

D R A F T R E P O R T

THE JACKSON LABORATORY, JAX WEST, AT UC DAVIS

DRAFT ENVIRONMENTAL IMPACT REPORT

Prepared for:

University of California, Davis
Office of Resource Management and Planning
376 Mrak Hall
One Shields Avenue
Davis, CA 95616

December 28, 2000

Prepared by:

URS

500 12th Street, Suite 200
Oakland, California 94607

TABLE OF CONTENTS

Executive Summary.....	ES-1
Section 1	Introduction1-1
1.1	Purpose of Report..... 1-1
1.2	Summary of the Proposed Project..... 1-2
1.3	EIR Review Process 1-2
1.4	Lead and Responsible Agencies..... 1-4
1.5	Decision to Prepare a Focused Tiered EIR..... 1-5
1.6	Relationship to the 1994 LRDP and LRDP EIR..... 1-6
1.7	Required Permits..... 1-8
1.8	Report Organization 1-9
Section 2	Project Description.....2-1
2.1	Project Location 2-1
2.2	Need for the Project..... 2-1
2.3	Project Objectives..... 2-6
2.4	Project Description 2-7
2.4.1	Facility..... 2-7
2.4.2	Construction Process and Schedule2-16
2.4.3	Population.....2-16
2.4.4	Landscaping.....2-16
2.4.5	Setbacks.....2-17
2.4.6	Utilities and Service Systems2-17
2.4.7	Roadway and Parking Improvements2-21
2.5	Project Approvals2-21
Section 3	Environmental Setting, Impacts, and Mitigation Measures.....3-1
3.1	Hazards and Hazardous Materials 3-1
3.1.1	Environmental Setting..... 3-1
3.1.2	Regulatory Setting 3-8
3.1.3	Impacts and Mitigation Measures.....3-10
3.2	Utilities and Service Systems.....3-23
3.2.1	Environmental Setting.....3-23
3.2.2	Impacts and Mitigation Measures.....3-26
Section 4	Required CEQA Sections4-1
4.1	Growth Inducement 4-1
4.2	Significant and Unavoidable Adverse Impacts..... 4-1
4.3	Irreversible Environmental Changes 4-2
Section 5	Alternatives to the Proposed Project.....5-1
5.1	Range of Alternatives Considered..... 5-1

TABLE OF CONTENTS

5.2	Alternatives Considered But Rejected As Infeasible	5-2
5.2.1	Construction of the Proposed Facility at an Alternate Location Off-Campus.....	5-2
5.2.2	Use of Alternative Research Techniques That Would Reduce the Need for Mice.....	5-2
5.3	Alternatives Evaluated In Detail	5-3
5.3.1	Alternative 1: Construction of the Proposed Facility at an Alternate Location On Campus	5-3
5.3.2	Alternative 2: Construction of a Reduced Project at the Proposed Site	5-4
5.3.3	Alternative 3: No Project Alternative	5-5
5.4	Environmentally Superior Alternative.....	5-6
Section 6	References.....	6-1
Section 7	Report Preparers and Individuals Consulted	7-1
7.1	Report Preparers.....	7-1
7.2	Individuals Consulted	7-1

List of Appendices

- A Notice of Preparation and Tiered Initial Study (See under separate link.)
- B Guidelines for Laboratory Animal Care

List of Tables

ES-1	Summary of Impacts and Mitigation Measures	ES-5
2-1	JAX West Space Allocation.....	2-13
2-2	Utility Demand Load	2-21
3-1	Animal Care Functions at JAX West	3-8

TABLE OF CONTENTS

List of Figures

1	Regional Location	2-2
2	Local Setting	2-3
3	Project Site and the West Campus Enterprise Reserve	2-4
4	Site Plan	2-8
5	First Floor Plan.....	2-11
6	Facility Elevations	2-12
7.	Proposed Utilities	2-23
8.	Alternate Natural Gas Pipeline Routes	2-25

ES.1 PROJECT DESCRIPTION

This Draft Focused Tiered Environmental Impact Report (EIR) evaluates the potential environmental impacts associated with the approval of a ground lease for The Jackson Laboratory to construct and operate a new facility in an Enterprise Reserve of the West Campus of UC Davis. The proposed project will hereinafter be known as JAX West. The project includes the construction and operation of a 96,064 gross square foot laboratory facility, and 167 parking spaces on a 6-acre building site to accommodate the users of the proposed facility. The facility would include animal rooms, laboratories, and support and office space for preparing, breeding and housing genetically standardized mice. These would be used in genetic research on campus and elsewhere on the western United States. The laboratory would be constructed and operated as collaboration between The Jackson Laboratory (TJL) and the UC Davis campus.

The Initial Study prepared for this project in August 2000 analyzed a facility of approximately 65,000 gross square feet. However, the project sponsor has requested analysis of a larger facility of about 96,064 square feet. Although the project analyzed in the Initial Study was smaller than the proposed project analyzed in this EIR, the project scope and project objectives are unchanged. The number of mice to be bred and housed in the facility remain unchanged at 300,000. The project as currently proposed would not increase the severity or significance of the impacts previously analyzed in the Initial Study. A revised Initial Study is included in Appendix A.

This Draft EIR evaluates potentially significant environmental impacts of the proposed project and recommends project-specific and cumulative mitigation measures, as appropriate. Please see Project Description (Section 2) for a complete description of the project.

ES.2 PROJECT OBJECTIVES

JAX West would provide state-of-the-art facilities for preparing, breeding and housing genetically standardized research mice for use in research on the UC Davis campus and in other western United States programs. The campus has identified the following objectives for the proposed project:

- Advance the University's capabilities and establish its leadership in mammalian genetic research, in support of its mission of teaching, research and public service, and of its Genomics Initiative;
- Ensure a reliable and stable long-term supply of high-quality research mice for the growing genetic research programs of UC Davis;
- Contribute to attracting world-class scientists in mouse biology and genomics to the UC Davis campus;
- Contribute to the University's initiative for the collaborative development of private and non-profit enterprises on campus, which enhance campus programs.

The Jackson Laboratory has identified additional objectives for the proposed project:

- Establish a state-of-the-art western United States facility for the production of genetically standardized mice to supply to the research community in the western United States;

- Support scientific collaboration among genetic researchers at JAX West and UC Davis.

ES.3 FOCUSED EIR

As noted above, the Tiered Initial Study prepared for the proposed laboratory in August 2000 evaluated potential environmental effects of a 65,000 gross-square-foot building and identified which issues would require further analysis in the EIR and which issues were fully evaluated in the Tiered Initial Study and would not require additional analysis. Based on the analysis contained in the Tiered Initial Study, it was determined that for those resource areas fully analyzed, the proposed project would not result in any significant impacts that cannot be mitigated to a less-than-significant level or are not sufficiently addressed by the 1994 LRDP EIR, as amended. The Tiered Initial Study determined that further analysis was required for a complete evaluation of impacts to Utilities and Service Systems, and concluded that impacts to this resource area could be potentially significant. Therefore, the Focused Tiered EIR should further evaluate the significance of impacts to this environmental resource area and develop project-specific mitigation measures, as necessary. Furthermore, the project is considered potentially controversial due to the nature of genetic research and the preparation and breeding of animals in the facility, therefore the Focused Tiered EIR should further evaluate the project's impacts with respect to Hazards and Hazardous Materials to confirm the determination that impacts to this resource area were adequately addressed in the 1994 LRDP EIR analysis. Since then, the project sponsor has requested analysis of a facility of about 96,064 square feet. The size of the leased parcel would increase from 5 acres to 6 acres. The additional acreage would be used for on-site detention of stormwater. The additional space included in the larger facility is mainly for administrative, warehousing, and other support functions. The square footage assigned to animal rooms remains largely the same as in the original proposal and the number of mice to be housed remains at 300,000. Because the number of mice is unchanged from the original proposal, the number of facility employees (who are mostly animal caretakers) required are almost the same as the original proposal (131 employees compared to 135 employees in the original proposal). All other aspects of the project including project scope and objectives remain unchanged.

In light of the change in the size of the building, the Initial Study has been revised (revisions are shown in underline/strikeout) and includes an analysis of the effects of the larger facility on all resource areas (please see Appendix A). This analysis shows that the size increase would not result in any new significant impacts or increase the severity of impacts previously analyzed in the August 2000 Initial Study. Because the number of employees are almost the same as the original proposal, impacts related to traffic, air quality and vehicle noise are unchanged. Because the number of mice also remains the same as the original proposal, impacts related to waste generation are unchanged. The addition of 1 acre of land to the project site does not change the impacts to cultural and biological resources because no resources were found on the site. There would be no changes in impacts with respect to all other resource areas, and similar to the original proposal, the larger facility remains within the scope of the impacts analyzed in the 1994 LRDP EIR except as specifically identified in the project EIR. This analysis also shows that the scope of the Focused Tiered EIR as determined in the August 2000 Initial Study is still valid and that the only two resource areas that should be further evaluated in the Focused EIR are Hazards and Hazardous Materials and Utilities and Service Systems. This Focused

Tiered EIR evaluates the potential impacts of the proposed project in the following resource areas:

- Hazards and Hazardous Materials
- Utilities and Service Systems

ES.4 IMPACT SUMMARY

Tables ES-1 and ES-2 that follow provide a complete listing of all impacts and mitigation measures. For each impact, it reports the significance of the impact before mitigation, applicable project-specific mitigation and/or applicable 1994 LRDP EIR mitigation measures and the level of significance of the impact after implementation of the mitigation measures. All project-level impacts would be reduced to a less-than-significant level. The project would contribute to significant cumulative regional impacts that were identified in the 1994 LRDP EIR and were determined to be significant and unavoidable.

ES.5 ALTERNATIVES TO THE PROPOSED PROJECT

The following alternatives were examined in detail in the EIR and compared to the proposed project to identify the environmentally superior alternative:

- No Project
- Construction of the proposed project at an alternate location on campus
- Construction of a reduced project at the proposed site

Detailed descriptions and an analysis of potential impacts of these alternatives are presented in Section 5. Of the build alternatives, construction of either the Project as proposed or of the Reduced Project would result in essentially the same less-than-significant project impacts or unavoidable cumulative impacts. However, the Proposed Project would be preferred because the Reduced Project would not fully meet project objectives.

ES.6 KNOWN AREAS OF CONTROVERSY

Section 15123 of the CEQA Guidelines requires that a summary of an EIR identify areas of controversy known to the Lead Agency, including issues raised by agencies and the public. During the public comment period after the Notice of Preparation (NOP), no correspondence was received regarding the proposed project. No controversial issues were raised during the scoping period. However, genetic research and research animal preparation and breeding generally are regarded as controversial.

**Table ES-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES IN THE DRAFT EIR**

Impact	Level of Significance Prior to Mitigation ¹	Mitigation Measures	Level of Significance Following Mitigation ¹
3.1 Hazards and Hazardous Materials			
<p>3.1-1 Implementation of the proposed project would lead to an increase in hazardous chemical use at UC Davis that could expose campus occupants to potential health or safety risks.</p> <p>Due to prior implementation of 1994 LRDP EIR Mitigation Measures 4.6-1(a) through (c), this impact is considered less than significant.</p>	LS	<i>No additional mitigation required.</i>	LS
<p>3.1-2 Implementation of the JAX West project could lead to an increase in the generation of hazardous chemical waste at UC Davis that could expose campus occupants to potential health or safety risks.</p> <p>Due to prior implementation of 1994 LRDP EIR Mitigation Measures 4.6-2(b) and (d), this impact is considered less than significant.</p>	LS	<i>No additional mitigation required.</i>	LS
<p>3.1-3 Operation of the proposed JAX West project could lead to an increase in radioactive material use at UC Davis and use of radiation producing machines which could expose campus occupants to potential health or safety risks.</p> <p>Due to prior implementation of 1994 LRDP EIR Mitigation Measures 4.6-5(a) and (b), this impact is considered less than significant.</p>	LS	<i>No additional mitigation required.</i>	LS

Table ES-1 (continued)

SUMMARY OF IMPACTS AND MITIGATION MEASURES IN THE DRAFT EIR

Impact	Level of Significance Prior to Mitigation¹	Mitigation Measures	Level of Significance Following Mitigation¹
<p>3.1-4 Implementation of the proposed project would lead to an increase in the generation of radioactive waste at UC Davis that could expose campus occupants to potential health or safety risks.</p> <p>Due to prior implementation of 1994 LRDP EIR Mitigation Measures 4.6-6(a), (c) and (d), this impact is considered less than significant.</p>	LS	<i>No additional mitigation required.</i>	LS
<p>3.1-5 The proposed project would increase the use of laboratory animals at UC Davis, thereby increasing the risk of animal bites and escapes.</p> <p>Due to prior implementation of 1994 LRDP EIR Mitigation Measure 4.6-10, this impact is considered less than significant.</p>	LS	<i>No additional mitigation required.</i>	LS
<p>3.1-6 The proposed project could lead to an increase in the generation of biohazardous waste at UC Davis that could expose campus occupants to potential health or safety risks.</p> <p>As all biohazardous waste is rendered non-hazardous prior to disposal and existing practices minimize the potential for adverse health effects prior to disposal, this impact is considered less than significant.</p>	LS	<i>No mitigation required.</i>	LS

Table ES-1 (continued)

SUMMARY OF IMPACTS AND MITIGATION MEASURES IN THE DRAFT EIR

	Impact	Level of Significance Prior to Mitigation¹	Mitigation Measures	Level of Significance Following Mitigation¹
3.1-7	<p>Hazardous materials used at the proposed facility may be inadvertently released to the sewer or disposed of with non-hazardous solid waste.</p> <p>Due to prior implementation of 1994 LRDP EIR Mitigation Measures 4.6-24(a) and (b), this impact is considered less than significant.</p>	LS	<i>No additional mitigation required.</i>	LS
3.1-8	<p>Implementation of the 1994 LRDP, including the proposed project and other developments in the region that use hazardous chemical materials would increase the number of people exposed to health hazards associated with such use.</p> <p>As the campus cannot guarantee that additional hazardous chemicals used at off-campus locations outside the control of the campus would be managed safely, this impact is considered significant and unavoidable. Due to prior implementation of 1994 LRDP EIR Mitigation Measure 4.6-1(a) through (c), the project's contribution to this impact would not be cumulatively considerable.</p>	SU ²	<i>No additional mitigation required for the proposed project. No additional mitigation available for the regional cumulative impact.</i>	SU ²

Table ES-1 (continued)

SUMMARY OF IMPACTS AND MITIGATION MEASURES IN THE DRAFT EIR

Impact	Level of Significance Prior to Mitigation ¹	Mitigation Measures	Level of Significance Following Mitigation ¹
<p>3.1-9 Implementation of the 1994 LRDP, including the proposed project and other developments in the region that generate hazardous chemical waste, could place an additional load on hazardous waste management facilities.</p> <p>Because the University cannot guarantee that other government entities would take steps to mitigate this impact within other jurisdictions, this impact is considered significant and unavoidable. Due to prior implementation of 1994 LRDP EIR Mitigation Measures 4.6-4(a) and (b), the project's contribution to this impact would not be cumulatively considerable.</p>	<p>SU²</p>	<p><i>No additional mitigation required for the proposed project. No additional mitigation available for the regional cumulative impact.</i></p>	<p>SU²</p>
<p>3.1-10 Implementation of the 1994 LRDP, including the proposed project and other developments in the region that use radioactive materials, would increase the number of people exposed to health hazards associated with the use of radioisotopes.</p> <p>This impact is considered significant and unavoidable because the University cannot guarantee that additional radioactive materials used at off-campus locations would be managed safely. Due to prior implementation of 1994 LRDP EIR Mitigation Measure 4.6-5(a) and (b), the project's contribution to this impact would not be cumulatively considerable.</p>	<p>SU²</p>	<p><i>No additional mitigation required for the proposed project. No additional mitigation available for the regional cumulative impact.</i></p>	<p>SU²</p>

Table ES-1 (continued)

SUMMARY OF IMPACTS AND MITIGATION MEASURES IN THE DRAFT EIR

Impact	Level of Significance Prior to Mitigation ¹	Mitigation Measures	Level of Significance Following Mitigation ¹
<p>3.1-11 Implementation of the 1994 LRDP, including the proposed project, in conjunction with other development in the region that generates radioactive waste, would place an additional load on radioactive waste management facilities.</p> <p>This impact is considered significant and unavoidable because only one out-of-state low-level radioactive waste facility continues to accept low-level radioactive waste for landfill disposal. In addition, the campus cannot guarantee that other jurisdictions will adopt, monitor, and enforce programs to minimize the generation of radioactive waste. Due to prior implementation of 1994 LRDP EIR Mitigation Measure 4.6-6(a) through (d), the project's contribution to this impact would not be cumulatively considerable.</p>	<p>SU²</p>	<p><i>No additional mitigation required for the proposed project. No additional mitigation available for the regional cumulative impact.</i></p>	<p>SU²</p>
<p>3.1-12 Implementation of the 1994 LRDP, including the proposed project, in conjunction with other development in the region that uses biohazardous materials and research animals would increase the number of people exposed to health hazards associated with such use.</p> <p>This impact is considered significant and unavoidable because the University cannot guarantee that additional biohazardous materials and research animals used in the Davis area would be managed safely. Due to prior implementation of 1994 LRDP EIR Mitigation Measure 4.6-9, the project's contribution to this impact would not be cumulatively considerable.</p>	<p>SU²</p>	<p><i>No additional mitigation required for the proposed project. No additional mitigation available for the regional cumulative impact.</i></p>	<p>SU²</p>

Table ES-1 (continued)

