternative could result in greater impacts on special-status plants, burrowing owls, CTS, and nesting birds. However, because the loss of habitat from the development of all of the campus lands has already been mitigated by the conservation of Tier 1 and Tier 2 lands and because permits are in place that allow UC Merced to develop all of the campus lands, the impacts under this alternative would also be less than significant. As with the proposed project, this alternative would also result in potentially significant adverse impacts on Crotch bumble bee, special-status bird species, and non-special-status migratory birds and raptors. However, the impacts would be reduced to a less than significant level with the same mitigation measures set forth for the proposed project.

Greenhouse Gas Emissions

As the same amount of building space would be built and the same enrollment and employment growth would be accommodated under the No Project Alternative, the alternative would result in the same significant GHG impacts as the proposed project and the same mitigation measures would be required to reduce the impacts to a less than significant level.

Hydrology and Water Quality

As the same amount of building space and impervious surfaces would be built and the same enrollment and employment growth would be accommodated under the No Project Alternative, the alternative would result in the same significant cumulative impact related to depletion of groundwater, as the proposed project. The same mitigation measure would be required but, as with the proposed project, the impact would not be reduced to a less than significant level with mitigation. All other impacts of the alternative would be less than significant.

Noise

As with the proposed project, construction on the campus under the No Project Alternative would also have the potential to expose existing off-site and future on-site noise-sensitive receptors to elevated noise levels and result in a potentially significant impact and the same mitigation measure would be required. As with the proposed project, all other noise impacts would be less than significant.

Population and Housing

As the No Project Alternative would involve the same amount of campus development as the proposed project, it would accommodate the same enrollment and employment increase as the proposed project. Consequently, it would result in the same less than significant impact on population and housing in the study area as the proposed project.

Public Services and Recreation

As the No Project Alternative would accommodate the same enrollment and employment increase as the proposed project, it would result in the same potentially significant impact on Lake Yosemite Regional Park as the proposed project, and the same mitigation measure would apply and would reduce the impact to a less than significant level.

Transportation

As the No Project Alternative would accommodate the same enrollment and employment increase as the proposed project, it would generate the same number of additional daily and peak hour vehicle trips and would result in the same significant impacts related to transportation as the proposed project under 2030 and 2035 conditions. As with the proposed project, both impacts would remain significant and unavoidable with mitigation.

Tribal Cultural Resources

Although campus development under the 2009 LRDP as amended, would likely affect larger area within the campus site, all development under that plan would also be subject to the mitigation measures set forth in the 2009 LRDP EIS/EIR for the protection of previously unknown cultural resources, including human remains, encountered during construction. Therefore, campus development under the No Project Alternative would also not result in any significant impacts on TCRs.

Utilities and Service Systems

As the No Project Alternative would involve the same amount of building space and enrollment and employment growth as the proposed project, it would result in the same utility demand as the proposed project. As with the proposed project, the impacts of the No Project Alternative on utilities would be less than significant.

Energy

Energy use under the No Project Alternative would be comparable to that under the proposed project. As with the proposed project, although the No Project Alternative would increase energy demand compared to existing conditions, it would not result in a wasteful, inefficient or unnecessary consumption of energy resources, and the energy impacts of the No Project Alternative would be less than significant.

Conclusion and Relationship to Project Objectives

The No Project Alternative would result in the same potentially significant and significant impacts as the proposed project, and the same mitigation measures would be required. For reasons presented above, the No Project Alternative would have the potential to result in greater impacts on biological resources. None of the significant and unavoidable impacts of the proposed project would be reduced or avoided by the No Project Alternative.

The alternative would not achieve many of the key objectives of the proposed project, including the objective to reduce the costs of the next phase of campus development by planning for a compact, pedestrian-oriented campus that reduces the need for new infrastructure and the objective to provide opportunities for on-campus academic field research. It would also not be as effective as the proposed project in meeting the objective to plan and develop the campus with sustainable design by incorporating energy efficiency, water conservation, protection of biological resources, waste reduction and minimization, on-site stormwater management, and reduced dependence on automobiles.

5.6.2 Alternative 2: Reduced Development Alternative

Description of Alternative

The Reduced Development Alternative was developed in order to evaluate the potential to reduce the increase in vehicle trips to the campus and transportation-related impacts of the proposed project. Under this alternative, a smaller building program would be planned which would accommodate 12,500 students and related faculty and staff by 2030 compared to 15,000 students and related faculty and staff under the proposed project.

Building Program

The 2020 LRDP plans building space to accommodate the projected growth in enrollment between 2020 and 2030, after the completion of the 2020 Project. This alternative also plans for campus development between 2020 and 2030 but includes a building program that is about 45 percent less than analyzed for the 2020 LRDP. Therefore, instead of the addition of about 1.83 million gsf of new building space, under this alternative, UC Merced would add approximately 1.01 million gsf of new building space between 2020 and 2030.

Campus Population

Under this alternative, the reduction in physical development would accommodate fewer students. Therefore, it is assumed that enrollment would increase from 9,700 students in 2020 to 12,500 students in 2030, an increase of about 2,800 new students. Similar to the proposed project, it is assumed that slightly more than half of the new students would be housed on the campus and the rest of the new students would live off-campus.

Assuming that the same student to faculty/staff ratio is maintained under this alternative as is represented by the proposed project, approximately 734 new on-campus employees would be added under this alternative. Therefore, under this alternative a total of 3,534 new students and employees would be added to the campus between 2020 and 2030. The increase in on-campus population under this alternative is presented in **Table 5.0-1**, above.

The campus population increase would be about 45 percent less than the increase of 6,431 new students and employees analyzed for the 2020 LRDP. The total on-campus population by 2030 under this alternative (that is, existing population plus projected growth) would be approximately 14,514 persons, which is about 17 percent lower than the 2030 population of about 17,411 persons analyzed for the 2020 LRDP.

Land Use Diagram

With regard to the land use diagram, it is assumed that the diagram under this alternative would be the same as the land use diagram under the proposed 2020 LRDP. As with the proposed 2020 LRDP, the new facilities would be built within the 274-acre area designated CMU. With the building program reduced by about 45 percent under this alternative compared to the proposed project, less acreage within the CMU area would be developed with new facilities under this alternative.

Environmental Impacts

Air Quality

The Reduced Development Alternative would involve a substantially smaller (45 percent less) amount of building space development than the proposed project, accommodate fewer students, and the employment increase would also be smaller than that under the proposed project. Therefore, it would result in reduced air quality impacts compared to the proposed project. Due to lower enrollment and employment growth, this alternative would result in reduced operational emissions of ROG that would not exceed the significance threshold. Emissions of NOx would also be lower but would still be over the applicable threshold and would not be reduced to a less than significant level with mitigation. Therefore, as with the proposed project, two air quality impacts associated with operational emissions of NOx would not be fully mitigated and the alternative would result in reduced but still significant and unavoidable air quality impacts.

Biological Resources

As noted above, under this alternative the land use diagram would be the same as under the proposed 2020 LRDP and the new facilities would be built within the 274-acre area designated CMU. With the building program reduced by about 45 percent under this alternative, less acreage within the CMU area would be developed with new facilities under this alternative. Therefore, the biological resource impacts would be reduced. As with the proposed project, this alternative would also result in potentially significant adverse impacts on Crotch bumble bee, special-status bird species, and non-special-status migratory birds and raptors. However, the impacts would be reduced to a less than significant level with the same mitigation measures set forth for the proposed project.

Greenhouse Gas Emissions

As about 45 percent less building space would be built and a smaller enrollment and employment growth would be accommodated under the Reduced Development Alternative, the alternative would result in lower total and per capita GHG emissions compared to the proposed project. However, the total campus emissions would still exceed the 2030 emissions target for the campus and all three GHG impacts would be significant. The same mitigation measures would be required to reduce the impacts to a less than significant level.

Hydrology and Water Quality

As about 45 percent less building space would be built and a smaller enrollment and employment growth would be accommodated under the Reduced Development Alternative, compared to the proposed project, this alternative would result in a smaller contribution to the significant cumulative impact related to depletion of groundwater. However, the contribution would still be considered considerable and the same mitigation measure would be required. As with the proposed project, the impact would not be reduced to a less than significant level with mitigation. All other impacts of the alternative on hydrology and water quality would be less than significant.

Noise

Although the total amount of construction would be less than that under the 2020 LRDP, construction on the campus under the Reduced Development Alternative would also have the potential to expose existing off-site and future on-site noise-sensitive receptors to elevated noise levels and result in a potentially significant impact and the same mitigation measure would be required. As with the proposed project, all other noise impacts would be less than significant.

Population and Housing

As the Reduced Development Alternative would involve a smaller amount of campus development than the proposed project, it would accommodate a smaller enrollment and employment increase by 2030 compared to the proposed project. Consequently, it would result a lower impact on population and housing in the study area. As with the proposed project, the impact would be less than significant.

Public Services and Recreation

As the Reduced Development Alternative would accommodate a smaller enrollment and employment increase by 2030 compared to the proposed project, it would result in a reduced but still potentially significant impact on Lake Yosemite Regional Park, and the same mitigation measure would apply and would reduce the impact to a less than significant level.

Transportation

As the Reduced Development Alternative would accommodate a smaller enrollment and employment increase by 2030 and 2035 compared to the proposed project, it would generate a smaller number of new daily and peak hour vehicle trips. The peak hour trips under this alternative would be reduced by 38 percent under 2030 conditions and by 42 percent under 2035 conditions. As a result of the reduction in peak hour trips, under 2030 conditions this alternative would result in significant impacts at five intersections compared to nine intersections that would be significantly affected under the proposed project. Significant impacts at intersections # 1, 7, 13, and 14 would be avoided. Under 2035 cumulative conditions, this alternative would result in significant impacts at 14 intersections compared to 15 intersections that would be significantly affected by campus-related traffic. The significant impact at intersection # 11 would be avoided. Similar to the proposed project, with the improvements listed in **Table 4.8-9**, traffic operations at the affected intersections would be restored to acceptable levels of service. However, because the implementation of the improvements at the affected intersections is not within University control and depends on the responsible agencies, the impacts, although reduced under this alternative, would remain significant and unavoidable with mitigation.