SUMMARY OF IMPACTS AND MITIGATION MEASURES IN THE DRAFT EIR

Impact	Level of Significance Prior to Mitigation ¹	Mitigation Measures	Level of Significance Following Mitigation ¹
<p>3.1-13 Implementation of the 1994 LRDP, including the proposed project, and other development in the region that generates biohazardous waste, would place an additional load on available biohazardous waste management facilities.</p> <p>As all biohazardous waste is rendered non-hazardous prior to disposal and existing practices minimize the potential for adverse health effects prior to disposal, this impact is considered less than significant</p>	LS	<i>No mitigation required.</i>	LS
3.2 Utilities and Service Systems			
<p>3.2.1 Development of the proposed JAX West project would contribute runoff water to existing stormwater drainage systems and could increase the risk of flooding on- or off-site. This is considered a <i>less-than-significant</i> impact.</p>	LS	<i>Design measures required by the Campus will ensure that no impact occurs. No mitigation required.</i>	LS
<p>3.2-2 Development of the proposed JAX West project would increase the demand for wastewater treatment and distribution. Because both collection and treatment capacity are sufficient to serve the project, and points of connection with adequate capacity are available, this is considered a <i>less-than-significant</i> impact.</p>	LS	<i>No mitigation required.</i>	LS

Table ES-1 (continued)

SUMMARY OF IMPACTS AND MITIGATION MEASURES IN THE DRAFT EIR

Impact	Level of Significance Prior to Mitigation¹	Mitigation Measures	Level of Significance Following Mitigation¹
<p>3.2-3 Development of the proposed JAX West project would increase the demand for electricity and related service systems. However, sufficient capacity is available to meet the demand. The impact is less than significant.</p>	<p>LS</p>	<p><i>No mitigation required.</i></p>	<p>LS</p>
<p>3.2-4 Development of the JAX West project would increase the demand for natural gas and related service systems. However, sufficient capacity is available to meet the demand. The impact is less than significant.</p>	<p>LS</p>	<p><i>No mitigation required.</i></p>	<p>LS</p>
<p>3.2-5 Development of the JAX West project would result in a direct increase in demand for telecommunication services on campus. However, adequate service will be available. This impact is less than significant.</p>	<p>LS</p>	<p><i>No mitigation required</i></p>	<p>LS</p>
<p>3.2-6 Cumulative development in the PG&E and WAPA service areas, including development of the proposed project in conjunction with 1994 LRDP development as amended, would result in increased demand for use of electricity and related service systems. There is no evidence that development on campus would create a need for new generating facilities. This impact is less than significant.</p>	<p>LS</p>	<p><i>No mitigation required</i></p>	<p>LS</p>

Table ES-1 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES IN THE DRAFT EIR

Impact	Level of Significance Prior to Mitigation ¹	Mitigation Measures	Level of Significance Following Mitigation ¹
<p>3.2-7 Development related to the implementation of the 1994 LRDP, including the proposed project, and other development in the region would continue to result in an increase in the consumption of domestic water, as anticipated in the 1994 LRDP.</p> <p>Since the capacity of the deep aquifer that provides domestic water to the campus and the region is unknown, this impact is considered significant and unavoidable. Implementation of 1994 LRDP EIR Mitigation Measure 14.4-1 will ensure that the project's contribution to this impact would not be cumulatively considerable.</p>	SU ²	<i>The 1994 LRDP EIR Mitigation Measures 4.14-1(a) would be implemented to reduce the contribution of the project to the impact to the deep water aquifer. No additional mitigation available for the regional cumulative impact.</i>	SU ²
<p>3.2-8 Cumulative development in the PG&E service area, including development of the proposed project in conjunction with 1994 LRDP development and the WWTP Replacement Project, would result in increased demand for use of natural gas and related service systems.</p>	LS	<i>No mitigation required.</i>	LS
<p>3.2-9 Development of the proposed project, in conjunction with 1994 LRDP development and the WWTP Replacement Project, would result in increased demand for telecommunication services on campus.</p>	LS	<i>No mitigation required.</i>	LS

¹ LS = Significant; PS = Potentially Significant; S = Significant; SU = Significant, Unavoidable

² Impacts are significant on a cumulative level only; project level impacts will be less than significant. The project's contribution to the impact will not be cumulatively considerable.

**Table ES-2
SUMMARY OF IMPACTS AND MITIGATION MEASURES FROM THE INITIAL STUDY**

Impact	Level of Significance Prior to Mitigation ¹	Mitigation Measures	Level of Significance Following Mitigation ¹
2. Agricultural Resources			
<p>a) Implementation of the proposed project would convert approximately 6 acres designated as Prime Farmland pursuant to the State of California Department of Conservation to non-agricultural uses.</p> <p>Measures included in the LRDP EIR and the subsequent Major Capital Improvements EIR to reduce the significance of this impact include acquisition and dedication of 100 acres at Russell Ranch to farmland focused on soil conservation research. Nonetheless, the LRDP EIR concluded that despite the compensatory value of these activities, the loss of Prime Farmland cannot be mitigated to a less-than-significant level unless developed Prime Farmlands are returned to their agricultural status. Because such measures are considered infeasible, this impact is considered significant and unavoidable even after mitigation.</p>	SU	<i>No additional mitigation available.</i>	SU
4. Transportation/Circulation			
<p>a, b) Implementation of the JAX West project would cause an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system. In addition, the proposed project would exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways.</p> <p>Due to prior implementation of 1994 LRDP EIR Mitigation Measure 4.3-1(a) as amended by Impact 8-13 of the 1997-98 Major Improvement Projects SEIR</p>	LS	<i>No additional mitigation required.</i>	LS

Table ES-2 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FROM THE INITIAL STUDY

Impact	Level of Significance Prior to Mitigation ¹	Mitigation Measures	Level of Significance Following Mitigation ¹
and by the Veterinary Medicine Laboratory and Equine Athletic Performance Laboratory Facilities Focused Tiered EIR, this impact is considered less than significant.			
5. Noise			
<p>a, c, d) Implementation of the proposed project would expose persons to or generate noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies. The proposed project would cause a substantial increase (permanent or temporary) in ambient noise levels in the project vicinity.</p> <p>Implementation of 1994 LRDP EIR Mitigation Measures 4.4-3 (a), (c), and (b) as necessary would reduce noise related impacts to a less-than-significant level.</p>	LS	<i>No additional mitigation required.</i>	LS
6. Air Quality			
<p>b) The proposed project would violate any air quality standard or contribute substantially to an existing or projected air quality violation during construction or operation of the proposed facility.</p> <p>Implementation of 1994 LRDP EIR Mitigation Measure 4.5-1 (a)-(d) would reduce project-specific short-term fugitive dust impacts to a less-than-significant level. In addition, implementation of 1994 LRDP EIR Mitigation Measures 4.5-3(a) and (b) would reduce the magnitude of impacts to regional air quality associated with operation of JAX West to a less-than-significant level.</p>	LS	<i>No additional mitigation required.</i>	LS

Table ES-2 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FROM THE INITIAL STUDY

Impact	Level of Significance Prior to Mitigation¹	Mitigation Measures	Level of Significance Following Mitigation¹
<p>c) The proposed project would result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors).</p> <p>Although development of JAX West would not exceed development proposed under the 1994 LRDP, the LRDP EIR recognized that criteria pollutant emissions of the 1994 LRDP in conjunction with those of cumulative development in the region would result in a significant and unavoidable impact. To reduce air quality impacts from the proposed project, LRDP EIR Mitigation Measures 4.5-6(a)-(b) would be implemented. However, because the actions of other air quality jurisdictions are not under the control of the campus, this impact would remain significant and unavoidable.</p>	SU ²	<i>No additional mitigation available.</i>	SU ²
<p>d) Implementation of the proposed project would expose sensitive receptors to substantial pollutant concentrations.</p> <p>Due to implementation of 1994 LRDP EIR Mitigation Measures 4.6-24(a) and (b), this impact is considered less than significant.</p>	LS	<i>No additional mitigation required.</i>	LS

Table ES-2 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FROM THE INITIAL STUDY

Impact	Level of Significance Prior to Mitigation ¹	Mitigation Measures	Level of Significance Following Mitigation ¹
8. Biological Resources			
<p>a) Implementation of the proposed project would have a substantial adverse effect, either directly or through habitat modifications on species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or United States Fish and Wildlife Service.</p> <p>Implementation of the 1994 LRDP EIR Mitigation Measures 4.7-3 (b), 4.7-5, 4.7-9 (a), and 4.7-3(c) (if necessary) would reduce impacts to sensitive species and their habitat to a less-than-significant level.</p>	LS	<i>No additional mitigation required.</i>	LS
9. Hydrology and Water Quality			
<p>a, c, d, f) Implementation of the proposed project may violate water quality standards or waste discharge requirements.</p> <p>Because the project would disturb approximately 6 acres, 1994 LRDP Mitigation Measure 4.8-4(a), 4.8-5(a), 4.8-6, and 4.8-8(a)-(c) would be implemented as part of the proposed project. Therefore, development of JAX West would have a less-than-significant impact on water quality standards and waste discharge requirements.</p>	LS	<i>No additional mitigation required</i>	LS

Table ES-2 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FROM THE INITIAL STUDY

Impact	Level of Significance Prior to Mitigation ¹	Mitigation Measures	Level of Significance Following Mitigation ¹
<p>b) Implementation of the proposed project would substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.</p> <p>To reduce impacts to groundwater supplies, 1994 LRDP EIR Mitigation Measure 4.8-9(a) and (b), 4.14-1(a) and (b), 4.8-5(a), and 4.14-3(a) and (b) would be implemented as part of the proposed project.</p>	LS	<i>No additional mitigation required.</i>	LS
10. Geology and Soils			
<p>a) Implementation of the proposed project would expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking, and/or seismic-related ground failure, including liquefaction.</p> <p>1994 LRDP EIR Mitigation Measures 4.9-1(a), (b), and (c), and 4.9-3 (a)-(c) were identified to reduce this impact to a less-than-significant level. However, due to cumulative development in the region, the number of people exposed to strong ground motion and other seismic effects would increase. Therefore, the campus considered this impact to be significant and unavoidable even after mitigation. This impact was fully addressed by the Findings and Overriding Considerations adopted by The Regents in connection with its approval of the 1994 LRDP EIR, as amended.</p>	SU ²	<i>No additional mitigation required for the proposed project. No additional mitigation available for the regional cumulative impact.</i>	SU ²

Table ES-2 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FROM THE INITIAL STUDY

Impact	Level of Significance Prior to Mitigation ¹	Mitigation Measures	Level of Significance Following Mitigation ¹
12. Cultural Resources			
<p>b, d) Implementation of the proposed project would cause a substantial adverse change in the significance of a unique archeological resource pursuant to § 15064.5, and/or may disturb human remains, including those interred outside of formal cemeteries.</p> <p>1994 LRDP Mitigation Measures 4.10-1 (c) i, ii, and iii would be implemented to reduce impacts from the project to a less-than-significant level. However, the 1994 LRDP EIR, as amended, concluded that cumulative loss of important cultural resources would be a significant and unavoidable impact because implementation of Mitigation Measure 4.10-4(b) falls within other jurisdictions to monitor and enforce. This significant and unavoidable impact was adequately analyzed in the 1994 LRDP EIR and full addressed by the Findings and Overriding Considerations adopted by The Regents in connection with its approval of the 1994 LRDP EIR, as amended.</p>	SU ²	<p><i>No additional mitigation required for the proposed project. No additional mitigation available for the regional cumulative impact.</i></p>	SU ²
13. Aesthetics			
<p>c) Development of the proposed JAX West project would substantially degrade the existing visual character or quality of the site and its surroundings.</p> <p>Implementation of 1994 LRDP EIR Mitigation Measure 4.11-2 would reduce this impact to a less-than-significant level. However, cumulative development in the region, including the project, would contribute to a cumulative alteration of the rural character of Yolo and Solano counties. This impact was considered significant and unavoidable because implementation of Mitigation Measure 4.11-5(b) falls outside of the University's jurisdiction to enforce and</p>	SU ²	<p><i>Design measures required by the Campus will ensure that no impact occurs from the project. No mitigation is available for the regional cumulative impact.</i></p>	SU ²

Table ES-2 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FROM THE INITIAL STUDY

Impact	Level of Significance Prior to Mitigation ¹	Mitigation Measures	Level of Significance Following Mitigation ¹
<p>monitor. This significant and unavoidable impact was fully addressed by the Findings and Overriding Considerations adopted by The Regents in connection with its approval of the 1994 LRDP.</p>			
<p>d) Development of the proposed JAX West project would create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.</p> <p>Implementation of 1994 LRDP EIR Mitigation Measure 4.11-4 (a) along with the UC Davis lighting standards would reduce this impact to a less than significant level.</p>	LS	<i>No additional mitigation required.</i>	LS
14. Public Services			
<p>a) Development of the proposed JAX West project would result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impact, in order to maintain acceptable service ratios, response times or other performance objectives for public services including fire protection, police protection, schools, parks, and other public facilities.</p> <p>Implementation of 1994 LRDP EIR Mitigation Measures 4.12-1, 4.12-2, 4.12-3, 4.12-4(b), and 4.12-5(b) would reduce this impact to a less-than-significant level. However, cumulative impacts to public services associated with development in the region, including the proposed project, were considered significant and</p>	SU ²	<i>No additional mitigation required for the proposed project. No additional mitigation available for the regional cumulative impact.</i>	SU ²

Table ES-2 (continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES FROM THE INITIAL STUDY

Impact	Level of Significance Prior to Mitigation¹	Mitigation Measures	Level of Significance Following Mitigation¹
unavoidable because implementation of Mitigation Measures 4.12-4(b) and 4.12-5(b) fall outside of the University's jurisdiction to enforce and monitor. This significant and unavoidable impact was fully addressed by the Findings and Overriding Considerations adopted by The Regents in connection with its approval of the 1994 LRDP.			

¹ LS = Significant; PS = Poetntially Significant; S = Significant; SU = Significant, Unavoidable

² Impacts are significant on a cumulative level only; project level impacts will be less than significant. The project's contribution to the impact will not be cumulatively considerable.

This Focused Tiered Draft Environmental Impact Report (DEIR) analyzes specific potential environmental impacts of the proposed Jackson Laboratory JAX West project in two resource areas: hazards and hazardous materials, and utilities and service systems.

1.1 PURPOSE OF REPORT

UC Davis has prepared this Focused Tiered DEIR on the proposed JAX West project for the following purposes:

- to satisfy the requirements of the California Environmental Quality Act (CEQA)
- to inform the general public, the local community, responsible and interested public agencies, and the University of the nature of the proposed project, the possible environmental impacts, possible measures to mitigate those impacts, and alternatives to the proposed project
- to enable The Board of Regents (The Regents) of the University of California (University) to consider environmental consequences when deciding whether to approve the project

As described in the CEQA Guidelines, public agencies are charged with the duty to avoid or minimize environmental damage where feasible. In discharging this duty, the public agency has an obligation to balance a variety of public objectives, including economic, environmental, and social (Section 15021 of the CEQA Guidelines). This Focused Tiered DEIR is a public information document, the purpose of which is to identify the potential significant effects of the proposed project on the environment, and to indicate the manner in which those significant effects can be avoided or mitigated, to identify any unavoidable adverse impacts that cannot be mitigated, and to identify reasonable and feasible alternatives to the proposed project that would eliminate any significant adverse environmental effects, or reduce the impacts to a less-than-significant level. The Focused Tiered DEIR also discloses growth inducing impacts, effects found not to be significant, and cumulative impacts.

The lead agency (The Regents) is required to consider the information in the Focused Tiered EIR, along with any other relevant information, in making its decision on whether to implement the project (Section 15121 of the CEQA Guidelines). Although the Focused Tiered EIR does not determine the ultimate decision that will be made regarding implementation of the project, CEQA requires The Regents to consider the information in the EIR and make findings regarding each significant effect identified in the Focused Tiered EIR.

For the proposed JAX West project, CEQA requires the University to prepare a DEIR reflecting the independent judgement of the University regarding the impacts, the level of significance of the impacts both before and after mitigation, and the mitigation measures proposed to reduce the impacts. The Focused Tiered DEIR is then circulated to responsible agencies, trustee agencies with resources affected by the project, and interested agencies and individuals. The purpose of public and agency review of the DEIR includes sharing expertise, disclosing agency analyses, checking for accuracy, detecting omissions, discovering public concerns, and soliciting counter-proposals. In reviewing the Focused Tiered DEIR, reviewers should focus on the sufficiency of the document in identifying and analyzing the possible impacts on the environment and avoiding or mitigating the significant effects of the proposed project.

1.2 SUMMARY OF THE PROPOSED PROJECT

The proposed project consists of the approval of a ground lease for The Jackson Laboratory to build and operate a laboratory facility on 6 acres of the UC Davis West Campus (see Figure 3). The proposed facility would consist of a primarily one-story building encompassing approximately 96,064 gsf. This facility would have approximately 131 full-time equivalent employees, and would be provided with 167 on-site parking spaces. The facility would include animal rooms, laboratories, and support and office space for preparation, breeding and housing of genetically standardized mice for use in genetic research. The project would be constructed and operated in collaboration between UC Davis and the private non-profit Jackson Laboratory.

The proposed facility is not a conventional experimental laboratory, but rather a maintenance, production and service building. Routine activities at the facility to facilitate scientific research would include: (1) importation of mouse strains of unknown health status into the colony; (2) breeding and distribution of standard mouse strains for sale to the research community; (3) long-term maintenance of specialized strains relevant to genetic research; and (4) preparation of embryos, eggs and sperm for long-term storage through deep freezing. When completed, the facility would supply research specimens to the UC Davis campus and throughout the western United States.

1.3 EIR REVIEW PROCESS

Tiered EIR

This environmental analysis is a Focused Tiered DEIR for the proposed JAX West project at UC Davis. The environmental analysis for the proposed project is tiered from the UC Davis 1994 Long Range Development Plan (LRDP) EIR in accordance with Sections 15152 and 15168(c) of the CEQA Guidelines. The 1994 LRDP EIR is a Program EIR, prepared pursuant to Section 15168 of the CEQA Guidelines (Title 14, California Code of Regulations, Sections 15000 et seq.). The 1994 LRDP EIR analyzed full implementation of uses and physical development proposed under the 1994 LRDP through the academic year 2005-06, and identified measures to mitigate the significant adverse project and cumulative impacts associated with that growth.

The CEQA concept of "tiering" refers to the coverage of general environmental matters in broad program-level EIRs, with subsequent focused environmental documents for individual projects that implement the program. The project environmental document incorporates by reference the discussions in the Program EIR and concentrates on project-specific issues. CEQA and the CEQA Guidelines encourage the use of tiered environmental documents to reduce delays and excessive paperwork in the environmental review process. This is accomplished in tiered documents by eliminating repetitive analyses of issues that were adequately addressed in the Program EIR and by incorporating those analyses by reference.

The State CEQA Guidelines at §15152(f)(3) provide that “[s]ignificant environmental effects have been ‘adequately addressed’ in a previous program EIR if the lead agency determines that:

- (a) they have been mitigated or avoided as a result of the prior environmental impact report and findings adopted in connection with that prior environmental report;

- (b) they have been examined at a sufficient level of detail in the prior environmental impact report to enable those effects to be mitigated or avoided by site specific revisions, the imposition of conditions, or by other means in connection with the approval of the later project; or
- (c) they cannot be mitigated to avoid or substantially lessen the significant impacts despite the project proponent's willingness to accept all feasible mitigation measures, and the only purpose of including analysis of such effects in another environmental impact report would be to put the agency in a position to adopt a statement of overriding considerations with respect to the effects."

These criteria are applied in the analysis set forth in this Focused Tiered DEIR. The tiering of the environmental analysis for the proposed project allows this DEIR to rely on the 1994 LRDP EIR for the following.

- (a) a discussion of general background and setting information for environmental topic areas
- (b) overall growth-related issues
- (c) issues that were evaluated in sufficient detail in the 1994 LRDP EIR for which there is no significant new information or change in circumstances that would require further analysis
- (d) long-term cumulative impacts

All applicable 1994 LRDP EIR mitigation measures, as identified in the Tiered Initial Study, are incorporated into and made part of the project. For a more detailed discussion of impacts to other resource areas not analyzed further in the body of this Focused Tiered DEIR, please refer to the Tiered Initial Study, which is included as Appendix A. Project-specific mitigation measures for new potentially significant impacts that were not previously identified in the 1994 LRDP EIR may also be required to be implemented as part of the proposed project.

Public Review

In accordance with Section 15063 and 15082 of the CEQA Guidelines, the campus published a Notice of Preparation (NOP) and Tiered Initial Study that were circulated for a 30-day period of public review comment from August 29, 2000 to September 27, 2000. A public scoping meeting was held on October 12, 2000 at the UC Davis University Club to solicit public comments. No comments were submitted. Copies of the NOP and Tiered Initial Study are included in this document as Appendix A. Copies of these documents are also available at the UC Davis Office of Resource Management and Planning at 376 Mrak Hall, UC Davis.

This Focused Tiered DEIR will begin public circulation on December 28, 2000, for a 45-day period of review and comment by the public and other interested parties, agencies, and organizations. The 45-day public review period will conclude at 5 p.m. on February 12, 2001. All comments or questions about the DEIR should be addressed to:

John A. Meyer
Office of Resource Management and Planning, 376 Mrak Hall
University of California
One Shields Avenue
Davis, California 95616

Copies of the DEIR are available during normal operating hours at the UC Davis Office of Resource Management and Planning, 376 Mrak Hall on the UC Davis campus; at the Yolo County Public Library, 315 E. 14th Street, Davis; and at the Vacaville Library, 1020 Ulatis Drive, Vacaville. The document is also available online during the public review period at www.pbo.ucdavis.edu/env/envplan/.

Comments relating to the Focused Tiered DEIR may also be presented orally during the public hearing on January 29, 2001 at 7:00 P.M. at the University Club on Old Davis Road on the UC Davis Campus. Following the public hearing on this document and after the close of the written public comment period, responses to written and oral comments on the environmental effects of the project will be prepared and published in the Final Focused Tiered EIR. The EIR (comprised of the Draft EIR and the Final EIR documents) will be considered by The Regents in a public meeting and will be certified if it is determined to be in compliance with CEQA. Following certification of the Focused Tiered EIR, The Regents will consider approval of the proposed project. CEQA requires the decision-makers to balance the benefits of a proposed project against any unavoidable environmental impacts. If environmental impacts are identified as significant and unavoidable, The Regents may still approve the project if it believes that social, economic, or other benefits outweigh the unavoidable impacts. The Regents would then be required to state in writing the specific reasons for approving the project based on information in the Focused Tiered EIR and other information in the record. As indicated in Section 15093 of the CEQA Guidelines, this reasoning is called a “statement of overriding considerations.”

CEQA Findings and Mitigation Monitoring

CEQA requires that when a public agency makes findings based on an EIR, the public agency must adopt a reporting or monitoring program for those measures which it has adopted or made a condition of the project approval in order to mitigate or avoid significant effects on the environment (Public Resources Code Section 21081.6). The reporting and monitoring program must be designed to ensure compliance during project implementation (Public Resources Code Section 21081.6).

The Mitigation Monitoring Program for the JAX West project will be prepared, and will be considered by The Regents in conjunction with review of the JAX West project.

1.4 LEAD AND RESPONSIBLE AGENCIES

The Regents of the University of California (University) is the lead agency for the proposed project evaluated in this Focused Tiered DEIR because it has principal responsibility for reviewing and certifying the adequacy of this document and approving the project. Distinct from the lead agency are responsible agencies with permitting or approval authority over the project. The State Water Resources Control Board is a responsible agency for this project with regards to compliance with NPDES requirements.

1.5 DECISION TO PREPARE A FOCUSED TIERED EIR

The Tiered Initial Study prepared for the proposed project in August 2000 evaluated potential environmental effects of the proposed project and identified which issues would require further analysis in the EIR and which issues were fully evaluated in the Tiered Initial Study and would not require additional analysis. That Initial Study analyzed a proposed facility of approximately 65,000 gross square feet. However, the project sponsor has requested analysis of a larger facility with about 96,064 square feet of space. Although the project analyzed under the August 2000 Initial Study was smaller than now proposed, the project scope, and objectives are unchanged. As shown in the revised Initial Study (Appendix A), the larger facility would not increase the severity or significance of the impacts previously analyzed in the August 2000 Initial Study.

Based on the analysis contained in the revised Tiered Initial Study, it was concluded that in all resource areas listed below the proposed project would either result in: no impact; a less-than-significant impact; a less-than significant impact due to incorporation of 1994 LRDP EIR mitigation measures or project-specific mitigation measures; or a contribution to a significant or unavoidable cumulative impact adequately analyzed in the 1994 LRDP EIR, for which no new mitigation measures are available and no new analysis is proposed:

- Land Use and Planning: No impacts identified.
- Agriculture Resources: The project would convert 6 acres of Prime Farmland to non-agricultural uses; purchase of Russell Ranch as described under LRDP somewhat compensates for loss, but impact is nonetheless significant and unavoidable.
- Population and Housing: No impacts identified.
- Transportation and Circulation: LRDP identified significant unavoidable traffic impacts resulting from anticipated increased traffic volumes. It is not anticipated that employee growth on the West Campus will exceed assumptions made in the LRDP. No additional impacts are anticipated.
- Noise: With the mitigation measures identified by the LRDP EIR, no significant impacts are anticipated.
- Air Quality: With the mitigation measures identified by the LRDP EIR, no significant impacts are anticipated.
- Hazards and Hazardous Materials: With the mitigation measures identified by the LRDP EIR, no significant impacts are anticipated.
- Biological Resources: With the mitigation measures identified by the LRDP EIR, no significant impacts are anticipated.
- Hydrology and Water Quality: With the mitigation measures identified by the LRDP EIR, no significant impacts are anticipated.
- Geology and Soils: With the mitigation measures identified by the LRDP EIR, no significant impacts are anticipated.
- Mineral Resources: No impacts identified.

- Cultural Resources: With the mitigation measures identified by the LRDP EIR, no significant impacts are anticipated.
- Aesthetics: With the mitigation measures identified by the LRDP EIR, no significant impacts are anticipated.
- Recreation: With the mitigation measures identified by the LRDP EIR, no significant impacts are anticipated.
- Public Services: With the mitigation measures identified by the LRDP EIR, no significant impacts are anticipated.

Based on the analysis contained in the revised Tiered Initial Study, it has been determined that for those resource areas fully analyzed, the proposed project would not result in any significant impacts that cannot be mitigated to a less-than-significant level or are not sufficiently addressed by the 1994 LRDP EIR, as amended. However, the Tiered Initial Study determined that further analysis is required for a complete evaluation of impacts to Utilities and Service Systems. The Tiered Initial Study thus concluded that impacts to this resource area could be potentially significant. Therefore, this Focused Tiered EIR further evaluates the significance of impacts to this environmental resource area and develops project-specific mitigation measures, if necessary. Furthermore, the project is considered potentially controversial due to the nature of genetic research and the preparation, breeding and housing of animals in the facility. This Focused Tiered EIR therefore also includes an evaluation of the proposed project's impacts with respect to Hazards and Hazardous Materials to confirm the determination that impacts to this resource area were adequately addressed in the 1994 LRDP EIR analysis. This Focused Tiered EIR evaluates the potential impacts of the proposed project in the following resource areas:

- *Hazards and Hazardous Materials* - impacts from increased use and generation of hazardous chemicals and waste, radioactive materials and waste, and biohazardous materials and waste, and laboratory animal preparation, housing and breeding by the proposed laboratory project.
- *Utilities and Service Systems* - impacts from increased demand on utility distribution system capacities and points of connections.

1.6 RELATIONSHIP TO THE 1994 LRDP AND LRDP EIR

1994 LRDP

The 1994 LRDP, as amended, was designed to facilitate development of campus facilities and accommodate population growth through 2005-06. The 1994 LRDP identifies physical planning principles to guide campus development and includes a land use plan that identifies zones on campus that could be used as future building sites for academic and administrative uses, teaching and research fields, support functions, housing, recreational uses, open space, parking, and commercial and potential enterprise opportunities. The proposed location of the JAX West project is designated for Academic and Administrative Low Density uses with Enterprise Reserve overlay in the LRDP adopted by UC Davis in 1994. The Academic and Administrative Low Density designation includes teaching and research support uses, such as greenhouses, field support, laboratories, offices, agricultural-related space, animal sciences facilities and animal

housing. These developments typically are of one-story, with low density occupancy. Enterprise Reserve overlay identified areas on campus where development would be financed in cooperation with public or private organizations external to the campus. Enterprise Reserve uses may include affiliated research, faculty housing, commercial activity, recreational and cultural facilities, office support and open space amenities. JAX West, as an animal breeding facility in support of biological research, and as a non-profit enterprise, is consistent with the land use designation of the 1994 LRDP.

The LRDP projects growth in assignable square feet of building space and of campus population at buildout of the 1994 LRDP, taking into account projects and types of projects foreseen for the campus. The Tiered Initial Study for the proposed JAX West project considered this project in conjunction with other projects approved or considered for the campus. The approximately 81,123 asf of academic and administrative use proposed under the project would not exceed planned development and would be consistent with the development approved under the 1994 LRDP. The population increase associated with the proposed project also would be within and consistent with the population projections in the 1994 LRDP (please refer to Appendix A, Tiered Initial Study and Notice of Preparation, Section IV, for additional discussion of other projects under consideration that would also increase the assignable square footage and population of the campus).

At this time, the University is undertaking preliminary feasibility studies to consider the possible future enrollment growth at some of the campuses, including UC Davis, over the next 10 - 15 years. To the extent that such future growth would cause growth which is not consistent with the 1994 LRDP and/or physical changes to the environment that have not been considered in the 1994 LRDP EIR, additional environmental impacts could conceivably occur. However, analysis of any such impacts would be speculative at this time because the current efforts are preliminary in nature and do not constitute anything more than feasibility and planning studies, as defined in the CEQA Guidelines Section 15262. The proposed project would not accommodate or result in an increase in the student population on the campus.

1994 LRDP EIR

The 1994 LRDP EIR is a program EIR, prepared pursuant to Section 15168 of the CEQA Guidelines (Title 14, California Code of Regulations, Section 15000 et seq.). The 1994 LRDP EIR analyzed full implementation of uses and physical development proposed under the 1994 LRDP through the academic year 2005-06 and identified measures to mitigate the significant adverse project and cumulative impacts associated with that growth. The environmental analysis in this EIR on the JAX West project is tiered from the 1994 Long Range Development Plan Environmental Impact Report (LRDP EIR) (State Clearinghouse #94022005) as supplemented and amended by a number of subsequent environmental documents.

Specifically, the 1994 LRDP EIR was supplemented and amended by the 1997 Wastewater Treatment Plant (WWTP) Replacement Project EIR (State Clearinghouse #95123027 and #96072024), by the 1997-98 Major Capital Improvement Projects Supplemental Environmental Impact Report (SEIR) (State Clearinghouse #97122016), by the Center for the Arts Performance Hall and South Entry Roadway and Parking Improvements Tiered Initial Study and Mitigated Negative Declaration (State Clearinghouse #98092016), by the USDA Western Human Nutrition Research Center Tiered Initial Study and Mitigated Negative Declaration (State Clearinghouse

#99092060), by the Veterinary Medicine Laboratory and Equine Athletic Performance Laboratory Facilities Focused Tiered EIR (State Clearinghouse #2000022057), by the Genome and Biomedical Sciences Facility Focused Tiered EIR (State Clearinghouse #2000042028) and will be amended by the Veterinary Medicine Facilities Improvement Project Focused Tiered EIR currently being prepared (State Clearinghouse #200009212). The 1994 LRDP EIR and these amending documents are hereby incorporated by reference. These documents are available for review during normal operating hours at the UC Davis Office of Resource Management and Planning at 376 Mrak Hall, University of California, Davis, at Reserves in Shields Library on the UC Davis campus, at the Yolo County Public Library, 315 E. 14th Street, Davis, and at the Vacaville Public Library, 1020 Ulatis Drive, Vacaville. Hereafter, reference to the 1994 LRDP EIR includes the 1994 LRDP EIR as supplemented and amended by the documents listed above.

In summary, the WWTP Replacement Project EIR identified the loss of an additional 20 acres of prime agricultural land that was not identified in the 1994 LRDP EIR analysis, which increased the magnitude of land use and biological impacts associated with the conversion of prime agricultural land and Ruderal/Annual Grassland habitat. The 1997-98 Major Capital Improvement Projects SEIR addressed the full buildout of all Enterprise Reserves on campus, including the 43-acre West Campus Reserve, and identified similar incremental losses of prime agricultural land and 31 acres of Agricultural Land and Ruderal/Annual Grassland. To mitigate identified land use and biological resource impacts associated with the conversion of prime agricultural land and Ruderal/Annual Grassland habitat, 20 acres of land at the Russell Ranch was redesignated from Academic and Administrative Low Density to Teaching/Research Fields. This SEIR is relevant to the proposed project because the project would also result in conversion of prime agricultural land and the impact would be mitigated through the implementation of a mitigation measure identified in the Major Capital Improvements SEIR (See Initial Study in Appendix A).

The Veterinary Medicine Laboratory and Equine Athletic Performance Laboratory Facilities Focused Tiered EIR updated the cumulative transportation and circulation impact analysis with a new cumulative traffic study conducted in 2000. The updated study identified potential cumulative traffic impacts to the intersection of Hutchison Drive and Health Sciences Drive. A project-specific mitigation measure was adopted to reduce this impact to a less-than-significant level. This new mitigation measure reduces a cumulative impact resulting from development under the 1994 LRDP and therefore revises the LRDP EIR. The Genome and Biomedical Sciences Facility Project Focused Tiered EIR also utilized the same updated traffic study and re-adopted the same new cumulative traffic mitigation measure for Hutchison/Health Sciences Drive. The cumulative traffic analysis contained in these two EIRs is relevant to the proposed project.

Revised 1994 LRDP EIR impacts and mitigation measures are identified in Section VII, Evaluation of Environmental Impacts, of the Tiered Initial Study, as appropriate.

1.7 REQUIRED PERMITS

The proposed project would disturb up to 6 acres. The contractor for the proposed project will file a Notice of Intent with the State Water Resources Control Board to comply with NPDES requirements, and will implement a storm water pollution prevention plan during project construction as required by the General Permit for Stormwater Discharges Associated with

Construction Activity. The JAX West facility would require permits from the Yolo-Solano Air Quality Management District to operate a natural gas steam generator and a standby electric generator.

1.8 REPORT ORGANIZATION

The Focused Tiered DEIR is organized in the following sections:

- *Executive Summary.* Summarizes environmental impacts that would result from implementation of the proposed project, describes proposed mitigation measures, and indicates the level of significance of impacts after mitigation. It also presents alternatives to the proposed project and known areas of controversy.
- *Section 1 Introduction.* Provides an introduction and overview describing the intended use and scope of the Focused Tiered EIR, its relationship to the 1994 LRDP and LRDP EIR, as amended, and the environmental review process.
- *Section 2 Project Description.* Provides a detailed description of the proposed project, including its location, background information, major objectives, and structural and technical characteristics.
- *Section 3 Environmental Setting, Impacts and Mitigation.* Contains project-specific and cumulative impact analyses for each resource area identified for further analysis in the Tiered Initial Study (Appendix A). For each resource area, it provides a description of the environmental setting, potential impacts of the project, cumulative impacts of this project in conjunction with the overall growth and development included in the 1994 LRDP and in the Davis region and mitigation measures.
- *Section 4 Other CEQA Considerations.* Provides a discussion of growth inducement, significant and unavoidable impacts, and irreversible environmental effects of the proposed project.
- *Section 5 Alternatives to the Proposed Project.* Identifies and discusses alternatives considered in the development of the proposed project and the associated environmental effects.
- *Section 6 References.* Itemizes supporting and reference sources used in the preparation of the Focused Tiered DEIR.
- *Section 7 Report Preparers and Individuals Consulted.* Identifies the persons who prepared the Focused Tiered EIR and those who were consulted during its preparation.
- *Appendix A.* Contains the Notice of Preparation and Tiered Initial Study for the Jackson Laboratory, JAX West project.
- *Appendix B.* Contains guidelines on the care and use of laboratory animals.