Tribal Cultural Resources

Campus development under this alternative would occur within a smaller portion of CMU lands than under the proposed project. As with the proposed project, all development under this alternative would also be subject to the mitigation measures set forth in the 2009 LRDP EIS/EIR for the protection of previously unknown cultural resources, including human remains, encountered during construction. Therefore, campus development under the Reduced Development Alternative would also not result in any significant impacts on TCRs.

Utilities and Service Systems

As the Reduced Development Alternative would involve a smaller amount of building space and lower enrollment and employment growth than the proposed project, it would result in utility demands that would be proportionally reduced compared to those associated with the proposed project. As with the proposed project, the impacts of the Reduced Development Alternative on utilities would be less than significant.

Energy

Energy use under the Reduced Development Alternative would be reduced compared to that under the proposed project. As with the proposed project, although the Reduced Development Alternative would increase energy demand compared to existing conditions, it would not result in a wasteful, inefficient or unnecessary consumption of energy resources, and the energy impacts of this alternative would also be less than significant.

Conclusion and Relationship to Project Objectives

The Reduced Development Alternative would result in several of the same potentially significant and significant impacts as the proposed project, and the same mitigation measures would be required. However, due to smaller amount of new building space and population, the alternative's impacts on air quality, transportation, and groundwater would be reduced compared to the proposed project. Although significant impacts at four intersections under 2030 conditions and one intersection under 2035 cumulative conditions would be avoided under this alternative, the Reduced Development Alternative would still result in significant and unavoidable transportation impacts.

The alternative would not achieve the key objective of the proposed project, which is to provide the physical planning framework to guide development that would be needed to accommodate anticipated increases in enrollment demand for the University of California system, both short-term and long-term.

5.6.3 Alternative 3: Distributed Employment Location Alternative

Description of Alternative

The Distributed Employment Location Alternative was developed to evaluate the potential to reduce the increase in the number of daily and peak hour vehicle trips to the campus and transportation-related impacts. Under this alternative, about 35 percent of the new staff employees would be located off campus.

Building Program

As a result of locating some of the new staff off campus under this alternative, the building program on the campus would be slightly reduced compared to that analyzed for the 2020 LRDP. Therefore, instead of the addition of about 1.83 million gsf of new building space to the campus, UC Merced would add approximately 1.79 million gsf of new building space on the campus and would lease or construct about 45,000[1] gsf of building space in Merced to house the 267 new employees who would be located off campus.

Campus Population

Under this alternative, enrollment at the campus would increase at the same rate as analyzed for the 2020 LRDP such that there would be 15,000 students by 2030, an increment of 5,300 students between 2020 and 2030. On-campus resident students would be the same as analyzed for the 2020 LRDP. The increase in faculty and staff would also be the same, with 346 new faculty and 785 new staff added between 2020 and 2030. However, while all of the additional faculty would be located on the campus, 65 percent of the new staff (518 new staff) would be located on the campus and 35 percent or about 267 of the new staff would be located off campus. The increase in on-campus population under this alternative is presented in **Table 5.0-1**, above.

Land Use Diagram

With regard to the land use diagram, it is assumed that the diagram under this alternative would be the same as the land use diagram under the proposed 2020 LRDP. With the building program reduced by about 2 percent under this alternative compared to the proposed project, slightly less area within the 274-acre CMU area would be developed with new facilities under this alternative.

1 Calculated based on a rate of 165 sq feet per employee. The rate was derived from the Downtown Center, which is a 75,000 gsf building for about 454 employees.

Environmental Impacts

Air Quality

The Distributed Employment Location Alternative would accommodate the same number of students, and the employment increase would also the same as under the proposed project, and almost the same amount of building space would be constructed on campus, with a small amount of space either constructed or leased off campus. Therefore, this alternative would result in substantially the same amount of air emissions both during construction and operations as the proposed project, such that it would have the same significant air quality impacts as the proposed project, and two air quality impacts would remain significant and unavoidable even with mitigation.

Biological Resources

As noted above, under this alternative the land use diagram would be the same as under the proposed 2020 LRDP and the new facilities would be built within the 274-acre area designated CMU. With the building program reduced by just 2 percent under this alternative, a comparable acreage within the CMU area would be developed with new facilities under this alternative. Therefore, the biological resource impacts would be comparable to those of the proposed project. As with the proposed project, this alternative would also result in potentially significant adverse impacts on Crotch bumble bee, special-status bird species, and non-special-status migratory birds and raptors. However, the impacts would be reduced to a less than significant level with the same mitigation measures set forth for the proposed project.

Greenhouse Gas Emissions

As approximately the same amount of building space would be built or built and leased, and the same enrollment and employment growth would be accommodated under the Distributed Employment Location Alternative, the alternative would result in the same significant GHG impacts as the proposed project and the same mitigation measures would be required to reduce the impacts to a less than significant level.

Hydrology and Water Quality

As approximately the same amount of building space would be built and the same enrollment and employment growth would be accommodated under the Distributed Employment Location Alternative, the alternative would result in the same significant cumulative impact related to groundwater depletion as the proposed project and the same mitigation measure would be required. As with the proposed project, the impact would not be reduced to a less than significant level with mitigation. All other impacts of the alternative on hydrology and water quality would be less than significant.