2.1 PROJECT LOCATION

The 5,300-acre UC Davis campus is located in Yolo and Solano Counties approximately 72 miles northeast of San Francisco, 15 miles west of the City of Sacramento, and adjacent to the City of Davis (see Figure 1). The campus, in general, is made up of four units: the Central Campus, the South Campus, the West Campus, and Russell Ranch (see Figure 2). The term “Main Campus” is used to refer to Central, South and West Campus units collectively and excludes Russell Ranch. The Central Campus is bounded approximately by Russell Boulevard to the north, Highway 113 (State Route 113) to the west, Interstate 80 (I-80) and the Union Pacific Railroad tracks to the south, and 1st and A Streets in the City of Davis to the east. The South Campus is located south of I-80 and north of the South Fork of Putah Creek. The West Campus is bounded to the east by Highway 113, to the north by Russell Boulevard, to the south by Putah Creek and to the west by privately owned lands. While the Central, South and West Campus units are contiguous, Russell Ranch is located to the west of West Campus and is separated from that campus unit by 1½ miles of privately owned agricultural land.

Project Site

The proposed Jackson Laboratory, JAX West would be constructed on an approximately 6-acre site in an Enterprise Reserve of the West Campus, approximately 2 miles from the Central Campus (see Figure 3). The proposed project site is south of Hutchison Drive, on the west side of Hopkins Road, opposite the University Airport. This level, rectangular parcel is bounded on the north by Bee Lane (a dirt service road), on the east by Hopkins Road (a two-lane paved road), and on the south and west by forage production fields. Adjacent land uses include existing single-story buildings, agriculture and animal resource-related buildings, and the University Airport. The parcel is currently an agricultural field.

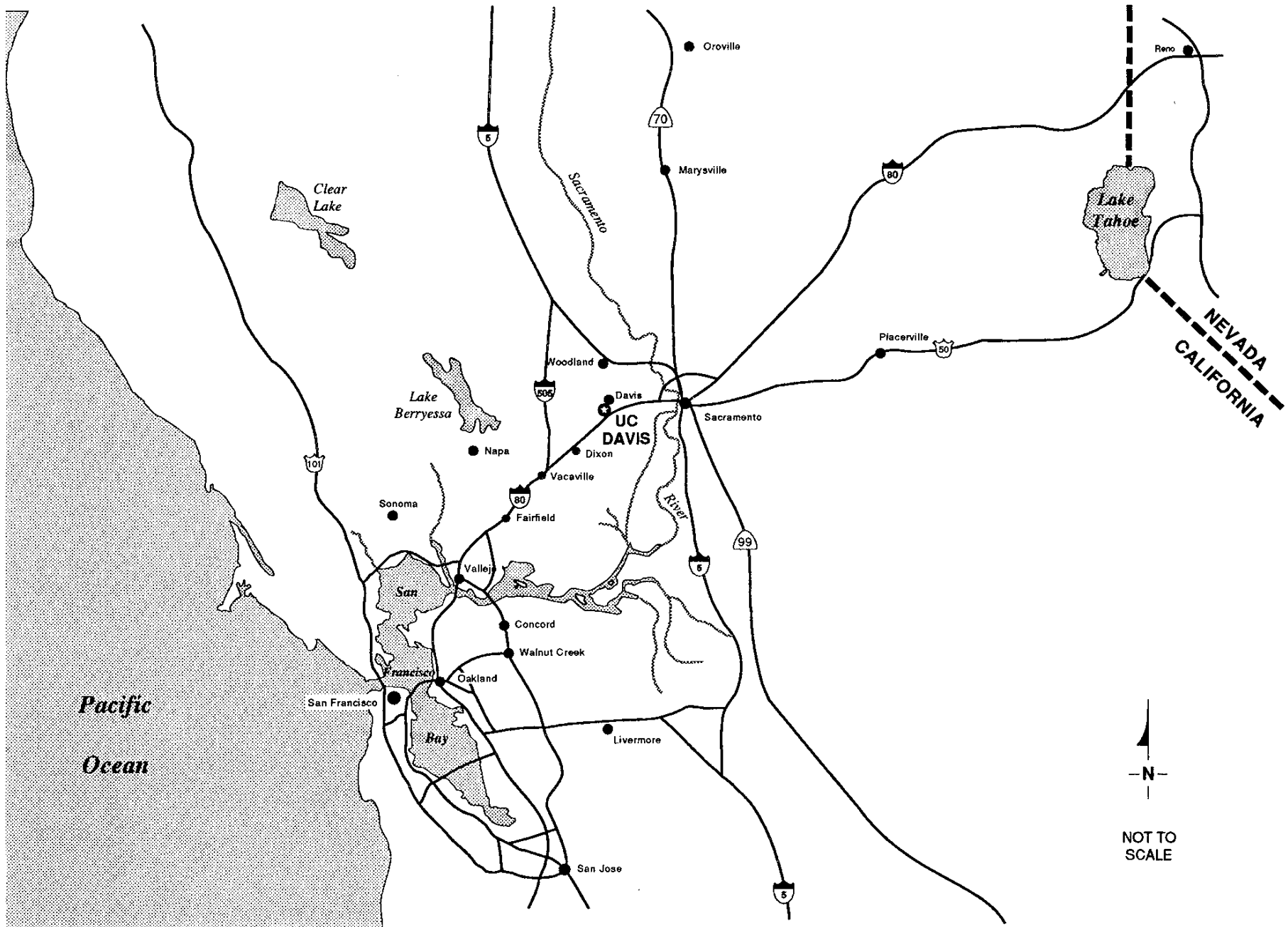
2.2 NEED FOR THE PROJECT

UC Davis

UC Davis is preparing for the revolution in the life sciences that is occurring. The sequencing of the human genome (the identity of genes in humans) was announced on June 26, 2000. This accomplishment means that the next major scientific task is to identify the functions of genes.

A major part of the UC Davis plan to meet this challenge is a campus-wide initiative in genomics (Genomics Initiative). Genomics is the study of genes in individual organisms through the use of automation and computers. UC Davis and The Jackson Laboratory (TJL) have agreed to form a long-term collaboration that will promote the advancement of genetic research. This research will expand the scientific understanding of the functions of genes (the biological codes which specify the traits of organisms) and their connection to human health.

The mouse is the model organism to study the functions of genes and their relevance to human health. This can be accomplished because the genes of the mouse are very similar to human genes. Due to the mouse's crucial role in genetic research, the Mouse Biology Program at UC Davis provides leadership in the effective integration of the mouse into scientific discovery. The Mouse Biology Program at UC Davis is designed to help scientists utilize the mouse for research to study, for example, human diseases. Some diseases under investigation include



Source: 1994 LRDP DEIR, Figure 3-1

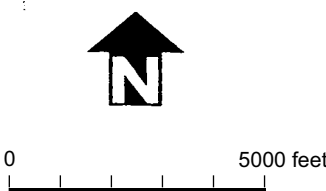
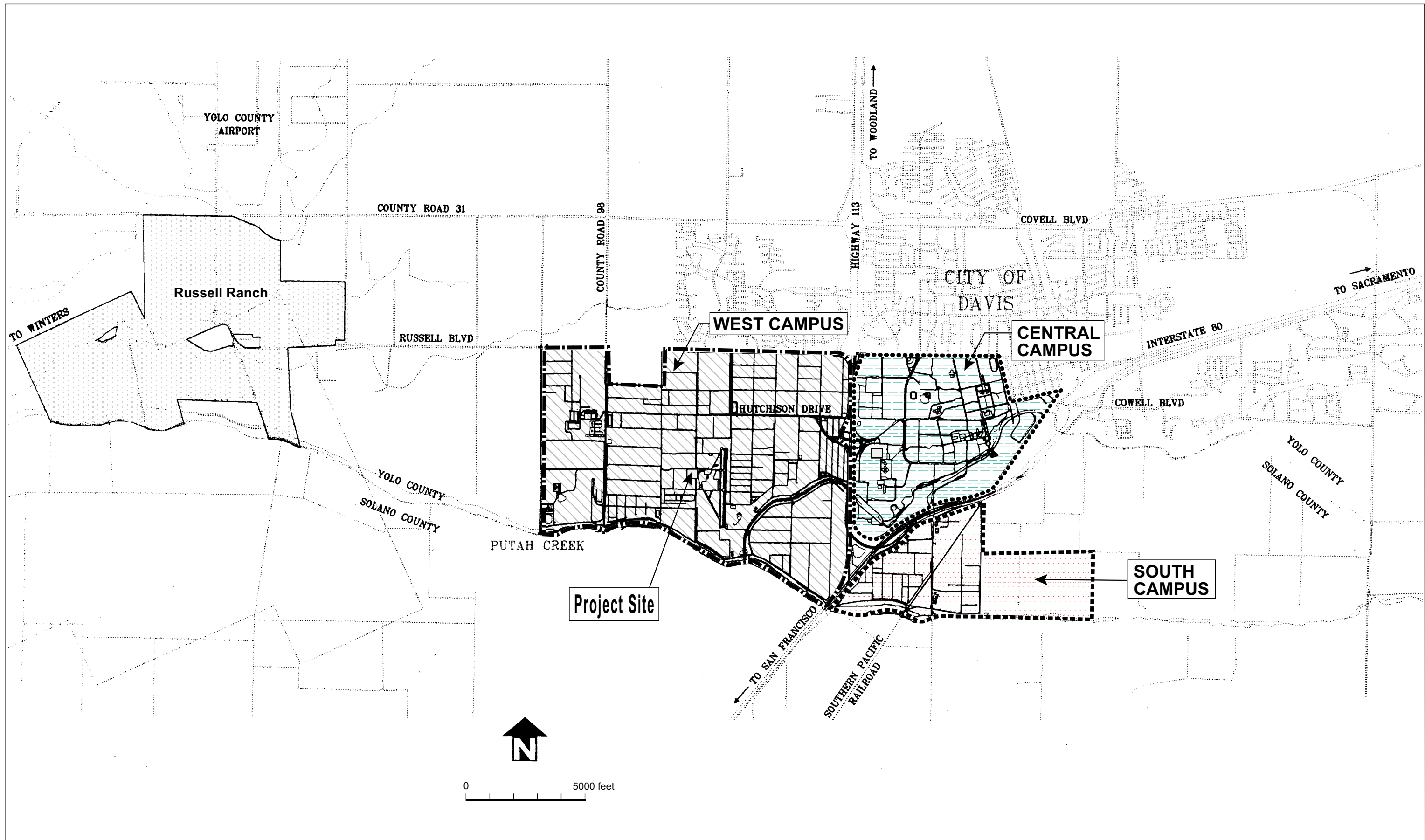


Project No. 51-00067047.00

UC Davis
The Jackson Laboratory
JAX West

PROJECT LOCATION

Figure
1



Source: 1994 LRDP DEIR, Figure 3-2

	Project No. 51-00067047.00	LOCAL SETTING	Figure 2
	UC Davis The Jackson Laboratory JAX West		

Figure 3

diabetes, obesity, heart disease, cancer and immune function disorders. For this work, it is essential to have facilities that can produce a variety of strains of genetically standardized mice and maintain them in a germ-free environment in a cost-effective framework. Part of the collaboration between UC Davis and TJL will include the sharing of some services between the two organizations to promote the mutual advancement of genetic research.

The proposed facility, including its production capabilities and service functions, is essential to the long-term research development plans of the campus in the area of genomics. UC Davis has arranged for the option to utilize part of the space in the facility for the maintenance of its research mice. The presence of a substantial facility associated with the prestigious Jackson Laboratory on the UC Campus would be highly beneficial to the UC Davis Genomics Initiative and to its Mouse Biology Program, and would be highly supportive of the University's mission of research, teaching and public service. Benefits of the project would include: 1) excellent cost-effective capabilities for producing and maintaining a long term supply of suitable high quality genetically standardized mice as research specimens; (2) attraction of world-class scientists in mouse biology and genomics to the campus; (3) establishment of the leadership of UC Davis in mammalian biology and genetic by advancing and expanding the Campus' capabilities in mammalian genetic research; and 4) contribution to the Campus' initiative for the development of collaborative private and non-profit enterprises on campus, including sharing of facilities and services.

UC Davis has determined that the collaboration with TJL will be beneficial to the support of the new genomics program and other related programs on campus, including the School of Medicine and the School of Biochemical Engineering. By providing a site for the facility, UC Davis will ensure its researchers a steady and cost effective supply of appropriately prepared research specimens which might otherwise be in short supply because of the lack of a western United States facility. This facility would contribute an important element to the service systems needed to support state-of-the-art genomics research at UC Davis, and would be one more element in the enhancement of collaborative activities between the Davis campus and other organizations working in the field of genomics.

In 1997, the Davis campus engaged in a strategic planning process for genomics. Among the goals of the program was the expansion of collaborations between the academic programs related to genomics and the private and non-profit sectors. JAX West represents one such collaboration between UC Davis and a not-for-profit organization, which would be mutually beneficial. TJL would be provided with a site for its facility, which would permit the expansion of its operations to the western United States. UC Davis would be assured of a cost-effective and ready supply of research specimens for its many on-campus genomics programs, and have access to and use of a specialized laboratory that would advance mammalian genetic research, in keeping with the campus' teaching and research mission.

The Jackson Laboratory

TJL is a not-for-profit basic research institute that is acknowledged to be a world leader in mouse biology and genetic research on mammals. It conducts research in genetic diseases focusing on inbred and genetically modified mice as the animal disease model. Areas of research interest include cancer, obesity and diabetes, neurobiology, cardiology and immunology. TJL was founded in 1929 as a basic cancer research institute. TJL is internationally recognized as the primary repository and supplier of inbred and genetically modified mice to the biomedical

research community. Through its JAX Research Systems (JRS) Division, TJL distributes over 1,300 different mouse stocks and nearly two million mice each year to virtually every university, medical school, research institute and biotech/pharmaceutical company in the USA and 50 foreign countries. TJL is a repository for over 2,500 different mouse strains. The mice provided by JRS are an extremely valuable resource to researchers. These research specimens are essential to the study of human genetic diseases, and serve as powerful scientific models of genetic disease for researchers worldwide. The proposed project would contribute to the advancement of human health by supporting biomedical researchers, primarily in California, by providing a source of high quality, genetically-standardized mice on the western United States in a cost-effective manner.

TJL's principal offices and operations are in Bar Harbor, Maine, with an existing small satellite facility at UC Davis. TJL operates over 500,000 gross square feet (gsf) of research and animal production facilities, and employs over 1,000 people, with an annual operating budget of 75 million dollars. TJL currently operates a small satellite facility in the Animal Resources Service area of the South Campus in an existing animal building that was modified to serve the needs of TJL. Approximately half of TJL's revenues derive from research grants from the National Institutes of Health, National Science Foundation, private research foundations such as the Howard Hughes Medical Institute and the American Cancer Society, and from private philanthropic support. TJL's remaining revenue derives from the distribution of inbred and genetically modified mice and related services from JRS.

With the increase in genetic research at research centers on the western United States, TJL has identified a need for a supply source that is closer to users on the western United States, and is therefore proposing to establish such a facility in California. Such a facility is needed to ensure the supply of adequate numbers of appropriately prepared genetically modified mice for scientific research in the western United States in an efficient and cost-effective manner. The scientific collaboration among genetic researchers at JAX West and UC Davis also would be beneficial to both TJL and UC Davis researchers.

2.3 PROJECT OBJECTIVES

The overall project objective is to provide the UC Davis campus with a reliable supply of high quality genetically standardized mice for use in genetic research. Establishment on campus of a source of supply would be beneficial to UC Davis both in promoting its objectives under the campus Genomics Initiative, and in enhancing the scientific and academic stature of the campus in the area of genetic research. Both UC Davis and TJL have specific objectives with regard to the proposed project, as follows:

UC Davis

- Advance the University's capabilities and establish its leadership in mammalian genetic research, in support of its mission of teaching, research and public service, and of its Genomics Initiative;
- Ensure a reliable and stable long term supply of high-quality research mice for the growing genetic research programs of UC Davis;
- Contribute to attracting world-class scientists in mouse biology and genomics to the UC Davis campus;

- Contribute to the University's initiative for the collaborative development of private and non-profit enterprises on campus, which enhance campus programs.

The Jackson Laboratory

- Establish a state-of-the-art western United States facility for the production of genetically standardized mice for supply to the research community in the western United States;
- Support scientific collaboration among genetic researchers at JAX West and UC Davis.

In addition to the project specific objectives, overall objectives from the 1994 LRDP also apply (see Section VI – 1994 LRDP Objectives in the Tiered Initial Study).