Noise

Although the total amount of construction on the campus would be slightly less than that under the 2020 LRDP, construction on the campus under the Distributed Employment Location Alternative would also have the potential to expose existing off-site and future on-site noise-sensitive receptors to elevated noise levels and result in a potentially significant impact and the same mitigation measure would be required. In addition, as this alternative could involve the construction of an office building off-campus, potentially in downtown Merced, construction at that additional site would have the potential to affect nearby receptors. The same or more stringent mitigation measures might be required. In the event that existing space is leased, a construction-phase noise impact on downtown receptors would not occur under this alternative. As with the proposed project, all other noise impacts of this alternative would be less than significant.

Population and Housing

As the Distributed Employment Location Alternative would involve the same amount of campus development as the proposed project, it would accommodate the same enrollment and employment increase as the proposed project, with just one difference that some of the new employees would be located off campus. Consequently, it would result in the same less than significant impact on population and housing in the study area as the proposed project.

Public Services and Recreation

As the Distributed Employment Location Alternative would involve the same amount of campus development as the proposed project, it would accommodate the same enrollment and employment increase as the proposed project, with only a small number of the new employees located off campus. Therefore, the alternative would result in the same potentially significant impact on Lake Yosemite Regional Park as the proposed project, and the same mitigation measure would apply and would reduce the impact to a less than significant level.

Transportation

As the Distributed Employment Location Alternative would involve the same amount of campus development as the proposed project, it would accommodate the same enrollment and employment increase as the proposed project, with a small number of the new employees located off campus. As a result of placing some of the new employees off campus, this alternative would generate a slightly smaller number of daily and peak hour vehicle trips to the campus. The peak hour trips under this alternative would be reduced by 13 percent under 2030 conditions and by 14 percent under 2035 conditions, compared to the proposed project. As a result of the reduction in peak hour trips, under 2030 conditions, this alternative would result in significant impacts at seven intersections compared to nine intersections under the proposed project. Significant impacts at intersections #13 and 14 would be avoided. Under 2035 cumulative conditions, this alternative would result in significant impacts at all 15 intersections that would be significantly affected under the 2035 Campus Scenario. Similar to the proposed project, with the improvements listed in **Table 4.8-9**, traffic operations at the affected intersections would be restored to acceptable levels of service. However, because the implementation of the improvements is not within University control and depends on the responsible agencies, the impacts, although reduced under this alternative, would remain significant and unavoidable with mitigation.

Tribal Cultural Resources

Campus development under this alternative would occur within a slightly smaller portion of CMU lands than under the proposed project. As with the proposed project, all development under this alternative would also be subject to the mitigation measures set forth in the 2009 LRDP EIS/EIR for the protection of previously unknown cultural resources, including human remains, encountered during construction. Therefore, campus development under the Distributed Employment Location Alternative would also not result in any significant impacts on TCRs.

Utilities and Service Systems

As the Distributed Employment Location Alternative would involve a slightly smaller amount of building space and slightly smaller on-campus population than the proposed project, it would result in utility demands at the campus that would be proportionally reduced compared to those associated with the proposed project. However, utilities would be needed at the downtown location to serve the employees who would be located off campus. As with the proposed project, the impacts of this alternative on utilities would be less than significant.

Energy

Energy use on the campus under the Distributed Employment Location Alternative would be slightly reduced compared to that under the proposed project, although some energy use would occur at the downtown location where some of the new employees would be located. As with the proposed project, although the Distributed Employment Location Alternative would increase energy demand compared to existing conditions, it would not result in a wasteful, inefficient or unnecessary consumption of energy resources, and the energy impacts of this alternative would also be less than significant.

Conclusion and Relationship to Project Objectives

The Distributed Employment Location Alternative would result in the same potentially significant and significant impacts as the proposed project, and the same mitigation measures would be required. The significant and unavoidable air quality and cumulative groundwater impacts of the proposed project would not be avoided by the Distributed Employment Location Alternative, and the significant and unavoidable transportation impacts to study area intersections would be reduced but not avoided.

The alternative would achieve all of the key objectives of the proposed project but would result in a slightly greater overall cost than the project, in the event that the needed space is constructed and not leased in downtown Merced. This would be because economies of scale are not achieved if a small amount of building space is built elsewhere. Also there would be cost associated with acquisition of land. Hence, the alternative would not meet the objective of reducing the costs of the next phase of campus development.

5.7 COMPARISON OF ALTERNATIVES/ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Table 5.0-2 presents a summary comparison of the alternatives evaluated in detail. The table is designed to allow a reader to compare the impacts of the proposed project with that of the alternatives, so that the reader can determine whether the alternative would result in similar, greater, or lesser environmental impacts than the proposed project.

CEQA requires the identification of the environmentally superior alternative among the alternatives to the proposed project. The environmentally superior alternative must be an alternative to the proposed project that reduces some of the environmental impacts of the proposed project, regardless of the financial costs associated with this alternative. Identification of the environmentally superior alternative is an informational procedure and the alternative identified as the environmentally superior alternative may not be that which best meets the goals or needs of the proposed project.