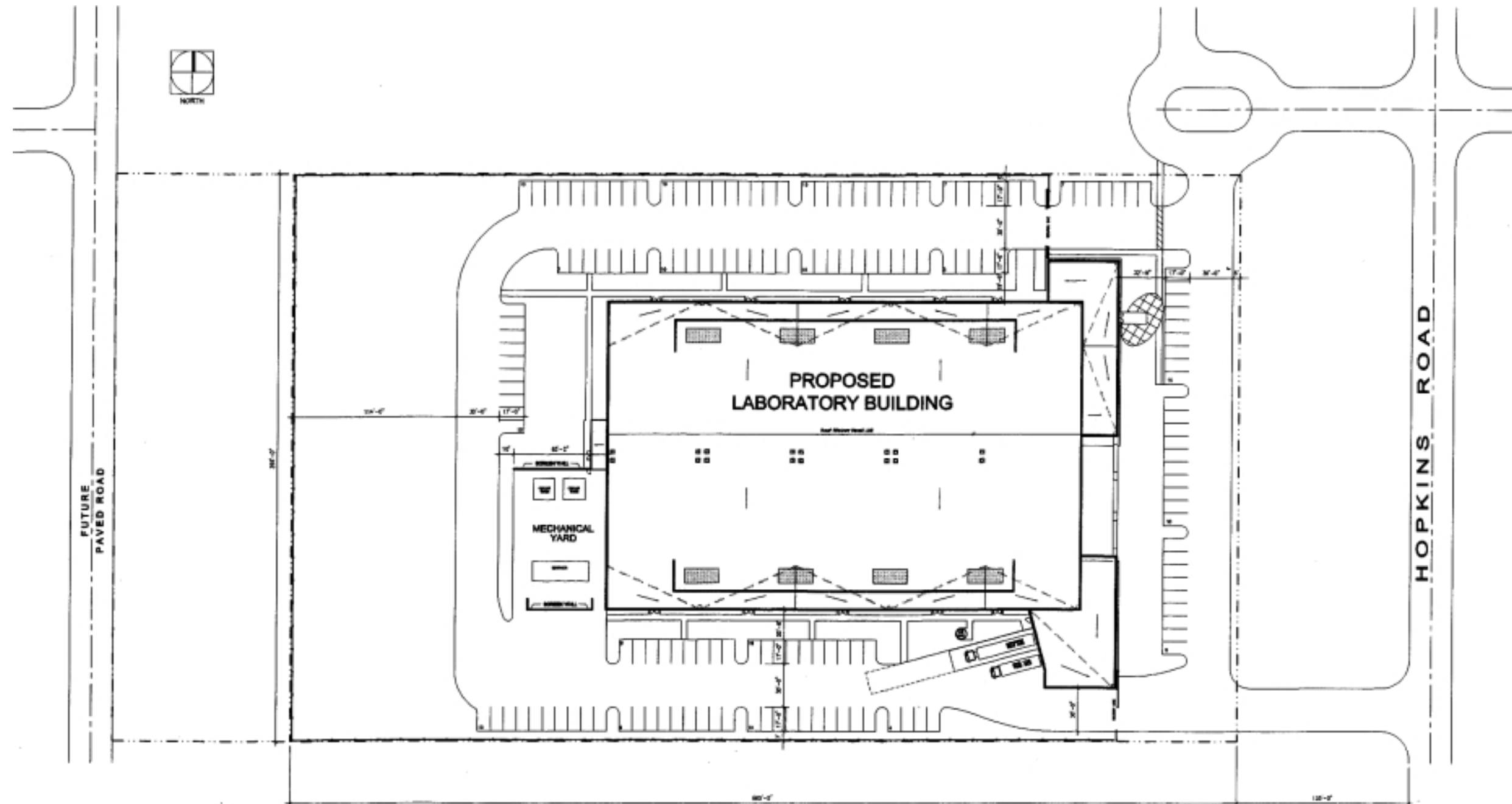
2.4 PROJECT DESCRIPTION

The proposed project involves the approval of a ground lease by The Regents for use of the site by TJL, as a research mice preparation and breeding facility. The project would be constructed in phases, and would be expanded in modules to accommodate increases in demand for research mice. Figure 4 presents the facility site plan. The facility would comprise approximately 96,064 gross square feet (81,123 assignable square feet), would include 30,000 duplex mice breeding boxes, and would have a full-time equivalent staff of about 131. The primary function of the facility is to prepare and breed genetically standardized mice and to provide researchers, primarily in California, with appropriately prepared research specimens. The proposed facility would include mouse housing and breeding space, surgical space for the appropriate preparation of specimens, and a laboratory to test incoming materials to ensure that they do not carry contaminants. A portion of the facility's production would be dedicated to UC Davis programs. The laboratory would meet the American Association for Accreditation of Laboratory Animal Care (AAALAC) standards. The facility would be treated in the same manner as a UC Davis campus department with respect to compliance with environmental controls and monitoring. Compliance with campus procedures and monitoring requirements of the campus department of Environmental Health and Safety would be conditions of the ground lease to TJL.

2.4.1 Facility

Building Design and Construction

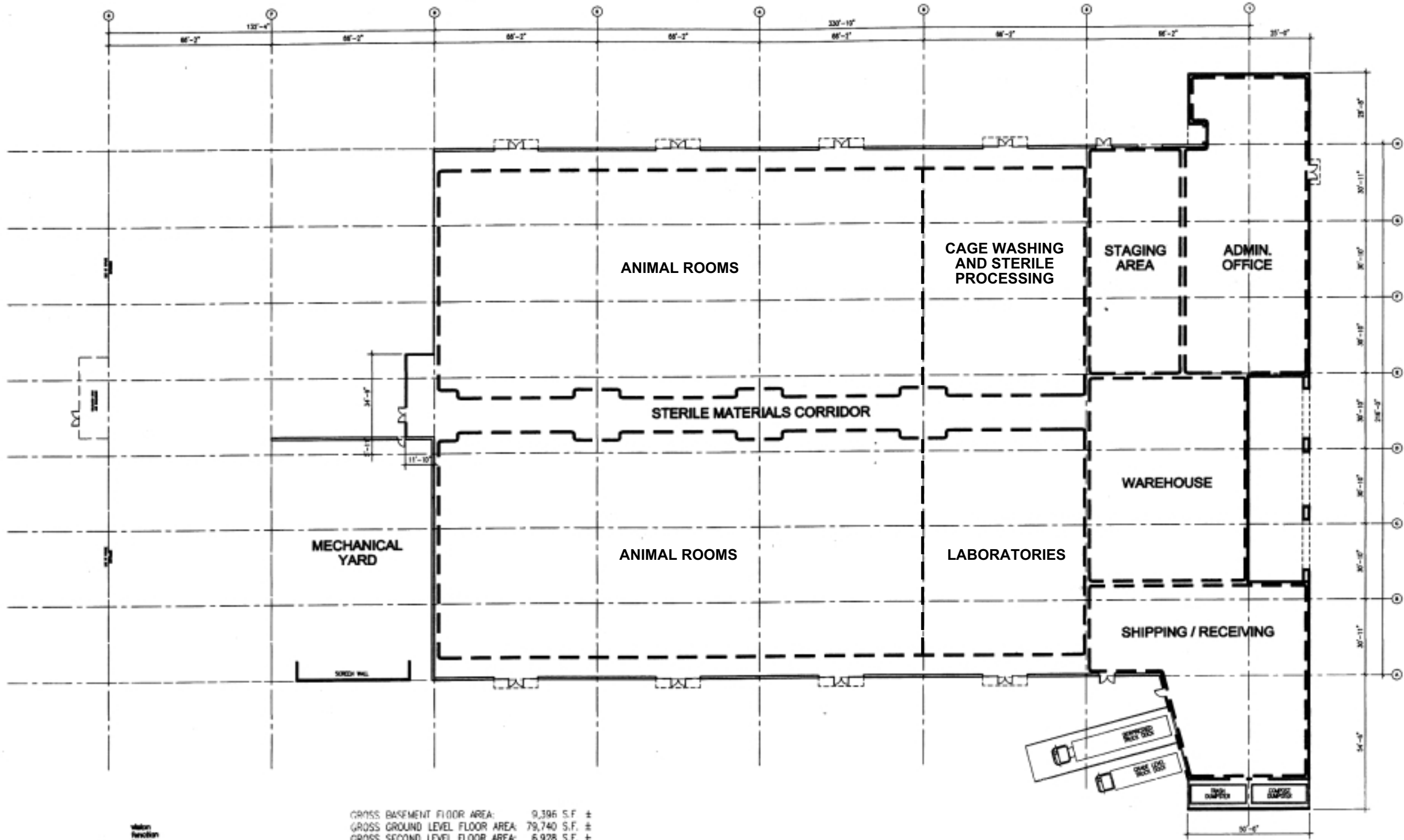
The proposed facility would have a first story of about 79,740 square feet, a partial basement of about 9,396 square feet, and a partial second story of about 6,928 square feet, for a total of 96,064 gross square feet (81,123 assignable square feet). The structure would be basically rectangular in plan, with relatively small extensions at the northeast corner to accommodate administrative functions and at the southeast corner for shipping and receiving (Figure 5). Construction would consist either of tilt-up panelized concrete or a steel frame and shell Butler building on a concrete slab. Project construction would not require pile-driving or extensive excavation or grading. The interior would be subdivided into animal rooms and work areas. In exterior construction, the structure would be a high primarily single-story warehouse-style building, with a roof peak at about 18 feet in height and eaves at about 16 feet. The front of the building would be two stories high, with the upper story devoted to administrative office space and an employee cafeteria. A partial basement also at one end of the building would provide a



1 PRELIMINARY SITE PLAN
T-307

A. SITE AREA:	261,360 ± S.F. NET = 6.00 ACRES
B. BUILDING FOOTPRINT AREA:	79,740 ± G.S.F.
C. TOTAL BUILDING AREA:	96,064 ± G.S.F.
D. SITE COVERAGE:	30.5 % (B / A)
E. FLOOR AREA RATIO (FAR):	36.7 % (C / A)
F. PARKING PROVIDED:	36 VISITOR SPACES 131 EMPLOYEE SPACES 167 SPACES TOTAL

	Project No. 51-00067047.00	SITE PLAN	Figure 4
	UC Davis The Jackson Laboratory JAX West		



GROSS BASEMENT FLOOR AREA: 9,396 S.F. ±
 GROSS GROUND LEVEL FLOOR AREA: 79,740 S.F. ±
 GROSS SECOND LEVEL FLOOR AREA: 6,928 S.F. ±
 TOTAL AREA: 96,064 S.F. ±

1 FIRST FLOOR PLAN
 1/8" = 1'-0"



Project No. 51-00067047.00
 UC Davis
 The Jackson Laboratory
 JAX West

FIRST FLOOR PLAN

Figure 5

recycle and wash area (Figure 6). Table 2-1 presents space allocation at JAX West, Utility services would be provided by the campus.

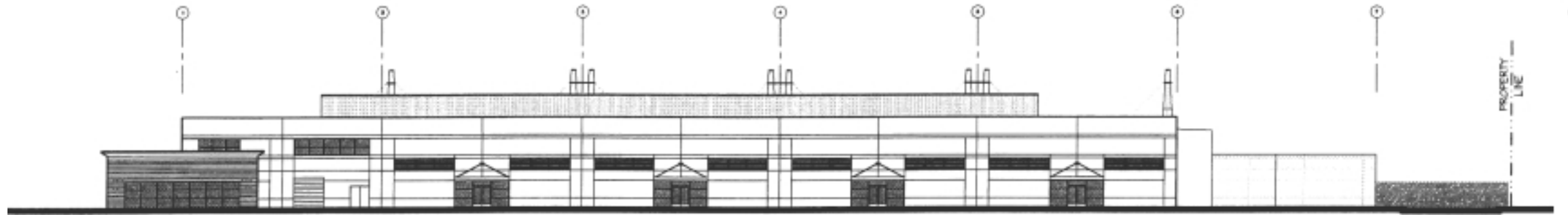
Table 2-1
JAX West Space Allocation

Space Allocation	Gross Square Feet	Assignable Square Feet
Animal rooms	24,261	24,261
Isolator space	2,560	2,560
Caretaker entry/exit locks	9,750	9,750
Clean break area	2,352	2,352
Cage wash and sterile processing	9,370	9,370
Materials delivery corridors	5,665	5,665
Shipping and receiving	2,225	2,225
Administrative	11,325	11,325
Warehouse	6,403	6,403
Laboratories	7,212	7,212
Access corridors	5,317	N/A
Unprogrammed	1,424	N/A
Mechanical	8,200	N/A
Total	96,064	81,123

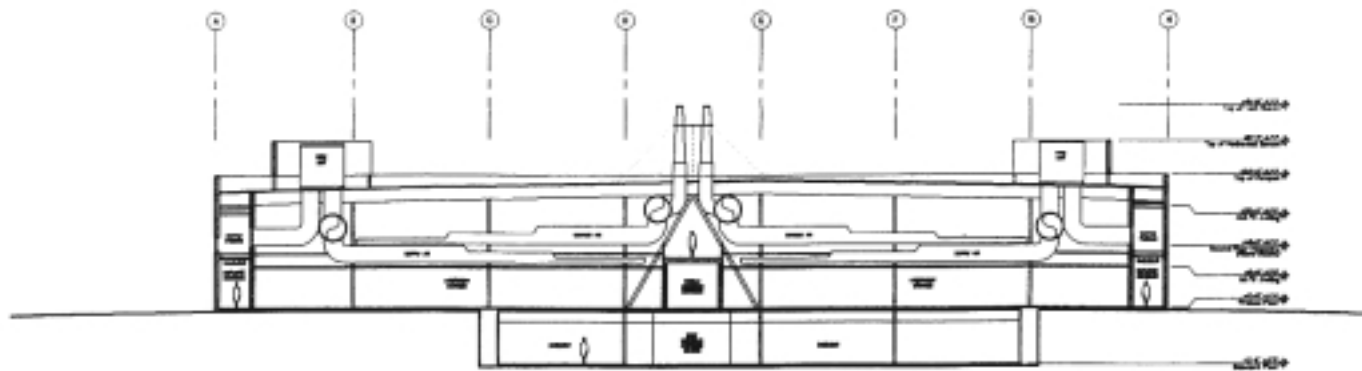
“High-barrier” design and construction techniques would be employed throughout the facility, primarily to protect animals inside the facility from outside pathogenic or genetic contamination from other external mice, airborne, or personnel-borne elements. This design would also protect against accidental releases of the mice. This type of construction entails thorough sealing of the building and HEPA filtration of incoming air. Special consideration would be given during construction to all floor, wall and ceiling penetrations to prevent unsanitary conditions and vermin infestation within the facility. Precautions during construction would include use of silicone caulk in all crevices and wall penetrations; pre-treatment for vermin control before closing off walls and ceilings; and no eating or drinking inside animal areas during their construction. Additional measures to discourage contamination from the exterior would include a stone mice strip (a four-foot-wide crushed stone strip around the structure), and restricting and removing all vegetation near the building façade. These measures would reduce the opportunity for nesting of birds and infestation by outside mice, mites or insects. Additional protective measures would include exterior lighting by high-pressure sodium lamps, and small-mesh screening of all operable windows and vents. Exterior perimeter traps may also be used to control feral mice. The facility would be vermin-proof and waterproof.

The entire facility would be fenced and gated. Exterior fencing would be of “rural” appearance. Card-access controls would be used for entry. These would be compatible with UC Davis Police Department equipment.

① **PRELIMINARY EAST ELEVATION**
VF - 14'



② **PRELIMINARY NORTH ELEVATION**
VF - 14'



⑤ **PRELIMINARY BUILDING SECTION
FACING WEST**
VF - 14'

URS			

Housing and Breeding Rooms

The breeding facilities would consist of high-barrier animal housing space, built and managed to provide the strictest control of the breeding environment. The facility would include housing and breeding space for up to 300,000 mice in a total of 30,000 duplex boxes. The proposed facility would be a “direct-sterile-supply” facility, designed around a system of sterile and soiled material handling corridors with strict operational controls to limit the risk of contamination from one room to the next. Boxes to hold mice are constructed in two-cage units; each cage houses about five mice. In this type of facility, the boxes are housed in discrete modules of 2,500 boxes in a series of high-barrier rooms flanked by “sterile” and “soiled material” corridors. The separation of breeding cages into smaller groups reduces the risk of infection between sub-populations should contaminants enter the laboratory, and also controls against accidental escapes, since any released mice would be observed readily in a small enclosed room. Within the housing area, the cages would be individually ventilated and room temperature and humidity would be controlled. Multiple lighting illumination levels would be provided. All room finishes would be designed to allow frequent wash-downs and cleaning. The proposed building would incorporate high-reliability environmental/HVAC systems, controlled to tight tolerances. Properly conditioned air must reach the animals at all times, and this would be ensured by redundant HVAC systems and an emergency backup power system, which would consist of a diesel generator with an aboveground tank. This would be enclosed in a fenced area.

Both personnel and materials would access the facility through at least two sets of doors in series, which would create intermediate airlock spaces. A number of design and operational procedures in place at other TJL facilities would be applied to this facility. To ensure sterile conditions and animal control, all animal room doors would have tight gasket seals and special bottom-drop seals that seal the door to the floor upon closure. Physical penetrations of the rooms would be minimized and controlled. Personnel entry/exit locks normally would be left closed via interlocked airlock doorways.

The animal housing itself would consist of plastic caging with secure top covers that would be removed periodically for the purpose of examining the animals, managing breeding, changing bedding, and providing food and water. These procedures would be performed in changing stations under controlled conditions. Rooms would be positively or negatively pressurized to the exterior depending on whether the room is considered pathogen free, high-health or low-health status. Operational controls would include HEPA filtration for incoming air to prevent contamination of the mice population, which may be immunologically compromised.

Ancillary and Support Facilities

Several laboratory spaces would be constructed as part of the facility. These would include the In-Vitro Fertilization (IVF) lab, a wet lab, a genotyping lab, and a cryopreservation facility, together totaling about 7,212 gsf, and 2,560 gsf of mini-importation and isolator space (described below).