As the table shows, although impacts on air quality, groundwater, and transportation would still remain significant and unavoidable, the Reduced Development Alternative would reduce all of the significant environmental impacts of the proposed project. This alternative would, therefore, be the environmentally superior alternative. It would not, however, meet the proposed project's objective of accommodating the projected increase in enrollment at UC Merced through 2030.

Table 5.0-2
Summary Comparison of Project Alternatives [a]

Project Impact	Proposed Project (Before and After Mitigation)	Alternative 1	Alternative 2	Alternative 3
		No Project	Reduced Development	Distributed Employment Location
LRDP Impact AQ-2: Campus development under the 2020 LRDP would result in operational emissions that would involve a cumulatively considerable net increase of criteria pollutants for which the air basin is in non-attainment.	*S/SU*	Similar; *S/SU*	Reduced; *S/SU*	Similar; *S/SU*
Cumulative Impact C-AQ-1: The construction and operation of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, could hinder air quality attainment and maintenance efforts for criteria pollutants.	*S/SU*	Similar; *S/SU*	Reduced; *S/SU*	Similar; *S/SU*
LRDP Impact BIO-4: Implementation of the 2020 LRDP would result in a potentially significant adverse impact on nesting and overwintering habitat for Crotch bumble bee.	*PS/LTS*	Greater; *PS/LTS*	Reduced; *PS/LTS*	Similar; *PS/LTS*
LRDP Impact BIO-9: Implementation of the 2020 LRDP would result in potentially significant adverse impacts on special-status bird species and non-special-status migratory birds and raptors.	*PS/LTS*	Greater; *PS/LTS*	Reduced; *PS/LTS*	Similar; *PS/LTS*
Cumulative Impact C-HYD-2: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not substantially interfere with groundwater recharge but would deplete groundwater supplies and contribute to an overdraft of the regional groundwater aquifer.	*S/SU*	Similar; *S/SU*	Reduced; *S/SU*	Similar; *S/SU*
LRDP Impact NOI-3: Construction activities associated with development under the 2020 LRDP could expose existing off-site and future on-site noise-sensitive receptors to elevated noise levels.	*PS/LTS*	Similar; *PS/LTS*	Reduced; PS/LTS	Similar; PS/LTS
LRDP Impact NOI-4: Pile driving activities during construction could expose nearby receptors to perceptible levels of groundborne vibration.	*PS/LTS*	Similar; *PS/LTS*	Reduced; PS/LTS	Similar; PS/LTS
LRDP Impact PUB-6: Implementation of the 2020 LRDP would increase the use of Lake Yosemite Regional Park which could accelerate physical deterioration of park facilities.	*PS/LTS*	Similar; *PS/LTS*	Reduced; *PS/LTS*	Similar; PS/LTS
LRDP Impact TRANS-1: Implementation of the 2020 LRDP would significantly affect study area intersections during peak commute hours under 2030 plus project conditions.	*S/SU*	Similar; *S/SU*	Reduced; *S/SU*	Similar; *S/SU*
Cumulative Impact C-TRANS-1: Implementation of the 2020 LRDP would significantly impact study area intersections during peak commute hours under 2035 plus project conditions.	*S/SU*	Similar; *S/SU*	Reduced; *S/SU*	Similar; *S/SU*

Source: Impact Sciences and Barati Consulting 2019

[a] *This table lists only the significant or potentially significant environmental impacts of the proposed project. A less than significant impact of the project is listed only if an alternative would worsen that impact of the project.*

SU = Significant and unavoidable
S = Significant impact
PS = Potentially significant impact
LTS = Less than significant impact
Similar = Impact similar to proposed project
Reduced = Impact less than proposed project
Greater = Impact greater than proposed project

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6.0 OTHER CEQA CONSIDERATIONS

6.1 INTRODUCTION

Sections 15126 and 15128 of the *State CEQA Guidelines* state that an EIR must include a discussion of the following topics:

- Significant environmental effects which cannot be avoided if the proposed project is implemented;
- Significant irreversible environmental changes which would be involved in the proposed project should it be implemented;
- Growth-inducing impacts of the proposed project; and
- A brief statement of the reasons why certain possible effects of a project were determined not to be significant and, therefore, are not evaluated in the EIR.

The following sections address each of these types of impacts and CEQA requirements, based on the analyses included in **Section 4.0, Environmental Setting, Impacts, and Mitigation Measures.**

6.2 SIGNIFICANT AND UNAVOIDABLE EFFECTS

This section identifies significant impacts associated with implementation of the proposed project that would not be mitigated to a less than significant level. As part of the certification process, The Regents will make a final decision as to the significance of impacts and the feasibility of mitigation measures in this Recirculated Draft SEIR (SEIR). As detailed in **Section 4.0**, implementation of the proposed 202020 LRDP would result in the following significant impacts that would not be mitigated to a less than significant level:

LRDP Impact AQ-2: Campus development under the 2020 LRDP would result in operational emissions that would involve a cumulatively considerable net increase of criteria pollutants for which the air basin is in non-attainment.

Cumulative Impact C-AQ-1: The construction and operation of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, could hinder air quality attainment and maintenance efforts for criteria pollutants.

Cumulative Impact C-HYD-2: Development of the campus under the 2020 LRDP, in conjunction with other past, present, and reasonably foreseeable future development in the project area, would not substantially interfere with groundwater recharge but would deplete groundwater supplies and contribute to the overdraft of the regional groundwater aquifer.

LRDP Impact TRANS-1: Implementation of the 2020 LRDP would significantly affect study area intersections during peak commute hours under 2030 plus project conditions.

Cumulative Impact C-TRANS-1: Implementation of the 2020 LRDP would significantly impact study area intersections during peak commute hours under 2035 plus project conditions.

6.3 ANALYSIS OF IRREVERSIBLE CHANGES

Section 15126.2(c) of the *State CEQA Guidelines* requires a discussion of any significant irreversible environmental changes that would be caused by the proposed project. Specifically, Section 15126.2(c) states:

> *Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible, since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.*

Generally, a project would result in significant irreversible environmental changes if:

- The project would generally commit future generations to similar uses at the project site.
- The proposed consumption of resources is not justified (e.g., the project involves the wasteful use of energy).
- The project would involve a large commitment of nonrenewable resources.
- The project would involve uses in which irreversible damage could result from any potential environmental accidents associated with the project.

Development under the proposed 2020 LRDP would result in the continued commitment of the UC Merced campus lands to institutional uses, thereby precluding any other uses for the lifespan of the campus. The University of California's ownership of the campus represents a long-term commitment of the campus lands to an institutional use. Restoration of the campus to pre-developed conditions would not be feasible given the degree of disturbance, the urbanization of the area, and the level of capital investment.

Additional irreversible commitments to future uses include those related to new development on the lands designated Campus Mixed Use (CMU). Development of these lands would constitute an irreversible use of these lands because once buildings or pavement are constructed, the underlying soils would no longer be available for other uses. Campus growth under the 2020 LRDP would result in the loss of approximately 100 acres of undeveloped although disturbed land, which provides some habitat value and has historically been used for grazing. As discussed in **Section 4.2**, **Biological Resources**, UC Merced would implement mitigation measures to reduce impacts to sensitive biological resources, and UC Merced has already preserved and enhanced appropriate habitat elsewhere in the vicinity of the campus. Several thousand acres of land owned or conserved by the University are and will continue to be available for grazing.

Resources that will be permanently and continually consumed by project implementation include water, electricity, natural gas, and fossil fuels. However, the consumption of these resources would not represent unnecessary, inefficient, or wasteful use of resources. The growth in enrollment is responsive to growth that has already occurred in the state as the children mature to college age. Therefore, natural resources are currently being consumed by this demographic group and would continue to be consumed by this group at some location. Nonetheless, construction activities related to the proposed 2020 LRDP would result in the irretrievable commitment of nonrenewable energy resources, primarily in the form of fossil fuels (including fuel oil, natural gas, and gasoline) for automobiles and construction equipment.

UC Merced has instituted several water conservation measures. These include a water conservation program to reduce the use of irrigation water by using drought tolerant species in landscaping, installing drip irrigation where appropriate, using automatic timing systems to apply irrigation water during the part of the day when evaporation rates are low, and installing of water meters. UC Merced has been installing low-flow fixtures in new buildings to minimize water consumption.

UC Merced has also instituted lighting and other energy conservation measures including up-to-date energy-saving equipment. Lighting conservation efforts in new construction include installation of occupancy sensors to automatically turn off lights when not in use, lighting reflectors, electronic ballasts, and energy-efficient lamps. In addition, UC Merced will continue to construct new facilities under the

2020 LRDP in accordance with the UC Green Building Policy, which requires campuses to outperform the energy requirements of the California Building Code by at least 20 percent on all new construction and major renovation projects (except acute care facilities) or meet UC's Whole Building Energy Targets.

With respect to operational activities on the campus, compliance with all applicable building codes and standard campus conservation features would ensure that all natural resources, including water, are conserved to the maximum extent feasible. It is also possible that new technologies or systems will emerge, or will become more cost-effective or user-friendly, to further reduce the campus's reliance upon nonrenewable energy resources. Overall, the consumption of natural resources would increase at a lesser rate than the projected population increase due to the variety of energy and water conservation measures that UC Merced has implemented and will continue to implement.

The *State CEQA Guidelines* also require a discussion of the potential for irreversible environmental damage caused by an accident associated with the project. While UC Merced uses, transports, stores, and disposes of hazardous wastes, as described in Section 4.7, Hazards and Hazardous Materials of the 2009 LRDP EIS/EIR, UC Merced complies with all applicable state and federal laws and existing campus programs, practices, and procedures related to hazardous materials, which reduces the likelihood and severity of accidents that could result in irreversible environmental damage. In fact, over the campus's nearly 15-year history, there has never been an accident that resulted in irreversible environmental damage, indicating that current practices with respect to hazardous materials handling are adequate, and thus the potential for campus development under the 2020 LRDP to cause irreversible environmental damage from an accident or upset of hazardous materials, is less than significant.

6.4 GROWTH-INDUCING IMPACTS

This section evaluates the potential for campus development under the 2020 LRDP to induce growth in eastern Merced County. Section 15126.2(d) of the *State CEQA Guidelines* requires that an EIR include a discussion of the potential for a proposed project to foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment.