In-Vitro Fertilization (IVF) Laboratory. This laboratory would comprise a surgery room and supporting facilities including two biosafety cabinets, an autoclave, a scrub room, animal preparation/recovery room, ancillary procedure rooms, and an x-ray room. Procedures that would be conducted routinely here would include microinjection and embryo transfer. The

biosafety cabinets would be used to protect the animals undergoing surgical procedures from external contamination. There would be no biohazardous agents (i.e. no pathogens or infectious agents) used in the laboratory that would require the use of biosafety cabinets for the protection of workers.

To carry out in-vitro fertilization at a level anticipated for full-scale production, there would be six workstations. Each workstation would have a microscope and a small bench-top incubator. The room would be provided with a HEPA filtered air supply because of culture work to be carried out there. A central gas delivery system to each workstation would also be provided. Two floor-standing incubators would be included in the IVF laboratory to serve all the workstations. In addition, other equipment in the laboratory would include a centrifuge, osmometer, a computerized sperm analyzer, and desktop computers. General laboratory equipment such as a refrigerator, an ultra-pure water system, a 6-foot biosafety hood, and a fume hood would also be provided.

This facility would be used to carry out in-vitro fertilization of eggs collected from female mice by sperm harvested from male mice. In-vitro fertilization essentially consists of culturing the eggs and sperm together in sterile medium in culture dishes that are then incubated under a gas environment consisting of 5% oxygen and 5% carbon dioxide with a balance of nitrogen. Upon successful fertilization, the resulting embryos are transferred into recipient foster mothers for gestation to birth. The embryo transfer is carried out in a surgical procedure room inside or adjacent to an animal room where the mice are housed.

Wet Laboratory. The central area of the facility also would include a “wet lab” to be used for quality control materials testing. The laboratory would contain desks and benches for work areas, laboratory equipment, cabinets and shelves for storage, sinks, gas, air and vacuum lines, up to two fumehoods, and an area for sterilization and glass-wash. The laboratory would be used for testing of incoming materials. It is anticipated that small amounts of controlled chemicals would be stored and used in the wet lab for standard chemical testing procedures. Chemicals that might be used in the wet laboratory include acrylamide, and small amounts of organic compounds such as phenol, chloroform, guanidium and isothiocyanate. These types of chemicals are commonly used in laboratories on campus.

Genotyping Laboratory. The genotyping laboratory would be used for analysis of genes from small samples of DNA isolated from mouse blood (“genetic fingerprinting”). The majority of genotyping in the laboratory would use a polymerase chain reaction (PCR) procedure. Laboratory equipment requirements would include centrifuges, thermal cyclers, gel analysis and imaging systems, computers, a spectrophotometer, and automated pipetting devices. Additional equipment might include a sequencer, a flow cytometer, a fluorescence-based PCR instrument, or possibly an imager for radioisotopes.

If radioisotope imaging is undertaken in the new laboratory, small quantities (less than 1 millicurie) of a rapidly decaying radioisotope of a medical radioisotope (^{32}P , with a half-life of 14.3 days) would be used. In these protocols, a small DNA probe is “labeled” with the radioactive compound, after which the probe is used to detect similar DNA sequences in mouse DNA immobilized on nylon filters. The sequences are detected by exposing the nylon fibers to conventional X-ray film, or more sophisticated imaging equipment, whereby the radioactive disintegrations expose the film, thereby producing a radioautograph, or “genetic fingerprint”. The amount of radioactive waste produced is small, and the majority of the radioisotope can be

held in the laboratory until it has decayed through several half-lives. Small amounts are released into the sewer system, as is permitted by law.

If it is necessary to perform these protocols, recombinant DNA materials would also be present in the lab. These would all be standard laboratory recombinant plasmids grown in *E. coli* bacteria, which are not considered to be a biohazard according to the National Institute of Health guidelines for research using recombinant DNA molecules.

Another type of imager that does not use radioisotopes is also available and may be used if DNA imaging is conducted. This is a fluorescence-based PCR instrument, which uses the chemical ethidium bromide (EtBr). EtBr is a potent mutagen and is handled accordingly. Jackson Labs currently uses EtBr in its Maine facility. The chemical is a hazardous waste under California State Hazardous Waste rules. At UC Davis, dilute solutions used in gel preparation would be filtered, using activated charcoal and a pre-filter, and the treated/aqueous portion, at solutions of less than 0.01mg/l, would be disposed to the sanitary sewer, as is permitted by UC Davis Local Limits for sanitary sewer disposal. Filters would be collected and disposed of through the hazardous waste stream. Gels contaminated with the EtBr would be disposed of at an offsite licensed facility. Ethidium bromide can be detoxified as part of the experimental protocol or picked up as a hazardous waste. Appropriate protocols would be used in handling of this material to ensure its safe use and disposal (UC Davis 2000e).

Cryopreservation Facility. JAX West would also include a cryopreservation facility for collection and rapid freezing of mouse embryos for future use. Embryo cryopreservation consists of collecting 8-cell embryos from female mice that were induced to ovulate with hormone injections prior to mating with a male. The embryos are put into vials containing a buffer medium with dimethyl sulfoxide as a cryoprotectant and then cooled at a rate of 0.5°C per minute to -80°C at which time the vials are then placed into liquid nitrogen storage containers for permanent storage. All information concerning the genetic identification of the embryos and storage location of vials would be recorded in a database for efficient data management.

The cryopreservation facility would require three separate, but adjacent areas. These would include a mouse embryo and sperm collection station, a freezer station, and general laboratory space. The collection station would include four workstations in a room supplied by HEPA-filtered air. Oviducts and epididymides would be surgically removed from the mice in a 6-foot biosafety hood at each station. Each workstation would also be equipped with a stereo dissecting microscope.

A freezer area would hold liquid nitrogen storage containers and two to three controlled-rate freezing units. This room would have liquid nitrogen delivered by means of vacuum-insulated stainless steel pipe from an exterior 1,000-gallon-capacity bulk tank. A high air exchange rate would be maintained in this room to avoid hazards associated with the use of liquid nitrogen. The high air exchange would keep evaporating liquid nitrogen from displacing oxygen to dangerous levels. An oxygen monitor would also be installed. All freezing and storage would be carried out in this room.

Adjacent general laboratory space would be provided for preparation, storage of materials used in the other areas of the cryopreservation facility (such as pipettes for embryo manipulation, hormone preparations for priming female mice, and media in which embryos are frozen or cultured), and data entry. This would include four workstations, and equipment such as a

centrifuge, osmometer and weighing balance either on a solid benchtop or on a vibration-free stand. This area also would provide desktop space for computers, printers, and file cabinets.

Mini-Importation. Space would be allowed in the facility for the possible development of a mini-importation laboratory, which would allow the facility to take in animals of unknown health status. Through various forms of rederivation, such as cesarean section or sperm extraction, clean progeny of these animals could be produced and subsequently imported into the facility's population.

Isolator Space. Space in the facility would be used for isolators, which are special cages to hold specific strains of mice. At the time the Initial Study for the proposed project was prepared, TJL was considering modifying space in an existing building on the South Campus to use as isolator space. This potential project has since been abandoned.

Support Space. Other functions in JAX West would include receiving/delivery areas and storage rooms for food and bedding supplies, shipping or distribution areas for export of mice, centralized cage washing and autoclave facilities, waste compactors for disposal of waste and used bedding and sterilization of cages and equipment, holding rooms and quarantine areas. Separate "sterile" and "soiled material" areas would be maintained to protect against any contamination between sterile and soiled materials. A partial basement would provide a dirty materials service corridor and recycle and wash area.

Administrative Support. Work areas within the facility would include administrative offices, and break rooms for staff, including wash, eating and locker facilities completely separated from the animal areas. These would be supplied with hot and cold water, electricity and phones, and computer and telecommunications hookups. Administrative offices would be located primarily on the partial second story at the eastern end of the building; other staff facilities would be on the ground floor. Water conserving toilets and showers would be incorporated into the project design.

Procedures and Protocols

Protections Against Contamination of Animals. The breeding facility would consist of high-barrier animal housing space, built and managed to provide control on the breeding environment, as described above. The proposed facility would be a "direct-sterile-supply" facility (i.e. all materials used in the production of the animals would be of sterile grade). In such a facility, fresh supplies and recycled breeding boxes are sterilized prior to entry to the animal spaces. Strict separation between "sterile" and "soiled" areas of the facility, and integrity of the clean rooms would be maintained through design, and through procedural controls and protocols. Personnel would enter the animal areas through a specialized entry-airlock system in which they would change from street clothes to caretaker clothes. Prior to each entry into the animal space, the caretaker would scrub up, shower, change to full-cover sterilized clothing, and don in-room shoes, gloves and haircovers. In the clean space, the caretaker would perform a number of specialized tasks, including inspection of the animals, food and water checks, setting up the matings, changing animals into fresh cages, weaning offspring, performing computer data entry, preparing mouse shipments, and in-room cleaning. Soiled cages would be removed through a second series of airlocks to the soiled material corridor and the cage-washing area. The cage-washing area would be used to re-process the soiled cages, water bottles and associated components on a one to two week cycle for each cage. In the cleaning process, cages containing

soiled bedding and animal waste are first emptied of contents in the soiled area. The waste is then compacted in preparation for transportation to the landfill. The cages then pass through a multi-step washing machine process, which washes them with cleaning soap and then rinses them. They are then restocked with clean bedding, passed through the autoclave, and then sent back to the breeding rooms via the sterile corridor.

Protections Against Escapes. Internal design elements, which includes enclosed corridors and a number of smaller enclosed rooms for housing and other operations, are designed to ensure that any possible mice escapes would be detected immediately. The design and operational procedures described above, including use of small tightly controlled rooms for housing and other procedures; room, cage and building seals; and exterior landscape design, serve both to ensure against internal contamination and control against escapes. All these animals are extremely valuable, and are handled and accounted for with great care, as described above in detail. An occasional in-room escape is inevitable, but such events are rare. Because the production animals are not treated with hazardous substances, escapes pose no risk outside the facility. When an animal escapes inside a barrier room, generally it is trapped in a live trap purposely left in place for such events.

2.4.2 Construction Process and Schedule

It is anticipated that project construction would require approximately 9 months from groundbreaking to occupancy of the facility. Pending the approval of The Regents, project site clearing would begin in April 2001, facility commissioning would begin in August 2001, and the building would be occupied in the winter of 2001-2002.

Hours of construction would normally be from 7 a.m. to 5 p.m. Monday through Friday. The site is essentially flat and no major grading is anticipated. Since no pile driving would be needed, high noise and vibration activities associated with construction would be very limited. Construction staging would take place on-site in the parking lot portion of the site. Construction traffic would access the site via Hutchison Drive and Hopkins Road.

2.4.3 Population

It is anticipated that the facility, initially at least, would be staffed with a “seed staff” from TJL’s East Coast facility, augmented by local trainees or skilled workers. The local staff would be expected to be drawn primarily from current residents of the local area or those within commuting range, with the exception of a few individuals who might move to the area from the East Coast facility.

The facility would require a staff of about 131 persons and would be staffed seven days per week. It is anticipated that the majority of staff would work during regular business hours, approximately 7:00 or 7:30 A.M. to 4:30 to 5:00 P.M. Possibly up to 10 percent of the staff could work during early morning or evening hours, depending on the ultimate operating plan of the facility.

2.4.4 Landscaping

Portions of the site that are not needed for the proposed facilities would be landscaped with plant materials similar to those used in adjacent areas, consistent with campus design requirements.

As noted above, there would be no landscaping adjacent to the façade of the building. The building would be surrounded by a 4-foot graveled mice strip.

2.4.5 Setbacks

JAX West would be located on Hopkins Road on the West Campus. Design would include appropriate setbacks on all sides, as required for adequate fire and emergency vehicle access, and by UC's Design Review Board. The footprint of the building would be approximately 488 feet east-west by 216 feet north-south; it is anticipated that this would be refined in final design.

2.4.6 Utilities and Service Systems

The proposed project would require connections to campus utilities and service systems including potable water, storm drains, sanitary sewer, solid waste, electrical, natural gas, and telecommunications. The facility would produce its own steam and chilled water and would not be served by campus lines. Anticipated utility demand is presented in Table 2-2.

**Table 2-2
Utility Demand Load or Peak Flow Rate**

Utility	Demand Load or Peak Flow Rate
Electrical	2,030 kVA
Chilled water	1,000 ton
Steam	35,000 lbs/hr
Domestic Water	4,400 gpm
Sanitary Sewer	57,000 gpd
Storm Drain	3.2 cfs
Natural Gas	33,400 cfh
Telecom	100 network access modules

The project site is not served by utility water (for landscape irrigation), steam, or chilled water lines. Water uses would include domestic uses, landscaping, cage washing, supply for internal steam and chiller lines, and fire suppression. Existing domestic water lines are present in the immediate vicinity of the project site along Hopkins Road and in the service road along the site's north margin. Short connectors adjacent to the facility and in the roadways would connect the project to existing lines in Hopkins Road (see Figure 7). Currently, there is not adequate domestic water to accommodate the fire flow for the new building and other future projects in West Campus. As a separate project, the Campus will build a 100,000 gallon water tank, and associated pumps and piping that will address the need.

The facility would supply steam for its autoclaves or other sterilization equipment through an on-site natural gas-fired steam generator. JAX West would be required to obtain a permit for the operation of the steam generator from the Yolo-Solano Air Quality Management District (Oatman 2000b). Chilled water would be generated electrically on site.

Several storm drains run through the project vicinity, including a line along the eastern margin of the site in the agricultural field adjacent to Hopkins Road, in the roadway to the airport, and in

Hutchison Road. These carry stormwater south to an outfall at Putah Creek. There is inadequate discharge capacity in the 48-inch outfall at Putah Creek. The project design includes detention basins on the perimeter of the site that would be constructed to accommodate the flows from a 10-year, 24-hour storm event. As a result, additional peak stormwater flows would not be added by the project to the storm drain outfall.

Cage washing and other routine activities at the facility would produce wastewater. Wastewater from the facility would be discharged to the UC Davis sanitary sewer system, where it would be conveyed to the Campus wastewater treatment plant and treated. Sanitary sewer lines in the project vicinity run south along Hopkins Road and the airport road to the treatment plant, which has an effluent outfall at the South Fork of Putah Creek. The project would be connected to existing sewer lines via short connectors adjacent to the facility and in the roadways.

It is anticipated that the facility would produce 32 tons of uncontaminated solid waste (primarily soiled wood shaving from cages) per month. This would be stored in waste holding areas adjacent to the internal "soiled" areas and regularly transported to the campus landfill, which has been determined to have adequate capacity (See Appendix A, the Tiered Initial Study for this project). The facility would also produce about 3.1 tons of mice carcasses per month. The carcasses would be hauled to the incinerator on campus or sent to an outside contractor for disposal by incineration, and incinerated under the existing permits of those facilities. If not to be incinerated immediately, the carcasses would be frozen to avoid decomposition and objectionable odors.

Electricity will power lights, computers, and a chiller to generate chilled water. Electrical power would be supplied from the campus 12KV distribution system. The service would be to either an outdoor pad-mounted transformer or an underground vault transformer that would serve the project. A campus upgrade currently in progress, which includes reconductoring of lines in the project vicinity, is expected to be complete before the proposed project comes on line. With the completion of that project, there would be adequate capacity to serve the proposed project. In the event that the project is delayed, the campus backup feeder would supply power to the proposed project. Lighting would be designed to achieve Illuminating Engineering Society (IES) recommended lighting levels while staying within the power limitations of Title 24 energy regulations. In general, fluorescent lighting would be used in office and laboratory areas and decorative lighting outdoors. A diesel generator would be installed to provide emergency and standby power.

Natural gas would be used at the facility to produce steam for autoclaves and for heating. Natural gas would be supplied to the project through the construction of one of two alternate gas lines, as shown on Figure 8.

The building would tie into the campus telephone and data networks through copper and fiber optic cable to a connection point on Hopkins Road. Permanent telecommunications availability depends on the completion of the UCD Net 2 Project. The UCD Net 2 Project is anticipated to come on line shortly after the proposed project would become operational. In the interim, the campus would supply the project temporarily through existing connections.

A fire alarm system would be provided with connection to the Central Campus system via phone line, which is standard practice. Smoke detectors would be installed in accordance with code and as required by the State Fire Marshal. The systems would be linked to the sprinkler flow switches and valve monitors.

A door contact, card key central alarm panel would be provided for the security system. The security alarm would be connected to the UC Davis Police Department. The site would be patrolled during night hours.

2.4.7 Roadway and Parking Improvements

The proposed project site would be accessed from Hopkins Road and an existing service road. Hopkins Road is adequate to handle truck deliveries. Anticipated vehicle access to the facility would be via two driveways onto Hopkins Road. A roadway flanked by parking would circle the building. Truck access for shipping and receiving would be at the south side of the building, near its eastern end, where there would also be a shipping dock. Trucks would circle the building and exit at the second driveway at the northeast corner. The main pedestrian entrances to the building for employees would be on the north and south sides. To provide parking adequate for the needs of the facility, 167 parking spaces would be provided adjacent to the building, with visitor parking and pedestrian access from the east side. Bike racks also would be provided.

2.5 PROJECT APPROVALS

As the public agency principally responsible for approving or carrying out the proposed project, the University of California is the Lead Agency under CEQA, and is responsible for reviewing and certifying the adequacy of this Focused Tiered EIR and approving the proposed project. It is anticipated that The Regents will consider design approval of the proposed project in March 2001. Since the project site is proposed to be leased to TJJ by The Regents, lease approval by The Regents also will be required. As discussed in the Initial Study for this project, several LRDP mitigation measures have been incorporated into the proposed project to reduce or avoid environmental impacts. These LRDP mitigation measures and any project-specific mitigation measures adopted by The Regents will be included in the lease agreement for the project to ensure that they are fully enforceable by the University and that they are implemented by TJJ.

Because the project site is about 6 acres, the project contractor would file a Notice of Intent with the State Water Resources Control Board to comply with NPDES requirements. A storm water pollution prevention plan would be developed and implemented during project construction as required by the General Permit. Permits would also be required from the Yolo-Solano Air Pollution Control District for the construction and operation of the steam generator and the standby electric generator.

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

This section describes existing conditions in the project area with respect to hazards and hazardous materials, and utilities and service systems that may be affected by the proposed JAX West project. It also describes associated impacts and mitigation measures that would mitigate or avoid identified impacts.

The environmental setting for each resource area discussed in this section is based on a review of existing available information and data gathered through field visits.

Significance criteria are stated in the impact discussions for resources for which such criteria can be defined. Generally, where impacts and analyses are quantitative, involving modeling or other methods of prediction, the significance criteria are stated as standards or guidelines adopted or accepted by regulatory agencies with expertise in the resource area. Qualitative impact analyses include significance criteria that generally are policies or goals, or are stated as the relative magnitude of impact in relation to the existing resource.

In the analysis of impacts and their significance, features included in the proposed site plan, or measures that would be required by law or local regulation are taken into account. Mitigation measures are identified for those impacts considered significant.

In general, this EIR depends upon the 1994 LRDP EIR, as amended, for the cumulative impact analysis. The 1994 LRDP EIR cumulative impacts analysis utilized both projections of land use and a list of reasonable foreseeable projects. Campus growth was apportioned to areas of the campus based on projections that correspond to projects anticipated as part of the 1994 LRDP.

Resource areas that are not addressed in this EIR are addressed in the Initial Study for this project, included as Appendix A to this document.

3.1 HAZARDS AND HAZARDOUS MATERIALS

This section addresses the potential impacts of the proposed project with respect to hazards and hazardous materials, from the routine use of hazardous materials (including chemicals, radioactive materials, and biohazardous materials), laboratory animals, and hazardous waste generated. For a discussion of other hazards and hazardous materials impacts such as risk of accident or upset conditions, hazardous materials transportation, and emergency response, please see Checklist Item 7 of the Tiered Initial Study included in Appendix A of this EIR. Applicable environmental and regulatory settings, standards of significance, and mitigation measures identified in Section 4.6 of the 1994 LRDP EIR and in Section 4.3 of the WWTP Replacement Project EIR are incorporated by reference and summarized below, as appropriate.

3.1.1 Environmental Setting

As shown in Table 2-1, the proposed JAX West project would mainly consist of animal housing and laboratory space, with some space devoted to support, administrative and office uses. Hazardous materials use generally would be confined to the laboratory space, of which there would be approximately 7,212 assignable square feet. While it is impossible to forecast the exact types and quantities of hazardous materials to be used in the proposed facility, it is reasonable to assume that hazardous materials use would roughly approximate use at the current laboratory facilities on campus. The JAX West project would be required to operate under the same

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

hazardous materials handling and environmental monitoring regulations required of other campus departments as a condition of the TJL ground lease from the University.

The term “hazardous material” is defined in different ways for different regulatory programs. This EIR uses the definition given in Section 25501(o) of the California Health and Safety Code, which defines hazardous material as:

*...any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.
“Hazardous materials” include, but are not limited to, hazardous substances, hazardous wastes, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.*

Toxic, ignitable, corrosive, and reactive materials are all subsets of hazardous materials and are defined on pages 4.6-2 and 4.6-3 of the 1994 LRDP DEIR. By convention, most hazardous materials are thought to be hazardous chemicals, but radioactive materials and biohazardous materials, as defined on page 4.6-3 of the 1994 LRDP DEIR, are also hazardous. This EIR considers hazardous materials to include hazardous chemicals (non-radioactive), radioactive materials, and biohazardous materials. A description of the types of hazardous materials found on the UC Davis campus is provided on pages 4.6-7 to 4.6-24 in the 1994 LRDP DEIR. Information from these discussions is incorporated by reference. Research and teaching laboratories are the primary users of hazardous materials. Because the proposed project includes laboratory space where hazardous materials would be used and hazardous waste would be generated, the discussion below provides an overview of existing conditions at UC Davis as they relate to hazardous materials and waste. The following discussion provides information pertaining to hazardous materials as they relate to the proposed JAX West project.

Hazardous Chemicals (Non-Radioactive)

UC Davis is required to include an inventory of hazardous chemical materials stored on campus when it files its annual Business Plan with the Yolo County Office of Emergency Services. The campus Office of Environmental Health and Safety (EH&S) maintains a computerized inventory of hazardous chemical materials that is accessible to authorized users through the worldwide web. The inventory lists the names and quantities of all hazardous chemical materials found on campus in quantities greater than 1 gallon of liquid, 1 pound of solid, or any volume of compressed gas per room. Examples of the types of hazardous chemicals found at UC Davis are presented in Table 4.6-1 of the 1994 LRDP DEIR. Roughly 254,000 gallons of hazardous liquids, 92,500 pounds of hazardous solids, and 1,350 cylinders of compressed gases are distributed among more than 200 buildings on the Main Campus (UC Davis 1999e).

A wide variety of chemicals currently is used in biological laboratories on campus. These chemicals include solvents for cleaning, extraction, or other laboratory activities such as formaldehyde, bleach and ethanol, reagents (chemical starting materials), small toxic organics isolated from natural sources, and aromatic hydrocarbons. Similar materials would be used at the JAX West laboratory, including detergents and disinfectants for cage and animal space cleaning; liquid nitrogen (for freezing embryos), and dimethyl sulfoxide as a cryoprotectant. Chemicals which might be used, depending on the specific types of work performed, include

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

acrylamide for gene typing, and small amounts of the organic compounds phenol, chloroform and guanidium isothiocyanate for RNA work. Like the other genotyping laboratories on campus, the genotyping lab could also use ethidium bromide (EtBr), if a fluorescence-based polymerase chain reaction instrument is employed in genotyping. Appropriate protocols would be used in handling of this material to ensure its safe use and disposal.

The campus Department of Environmental Health and Safety (EH&S) has developed safety net pamphlets governing the use of most hazardous chemicals. JAX West would be required to comply with EH&S procedures as a condition of its ground lease.

Radioactive Materials

Radioactive materials are useful in certain types of research. They contain atoms that spontaneously emit radiation from the transformation of unstable atomic nuclei, which result in chemically different substances that may or may not be radioactive. These radioactive atoms are called "radionuclides" or "radioisotopes." Because radioactive materials emit ionizing radiation, their presence can be detected easily. Researchers take advantage of this easy detectability by using radioactive materials to learn about chemical processes. (For example, radioactive isotopes were used to trace glucose through metabolic pathways.) Radioactive materials are constantly decaying, and each radioisotope has a characteristic half-life, which is the time for one half the radioactivity to decay. For example, phosphorous-32 (^{32}P) has a half-life of about two weeks (in other words, half of the radioactivity of a quantity of ^{32}P disappears every two weeks). Maximum current permitted storage limits for radioactive isotopes currently used on campus are shown in Table 4.6-3 of the LRDP DEIR (on page 4.6-12). Approximate typical purchases of radioactive materials are shown in Table 4.6-4 of the 1994 LRDP DEIR (on page 4.6-13).

UC Davis possesses a Broadscope Radioactive Materials License from the State of California, Department of Health Services, Radiologic Health Branch which authorizes the University to use radioactive materials for a variety of activities in over 1,200 laboratories/facilities on campus, the UC Davis Medical Center, and 16 off-site field stations throughout the state. The license can be reviewed at the campus Office of Environmental Health and Safety/UCDHS Health Physics office. In accordance with the license, prior to obtaining radioactive materials, each principal investigator applies for a Radiation Use Authorization (RUA). The license describes the possession limits for each radionuclide and locations for use, and provides for the internal issuance of RUAs. It is probable that the JAX West lab would be included in the campus' Broadscope Radioactive Materials License. If not, TJL would obtain a separate license from the State to cover its activities at JAX West.

The majority of the University's requirements are mandated in Title 17, California Radiation Control regulations and within the University's Broadscope Radioactive Materials License. The UC Davis Health Physics (radiation safety) Program, which is required by the Radiation Control Law, is designed to provide adequate protective measures against exposure and comply with all local, state, and federal regulations. JAX West would be required to comply with all provisions of these regulations pursuant to its ground lease. Routine monitoring (including wipe samples, radiation leak detection, and visual inspection) is conducted for sealed radiation sources.

Radioactive materials anticipated to be used at the proposed facility would be similar to those currently used on campus at various biological research laboratories. At the JAX West project, radionuclides could be used for imaging in a small genotyping laboratory, as described above. If

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

radioisotope imaging is pursued, small amounts of the medical radioisotopes, phosphorus-32 (^{32}P) and phosphorus-33 (^{33}P) would be used, as described above in Section 2.4. Viable alternatives to the use of radioisotopes are available and may be used, as also described.

X-ray machines would also be present in the laboratory. Although these machines emit radiation, they do not contain any radioactive material. Standard precautions are taken to limit human exposure to radiation when x-rays are being taken of animals. All work done with x-ray machines need to be authorized under the auspices of EH&S via an X-Ray Machine Use Authorization. Radiation-producing machines may only be operated by authorized personnel and radiation dosimetry is required for all personnel working with radiographic units to measure the operator's exposure to radiation. All individuals in the room during exposure must wear protective aprons and gloves that are inspected annually. Regular x-ray machines for animals are inspected every one or two years depending on the type of machine (UC Davis 2000b).

As with hazardous chemicals, EH&S has developed health physics procedure manuals governing the use and operation of all radioactive materials and radiation producing machines. JAX West would be required to comply with EH&S procedures as a condition of its ground lease.

Biohazardous Materials

A biohazardous material is a biological agent posing a hazard to humans or the environment. Under some conditions, recombinant DNA, which in some conditions is considered to be a biohazard, may be used in JAX West if DNA imaging is conducted. However, the recombinant DNA used in JAX West would be standard laboratory recombinant plasmids grown in *E. coli* bacteria which are not considered to be a biohazard according to the National Institutes of Health guidelines for research using recombinant DNA molecules. No biohazardous materials would be used or produced by JAX West.

UC Davis uses the 1993 U.S. Department of Health and Human Services guidelines contained in *Biosafety in Microbiological and Biomedical Laboratories* and *Guidelines for Research Involving Recombinant DNA Molecules* to classify biohazardous agents and to determine the level of safety precautions that must be used. Four biosafety levels apply to biohazardous materials operations, depending on the potential of the hazard used. Biosafety Level 1 is for the least hazardous biological agents and Biosafety Level 4 is for the most hazardous biological agents. The JAX West laboratory would operate at Biosafety Levels 1 and 2. Biosafety Level 1 agents pose minimal or no known potential hazard to laboratory personnel and the environment and may be effectively contained by ordinary laboratory techniques. Biosafety Level 2 agents are considered to be of ordinary (not special) potential hazard and may produce varying degrees of disease through accidental inoculation, but Biosafety Level 2 agents may be effectively contained by special engineering controls such as biological safety cabinets. Some procedures in the JAX West facility would be performed under Biosafety Level 2 conditions solely for the protection of the research animals from potential outside contamination. The UC Davis Biosafety Manual describes Biosafety Levels 1 and 2 as follows:

Biosafety Level 1 is appropriate for work done with defined and characterized strains of viable microorganisms not known to cause disease in healthy adult humans. It represents a basic level of containment that relies on standard microbiological practices with no special primary or secondary barriers recommended, other than a sink for handwashing.

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

Biosafety Level 2 is applicable to work done with a broad spectrum of indigenous moderate-risk agents present in the community and associated with human disease of varying severity. Agents can be used safely on the open bench, provided the potential for producing splashes or aerosols is low. Primary hazards to personnel working with these agents relate to accidental percutaneous or mucous membrane exposures or ingestion of infectious materials. Procedures with high aerosol or splash potential must be conducted in primary containment equipment such as biosafety cabinets. Primary barriers such as splash shields, face protection, gowns and gloves should be used as appropriate. Secondary barriers such as handwashing and waste decontamination facilities must be available (UC Davis 1996b).

Laboratory Animal Use

Animals on campus are housed in approximately 1,200 rooms, pens, paddocks, or pastures, including nearly 200 buildings that contain animal rooms. The approximate number of vertebrate animals participating in research projects annually is presented in Table 4.6-5 of the 1994 LRDP DEIR (pages 4.6-16 to 4.6-17).

The proposed project would involve the breeding of large numbers of genetically altered mice for research purposes. The mice would be bred and held for extended periods onsite. Animals present physical safety hazards, such as bites. Although no infectious agents would be used at the JAX West, there could be public concern regarding genetically altered mice and that the mice, if released, could carry disease. As described in the Project Description, the facility has been designed to breed and raise genetically modified mice. No disease organisms such as viruses would be used in the facility. In addition, numerous design elements and procedural controls would be utilized to prevent disease organisms from entering the facility either on humans or other insects or mice. The mice would be born and raised in a laboratory setting and kept in clean cages. Operation of interior space includes building components designed for frequent and easy cleaning and disinfection. Operations include protocols to protect animals from disease. Exotic viruses, such as the hantavirus, are carried by deer mice and their feces, which would not be present in the facility. Such viruses are extremely sensitive to disinfectants and thrive only in dark unclean settings. The regular cleaning and disinfection procedures would prevent any such viruses from spreading.

The JAX West project would house up to 300,000 mice at capacity. The facility would be used for preparation, breeding and housing of genetically standardized animals, rather than for research. No special precautions would be necessary to protect facility staff, as no infectious or pathogenic agents would be used; however, facility design and operational procedures described above (including HEPA filtration of incoming air, and use of sterile handling procedures) would protect the animals themselves from potential outside contaminants.

To provide oversight for its programs of animal care, the Jackson Laboratories has an Institutional Animal Care and Use Committee (IACUC), that includes both scientific staff and one or more public members. The composition and duties of the IACUC are described in US Public Health Service Policy. Animal care functions are summarized in Table 3-1.

**Table 3-1
Animal Care Functions at JAX West**

Entity	Inspection Frequency	Notes
Animal Care and Use Committee	Twice yearly	Oversight committee composed of scientist(s), non-scientist(s), veterinarian(s), and public member(s). Inspects animal facilities and animal study areas to insure compliance with PHS Policies.
	Annually	Reviews all proposed and continuing projects for humane care and use of animals. Reviews all aspects of animal care program, including veterinary care and operation of the IACUC.
American Association for the Accreditation of Laboratory Animal Care	Once every three years	Independent, private, external review organization that will evaluate all aspects of the animal care program for compliance with all pertinent federal requirements.
National Institutes of Health	Inspections are connected to funding. Institutions may choose method.	Methods include (1) outside inspection by American Association for the Accreditation of Laboratory Animal Care or (2) self-assurance by the institution.

Source: UC Davis 2000g.

The campus presently has full accreditation from American Association for the Accreditation of Laboratory Animal Care (AAALAC), a private agency with no regulatory authority, to which the campus voluntarily applies for accreditation. As a condition of accreditation, AAALAC requires correction of any deficiencies, in either program or physical facilities that are observed by AAALAC during site visits. AAALAC standards are included in this document as Appendix 3. The Jackson Laboratories is fully accredited by AAALAC, and would apply for and maintain accreditation for the proposed laboratory.

Hazardous Waste Generation

Hazardous wastes are generated at campus locations where hazardous materials are used. Research and teaching activities produce most of the hazardous waste generated annually by the campus. To facilitate safe management, hazardous wastes are generally subcategorized into groups with similar or closely related properties. Hazardous wastes generated on campus are grouped into three major categories: non-radioactive chemical waste, radioactive waste, and biohazardous waste. Mixed wastes contain hazardous chemical and radioactive wastes. Types of wastes generated at UC Davis and examples of waste materials typical of these wastes are presented in Table 4.6-7 of the 1994 LRDP DEIR (on page 4.6-19).

All hazardous chemical and radioactive waste generated on campus is collected and managed by EH&S through the campus Environmental Services Facility (ESF). EH&S personnel collect wastes from laboratory buildings and other generation points and transport them to the ESF. Before EH&S picks up materials, they must be packaged and labeled properly, which includes

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

placing them in appropriate sealed containers, segregating incompatible materials, and identifying all components with approximate concentrations. Campus plans, policies, and training stress that hazardous wastes are not to be placed in the trash or poured down a drain (some empty, rinsed, and defaced chemical containers may be discarded with the trash). EH&S has developed and implemented a hazardous waste minimization program on campus. This program stresses the proper management of laboratory hazardous materials inventories, and development and implementation of laboratory procedures to reduce hazardous materials usage and properly manage generated wastes. EH&S has also implemented a chemical exchange program to reduce the disposal of useable radioactive and non-radioactive chemicals. JAX West would be required to participate in these programs as a condition of its ground lease.

Biohazardous waste includes all liquid and solid waste generated while working with specimens from humans or animals which are known or reasonably suspected of containing agents infectious to humans, and cultures of infectious agents classified as Biosafety Level 2 or greater with evidence of human pathogenicity. It also includes all human anatomical remains (except teeth) and any fluid human blood and blood products. Sharps waste is defined by the California Health and Safety Code §117755 as any device capable of cutting or piercing, such as hypodermic needles, razor blades, and broken glass. All biohazardous waste generated on campus is properly treated before disposal as solid waste or is collected, treated and disposed of by an approved medical waste company. The campus currently manages some of its biohazardous waste as it is generated by sterilizing it on site (e.g. in on-site autoclaves). Due to the potential for sharps to injure people, they are disposed in special containers that are clearly marked and maintained throughout the facilities for this purpose alone. Both sharps containers and biohazardous waste are shipped off-site to the UC Davis Medical Center, and are then sterilized, shredded and conveyed to a landfill.

Animal carcasses produced by the project's operations would not be considered biohazardous because the mice would not be experimented upon at the laboratory with infectious agents. The carcasses would be double-bagged, refrigerated and transported to an incinerator on campus, or picked up by an outside contractor for incineration. Waste associated with uninfected laboratory animals, including bedding, food, blood and excreta, would be disposed with regular solid waste at the campus landfill or in the sanitary sewer system.