The *State CEQA Guidelines* do not provide specific criteria for evaluating growth inducement and state that it must not be assumed that growth in an area is necessarily beneficial, detrimental, or of little significance to the environment. Growth inducement is generally not quantified, but is instead evaluated as either occurring, or not occurring, with implementation of a project. The identification of growth-inducing impacts is generally informational, and mitigation of growth inducement is not required by CEQA. It must be emphasized that the *State CEQA Guidelines* require an EIR to "discuss the ways" that a project could be growth inducing and to, "discuss the characteristics of some projects that may encourage…activities that could significantly affect the environment." However, the *State CEQA Guidelines* do not require an EIR to predict or speculate specifically where such growth would occur, in what form it would occur, or when it would occur.

For the purposes of this analysis, the proposed project would be considered growth inducing if it meets either of the following criteria:

- The proposed project causes economic expansion and population growth through employment expansion and/or the construction of new housing, or
- The proposed project removes an obstacle to population growth (for example, through the expansion of public services or utilities into an area that does not presently receive these services), or through the provision of new access to an area, or a change in a restrictive zoning or General Plan land use designation.

An evaluation of the proposed project compared against these criteria is provided below. In addition, because local land use plans provide for land use development patterns and growth policies allow for the orderly expansion of development supported by adequate public services, (e.g., water supply, roadway infrastructure, sewer service and solid waste service), growth induced by the proposed project would be considered adverse only if the growth is not consistent with the land use plans and growth management plans and policies for the area affected.

6.4.1 Growth Induced by Employment Expansion and Provision of Housing

Campus-Related Direct Growth

The growth and development of a large institution such as a major research university could result in a substantial growth in a region's population and employment. The UC Merced campus would continue to draw students, faculty, and employees from both the surrounding region and other parts of the state and country. In addition to the direct population changes that would result from any nonlocal students, faculty, and staff and their dependents relocating to Merced County, additional increases in employment and population could result as campus-serving businesses or other population-serving businesses move or expand in the area in response to increased demand.

The 2009 LRDP EIS/EIR analyzed the potential for campus development under the 2009 LRDP to result in substantial population growth in the City of Merced and Merced County. The analysis in the 2009 LRDP EIS/EIR was based on the assumption that campus enrollment would increase to 25,000 students by 2030 and that the campus would have an employee population of 6,560 faculty and staff for a total of 31,560 persons. The EIS/EIR estimated students and employees who would be already living in the area and hence would not represent new population and the number of persons who would be new to the area.

The EIS/EIR also estimated the number of dependents that would accompany the students and employees that would relocate into the City of Merced and the County. The EIS/EIR projected that between 2009 and 2030, a population of approximately 38,044 persons associated with the campus would be added to the area.

As explained in **Section 1.0, Introduction**, the University has revised its enrollment projections through 2030 down substantially. Enrollment at UC Merced is expected to grow at a slower pace than originally anticipated, adding no more than about 5,300 additional students between 2020 and 2030. The campus is now projected to reach an enrollment of 15,000 students at full development under the 2020 LRDP and is expected to have a total population of 17,411 including students, staff, faculty, and researchers, which is substantially less than 31,560 persons previously projected for 2030. The University has not projected enrollment growth beyond 2030 as it will be largely dependent on future student demand and funding for additional facilities.

In order to estimate how many new persons would relocate to the Merced area, this SEIR conservatively assumes that all of the new students that would enroll between 2020 and 2030 would be non-local and would move into the area in order to study at UC Merced. This SEIR also assumes that all of the new faculty and 50 percent of the new staff would relocate to the Merced area at the time that they are hired by the University (see **Section 4.6, Population and Housing,** for demographic data and assumptions used in this SEIR). Some of the non-local students, faculty, and staff would also be accompanied by dependents. Therefore, by providing opportunities for education and employment, the 2020 LRDP would directly increase the population of Merced County and adjacent Stanislaus and Madera Counties by about 6,431 persons.

To address this direct growth, the 2020 LRDP includes land area to house half of the campus's student population at full development. As discussed in **Section 4.6, Population and Housing,** with half the students housed on the campus, the remainder of the new students and all of the new nonlocal faculty and staff would require a total of about 2,000 dwelling units. A comparison of this housing demand to available existing and projected housing supply in the City of Merced, other Merced County cities, and in the cities in the adjoining counties shows that ample housing would be available.

In summary, some of the direct growth impacts of the campus would be captured within the campus whereas some of the direct growth impacts would occur in the City of Merced and other communities near the campus where the new population would reside. The environmental consequences of this direct growth are evaluated in relevant technical sections of this SEIR, including the effects of this growth on traffic, air quality, noise, housing supply, and water supply, as well as in the analysis of cumulative impacts. To the extent that there would be significant impacts from this direct growth, those would be mitigated by the mitigation measures included in this SEIR.

Campus-Related Indirect and Induced Growth

The development of the campus would not only result in the direct growth in the population of Merced and adjoining counties as described above but would be expected to generate additional indirect and induced growth (hereinafter induced growth) within the regional economy through the workings of the income multiplier and the magnet effect of a major research university. The nature and magnitude of this induced growth is first discussed below, followed by a discussion of its environmental consequences.

In 2000, when the new campus was first proposed in Merced County, a study of the multiplier effect of the new campus was commissioned by Merced County. That study conducted by EPS analyzed the projected expenditures of campus students and employees and the expenditures made by UC Merced within the regional economy and estimated the number of the induced jobs that would be supported by this spending (EPS 2000). The study concluded that at an enrollment level of 25,000 students and with 6,560 faculty and staff, the direct jobs at the campus and the spending by the students and UC Merced would generate approximately 6,000 additional jobs in the regional economy. However, as noted above, the projected size of the campus in 2030 is reduced from an enrollment level of 25,000 FTE students to 15,000 students, and instead of 6,560 faculty and staff in 2030, UC Merced is expected to have 2,411 employees on the campus and another 300 employees in facilities off campus for a total of 2,711 employees. Using the same ratio of induced jobs to enrollment that is in the 2000 study, with this reduced enrollment, UC Merced would result in approximately 3,600 induced jobs in Merced and adjoining counties.

The induced jobs are not expected to result in substantial additional growth impacts of their own. A large influx of non-local population into Merced and adjoining counties in response to these induced jobs is not expected for several reasons. A large number of these indirect and induced jobs would be in the retail and services sectors and would not require special skills. Therefore, it would be reasonable to assume that the majority of these jobs would be filled by persons already residing in the area that either are unemployed, underemployed, or would like to work locally instead of commuting to other communities, or by students at the campus, or dependents and spouses of the faculty and staff who move into the area in response to the new direct jobs at UC Merced. Based on the State of California Employment Developmental Department, the average annual unemployment rate in the county has also historically been high and has ranged between 9.3 percent and 14.5 percent in the last 5 years (2018). Therefore, a pool of local labor should also be available to fill these induced jobs.

It is acknowledged that some potential remains for induced growth to occur, particularly in geographic areas that are proximate to the campus. The pressure to develop would be the greatest along the Bellevue corridor and the lands to the south of the campus because of their proximity to the campus. Lands to the north and east of the campus would not be developed because they are conservation lands. Lands to the south of Yosemite Avenue would be too distant to experience the same growth pressure as lands along Bellevue corridor. Besides those lands are prime farmlands and conversion of that land to urban uses would not be allowed under the County policies that control the conversion of prime farmlands.

Recognizing the potential growth pressures on land along Bellevue Road leading to the campus, in developing the Merced 2030 Vision General Plan, the City redefined its SUDP boundary and sphere of influence (SOI) to encompass the lands on either side of Bellevue Road between G Street and Lake Road. By commencing the planning for the development of this area, the City is reducing the potential for haphazard and unplanned growth that may otherwise occur.

The environmental effects from the development of housing, retail and urban services in the areas of the City of Merced that are slated for development are evaluated in the General Plan EIR and include the conversion of farmland to urban uses; impacts on archaeological and historical properties; impacts on biological resources, including wetlands, air quality, noise, water supply, and traffic. Environmental impacts from the expansion of the City's Sphere of Influence (SOI) (including the Bellevue corridor) are also evaluated in the General Plan EIR and include conversion of farmland to urban uses, biological resource and cultural resources impacts, traffic, air quality, and water supply impacts. Additional environmental review would be conducted when specific projects are proposed. Development projects constructed within the City would be required to mitigate their significant environmental impacts in accordance with adopted General Plan policies.

6.4.2 Removal of an Impediment to Growth

In addition to population growth from the provision of housing or employment, population growth in an area may also result from the removal of physical impediments, which can include non-existent or inadequate access to an area; the lack of essential public services and utilities (e.g., water supply); or restrictions on growth and planning impediments such as restrictive zoning and/or general plan designations.

As analyzed in **Section 4.10, Utilities and Service Systems**, all of the existing utilities are adequate to serve the campus through 2030, and no expansions beyond those that are already planned would be required. Therefore, there would be no potential for provision of utilities to the campus to trigger growth beyond what is planned for the campus. Regarding the roads that provide access to the campus, those roadways would be improved and/or widened to serve the campus and would have the potential to improve access to undeveloped land along Lake and Bellevue Roads. However, those roadways would not be improved by the University but by the County as and when the County determines additional roadway capacity improvements are needed. For these reasons, the proposed project would not induce growth through the extension of infrastructure.

As noted above, growth can also be induced if restrictions to growth and other planning impediments are removed. The proposed project would not require any changes to land use designations or zoning as it would be implemented on land owned by the University. The project would also not cause any existing restrictions on growth on lands within the City's SUDP/SOI or within the unincorporated county to be removed.

6.4.3 Conclusion

Implementation of the proposed project would induce growth within Merced County. However, the growth would be substantially less than previously projected for 2030. Although there would be growth pressures on lands adjacent to the campus, especially along the Bellevue corridor and to the south of the campus. However, the City has redefined its SUDP/SOI to encompass the Bellevue corridor in order to guide the development of this area. Therefore, the induced growth due to the campus would be adequately addressed by the land use planning that is underway. This land use planning would help reduce the environmental effects associated with the induced growth.

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