The proposed JAX West project is anticipated to generate hazardous chemical, radioactive, biohazardous and sharps waste as described above, and would be subject to the same policies and procedures regarding hazardous waste as existing facilities on campus as a condition of the ground lease. Animal carcasses and waste would be the only potentially biohazardous waste generated by the proposed facility, which would be disposed of by incineration.

Hazardous Materials Contamination

Existing hazardous materials contamination known or suspected on the campus is described on pages 4.6-24 to 4.6-30 of the 1994 LRDP DEIR. As a result of past and current land uses on campus, several locations are known to have soil or groundwater contamination, and other areas are suspected of being contaminated. Campus areas with known environmental contamination include the site of the current campus landfill, a pesticide storage building, and the South Campus Disposal Site (SCDS) (including the former Laboratory for Energy-Related Health Research (LEHR), and an inactive campus landfill. Existing conditions at the SCDS are

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

discussed in Chapter 7 of the 1994 LRDP DEIR, Effects Related to the South Campus Disposal Site. Contamination from these areas may extend to adjacent areas, but the project site is too far from these sites to be affected.

A Phase 1A preliminary site assessment was performed for the West Campus Enterprise Reserve, including the site for this project, as part of the due diligence process for the project site. No hazardous materials were encountered, and no evidence of soil or groundwater contamination was found at the proposed site (UC Davis 1998a).

Safety Program Administration

The campus has charged EH&S with the responsibility of promoting a safe and healthy environment. EH&S has the authority to require the abatement of any condition or operation that could endanger people or facilities on campus or that might result in violations of pertinent federal or state laws or campus policies concerning health and safety. The JAX West project would be monitored and regulated by EH&S, similarly to other campus departments, as a condition of its ground lease.

Areas covered by the roughly 30 (full-time equivalent) EH&S technical staff at the campus include industrial hygiene, toxicology, chemical safety, physical safety, radiation safety (i.e., health physics), biohazard safety, hazardous waste management, animal care, and environmental protection. EH&S develops specific campus policies in these areas such as establishing procedures for packaging hazardous wastes and authorizing the use of radioactivity.

The principal investigators or supervisors of laboratories are responsible for ensuring that their laboratories are inspected by laboratory personnel at least twice each year. EH&S provides a checklist for this purpose. In general, EH&S does not conduct routine health and safety audits or inspections on or off campus, except for facilities that use radioactive materials, biohazardous material, regulated chemical carcinogens, or are generators of hazardous waste. EH&S staff audit facilities using biohazardous materials or regulated chemical carcinogens annually or semiannually, depending on the types of materials used. In accordance with the UC Davis Broadscope Radioactive Materials License, laboratories in which radioactive materials are used are subject to inspection by EH&S staff with frequencies from once a month to once a year. EH&S staff use a Facility Monitoring Report when inspecting labs and other campus facilities where radioactive materials are used. These audits are to ensure compliance with applicable codes and policies, and to be certain of conformity with applicable radioactive, biohazardous, or regulated chemical carcinogenic material handling standards.

3.1.2 Regulatory Setting

Hazardous materials handling and hazardous waste management are subject to numerous laws and regulations at all levels of government. These laws apply to classroom activities, research-related activities, maintenance work, and other activities on campus just as they do to other hazardous materials users. In this respect, the JAX West project would operate on the campus in the same manner as other campus departments. Laws and regulations related to health and safety are discussed in detail in Appendix E of the 1994 LRDP DEIR. A brief summary of these regulations is described below.

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

Hazardous Materials Management

State and federal laws require detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed, and, in the event that such materials are accidentally released, to prevent or to mitigate injury to health or the environment.

Worker Safety

The California Occupational Safety and Health Administration (Cal/OSHA) and the federal Occupational Safety and Health Administration (Fed/OSHA) are the agencies responsible for assuring worker safety in the handling and use of chemicals in the workplace. In California, Cal/OSHA assumes primary responsibility for developing and enforcing standards for safe workplaces and work practices.

Hazardous Waste Handling

The California Environmental Protection Agency (Cal-EPA) Department of Toxic Substances Control (DTSC) regulates the generation, transportation, treatment, storage, and disposal of hazardous waste under the Resource Conservation and Recovery Act (RCRA) and the California Hazardous Waste Control Law. These regulations are implemented at the local level by Yolo County Environmental Health Services, a designated Certified Unified Program Agency.

Radioactive Materials

The Radiologic Health Branch of the California Department of Health Services administers the federal Atomic Energy Act, the California Radiation Control Law, and related regulations, which govern the receipt, storage, use, transportation, and disposal of sources of ionizing radiation (radioactive material) and provide for protecting the users of these materials and the general public from radiation hazards.

Biohazardous Materials and Animals

The United States Department of Health and Human Services Public Health Service, Centers for Disease Control and Prevention, and National Institutes of Health prescribe containment and handling principles for use in microbiological, biomedical and animal laboratories. Although following these guidelines is not legally required for most activities, all UC Davis laboratories operate with the intent to follow these good hygienic practices. The JAX West project would be operated under the same guidelines as a condition of its ground lease. Federal and state laws such as the Animal Welfare Act specify standards for registration, record keeping, handling, care, treatment, and transportation of animals. Such laws are enforced by the US Department of Agriculture and the California Department of Fish and Game.

Medical Waste Handling

Medical (biohazardous) waste is generally regulated in the same manner as hazardous waste, except that special provisions apply to storage, disinfection, containment, and transportation. The California Department of Health Services Medical Waste Management Program enforces the Medical Waste Management Act and related regulations.

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

3.1.3 Impacts and Mitigation Measures

As noted above, with respect to campus policy and LRDP-mandated mitigation measures, the JAX West project would generally be operated in the manner of a campus department. Compliance with applicable campus-developed mitigation measures for project-level and cumulative impacts would be a condition of the project's ground lease.

Standards of Significance

For the purpose of this EIR, an impact is considered significant if the proposed project would:

- Involve the use, production, or disposal of materials in a manner that poses a hazard to people, or to animal or plant populations in the area affected;
- Expose employees to working situations that exceed health standards;
- Involve violating applicable laws intended to protect human health and safety; or
- Create a significant hazard to human health or the environment through the routine breeding, housing, use, or disposal of laboratory animals.

Project Impacts and Mitigation Measures

3.1-1 Implementation of the proposed project would lead to an increase in hazardous chemical use at UC Davis that could expose campus occupants to potential health or safety risks. With implementation of mitigation measures currently in place, this is considered to be a *less-than-significant* impact.

Development of the JAX West project is projected to slightly increase hazardous materials use on campus over current levels. The range and nature of chemical use at the JAX West facility is expected to be the same as use at existing laboratories on campus.

Various chemicals pose different levels of hazards in their use. Some substances are flammable while others can be toxic. Some non-radioactive chemicals have the potential for causing cancer or acute and chronic illnesses. The properties and health effects of chemical substances are unique to the individual materials, although they often can be grouped by chemical types. No classifications exist to rate the level of hazard posed by all substances under all circumstances. While some substances may present little potential for hazard, others may be capable, in certain situations, of causing severe health effects.

Workers might be exposed to hazardous chemicals through inhalation, skin absorption (contact), ingestion, and injection (cuts). UC Davis policies and procedures address the procurement, handling, and disposal of carcinogenic, controlled, volatile, flammable, and explosive substances. EH&S is charged with implementing measures, directly and through campus departments, designed to ensure compliance with applicable laws and regulations and to impose additional, more stringent UC Davis policies to further reduce the potential for human harm.

To minimize inhalation exposure to chemicals, researchers and other workers would take standard procedural precautions, such as working under fume hoods, when using chemicals likely to present such an exposure hazard. As part of the project, fume hoods and other engineering controls (such as ventilation systems) would be required to meet Cal/OSHA requirements. Proper use of the fume hoods and other engineering controls would keep indoor

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

laboratory air toxics concentrations below the suggested guidelines of the American Conference of Governmental Industrial Hygienists Threshold Limit Values and the legal limits of the OSHA Permissible Exposure Levels.

To prevent exposure through skin contact, campus policy is to use protective clothing, such as laboratory coats, gloves, and safety glasses while handling hazardous materials and wastes. Also, in accordance with state laws and campus policy, eating, drinking, applying cosmetics, chewing gum or tobacco, and smoking are not allowed in laboratories using radioactive materials. Proper washing after handling chemicals is also required. These restrictions are imposed to prevent the potential ingestion of chemicals.

Campus departments are primarily responsible for ensuring that safe work practices are followed; EH&S supports departments with this responsibility. EH&S also reviews proposed laboratory designs for non-structural seismic safety concerns and compliance with Cal/OSHA requirements to provide appropriate protection for the workers. In this respect, JAX West would have the same responsibilities as other campus departments and would be subject to the same oversight by EH&S as a condition of its ground lease.

Environmental health and safety requirements are dynamic and have been frequently expanded in recent years. The various federal, state, and local agencies that monitor campus regulatory compliance require time to receive, interpret, and transmit changes to the regulated community. In turn, regulated entities such as UC Davis require some time to receive proper notice, to understand changed laws and regulations, to acquire proper equipment, to inform campus workers, and to train or hire new staff to comply with the changes. Hence, compliance is an evolving and perpetual process. UC Davis is committed to providing a safe environment for the campus and the local community by implementing the increasingly complex laws and regulations regarding the use of hazardous materials.

Compliance with all state and federal laws and regulations as well as campus policies would reduce the impact of increased hazardous materials use to a less-than-significant level. In addition, the 1994 LRDP EIR recommended implementation of Mitigation Measure 4.6-1(a) through (c), prior to occupying the first project approved following adoption of the 1994 LRDP that involved the use of hazardous materials, to reduce this impact to a less-than-significant level. Pursuant to 1994 LRDP EIR Mitigation Measure 4.6-1(a), the campus has strengthened its programs to improve compliance with the laws and regulations applicable to the use of hazardous materials. The UC Davis EH&S website (www.ehs.ucdavis.edu) currently contains information on the types and quantities of hazardous materials on the UC Davis campus and an online chemical inventory system accessible to authorized users. The campus also submits annual chemical inventory report to the County, fulfilling Community Right-to-Know and Business Plan requirements. JAX West would be included in this inventory. In addition, Waste Minimization, Injury and Illness Prevention, Chemical Hygiene, and Emergency Action Plans have been developed and implemented and a waste minimization coordinator position has been created (Oatman 2000).

Consistent with 1994 LRDP EIR Mitigation Measure 4.6-1(b), the campus has established a self-audit mechanism and a reporting system to document the compliance status of campus departments and units. The Certified Unified Program Agency (CUPA) self-audit program has been implemented and checklists are downloadable from the EH&S website. Consistent with 1994 LRDP EIR Mitigation Measure 4.6-1(c), biennial audits of EH&S are conducted by

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

individuals independent of the campus (such as from other agencies or other campuses). JAX West would be subject to the requirements of this program.

Compliance with the many controls, procedures, and plans currently in place on campus to minimize risk of exposure to hazardous chemicals would be required as a condition of the JAX West ground lease; therefore, the impact of increased hazardous chemicals use at the proposed project site would result in a *less-than-significant* impact to campus occupants.

Mitigation Measures

No additional mitigation required.

3.1-2 Implementation of the JAX West project could lead to an increase in the generation of hazardous chemical waste at UC Davis that could expose campus occupants to potential health or safety risks. With implementation of mitigation measures currently in place, this is considered to be a *less-than-significant* impact.

As described in the setting section, hazardous chemical wastes are generated whenever hazardous chemicals are used. General types of hazardous chemical wastes include spent solvents from laboratories, discarded laboratory reagents and reaction products, and contaminated materials such as gloves and containers. The extent that workers are exposed to hazardous waste is related to the training they receive, how conscientiously they follow safety procedures, how well engineering controls are maintained and operated, and the extent that compliance is supervised and enforced.

The campus has prepared guidelines for proper disposal of hazardous wastes based on regulations established by the Environmental Protection Agency and the Department of Toxic Substances Control. JAX West would be subject to these guidelines as a condition of its ground lease. To facilitate safe management, hazardous wastes are subcategorized into groups with similar or closely related properties. Before EH&S picks up materials, they must be packaged and labeled properly, which includes placing them in appropriate sealed containers, segregating incompatible materials, and identifying all components with approximate concentrations. Hazardous materials transported to the Environmental Services Facility (ESF) are separated into subcategories based on the handling methods employed, storage locations at the facility, and the ultimate destination of the materials. Flammable wastes (mostly solvents), corrosives (acids and bases), certain oils, poisons, heavy metals, and oxidizers are shipped off-site for recycling, treatment, or disposal. Chemical wastes, once packed for disposal, are further categorized according to their off-campus disposal methods.

The 1994 LRDP recommended that prior to occupying the first project approved following adoption of the 1994 LRDP that involved the use of hazardous materials, Mitigation Measure 4.6-2(a), (b), or (c), in combination with Mitigation Measure 4.6-2(d), should be implemented to reduce the impact from increased hazardous waste generation to a less-than-significant level.

In conformance with 1994 LRDP EIR Mitigation Measure 4.6- 2(b), the Environmental Services Facility, a new handling facility for campus hazardous wastes, has been constructed and is operational. In addition, a Waste Minimization Coordinator position has been created and EH&S has developed and implemented a hazardous waste minimization program on campus pursuant to 1994 LRDP EIR Mitigation Measure 4.6-2(d). This program stresses the proper management of laboratory hazardous materials inventories and development and implementation

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

of laboratory procedures to reduce hazardous materials usage and properly manage generated wastes. EH&S has also implemented a chemical exchange program to reduce the disposal of useable chemicals. JAX West would be subject to these programs as a condition of its ground lease.

Operation of the proposed JAX West project could result in an increase in hazardous chemical waste generation at UC Davis by slightly increasing the amount of laboratory space. However, off-campus treatment, storage, and disposal facilities are available with the capacity to accept and safely manage UC Davis chemical waste, including any produced by JAX West.

Compliance with the programs and controls currently implemented on campus to provide safe handling, treatment and disposal of hazardous chemical waste would be required as a condition of the JAX West ground lease; therefore, this impact is considered *less than significant*.

Mitigation Measures

No additional mitigation required.

3.1-3 Operation of the proposed JAX West project could lead to an increase in radioactive material use at UC Davis and use of radiation producing machines which could expose campus occupants to potential health or safety risks. With implementation of mitigation measures currently in place, this is considered to be a *less-than-significant* impact.

As discussed in the setting, radioactive materials are used on campus and are highly useful in research. For the purposes of this analysis, operation of the JAX West project could increase radioactive materials use over current usage due to the addition of imaging equipment, which uses or produces radiation. The types of radioactive materials used would be similar to, but not necessarily the same as, those currently used at other UC Davis biomedical laboratories. The potential human health effects from radiation exposure range from no known health effects to minor skin irritations to cancerous tumors. With the proposed project's implementation, the number of people who would be using radioactive materials would increase slightly; therefore, the number of people who would be exposed to potential risks associated with radioactive materials use would increase.

Average background radiation exposure in the United States is about 163 millirem per year (UC Davis 1994b). Typical average doses to workers at campus facilities are less than 30 millirem per year, a level well below applicable standards (UC Davis 1994b). While implementation of the proposed project could increase the number of people exposed to this typical dose, it would not be anticipated to change the typical dose level.

Radiation poses a health risk to those who are exposed, but exposure can be prevented with proper protective equipment and procedures. Radioactive materials are monitored closely. In accordance with the UC Davis Broadscope Radioactive Materials License, which would be amended to apply to JAX West as to other campus programs, prior to obtaining radioactive materials, each principal investigator must apply for a Radiation Use Authorization which specifies the particular radioisotopes to be used and maximum quantities to be possessed. The UC Davis Health Physics (radiation safety) Program is designed to provide adequate protective measures against exposure to these sources for visitors, students, faculty, staff, and the community at large. JAX West would be required to comply with this program as a condition of its ground lease. Together, these existing measures are designed to reduce the risk of illness and

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

accidents. Continued implementation of these measures is part of the proposed project. If JAX West is required to obtain its own Broadscope Radioactive Materials License, the laboratory would be subject under that license to the same or similar regulatory conditions imposed upon other radioactive materials users on campus.

The 1994 LRDP EIR recommended implementation of Mitigation Measures 4.6-5(a) and (b) to reduce this impact to a less-than-significant level. These measures were implemented prior to occupation of the first project approved following adoption of the 1994 LRDP that involved the use of radioactive materials.

Pursuant to 1994 LRDP EIR Mitigation Measure 4.6-5(a), the campus has strengthened its health physics program commensurately with changes in the hazards associated with campus radioactive materials usage. The University's health physics program involves maintenance of a radiologically safe work environment and compliance with all regulatory requirements. The program also offers technical education programs in the areas of radiation safety, regulatory compliance, radiological waste management and other relevant topics. The program's staff is available to researchers, local, state, and federal agencies and the local community for consultation regarding use of radioactive materials on campus.

1994 LRDP Mitigation Measure 4.6-5(b) involves implementation of Mitigation Measures 4.6-1(a) through (c). These mitigation measures have been implemented as discussed above under Impact 3.3-1.

Given that adequate safety controls, plans, and procedures are in place to limit exposure to radiation from radioisotopes and radiation producing machines, the potential of the proposed project to expose campus occupants to health or safety risks is low. JAX West would be required to comply with these controls as a condition of the ground lease. This impact therefore is considered to be *less than significant*.

Mitigation Measures

No additional mitigation required.

3.1-4 Implementation of the proposed project would lead to an increase in the generation of radioactive waste at UC Davis that could expose campus occupants to potential health or safety risks. With implementation of mitigation measures currently in place, this is considered to be a *less-than-significant* impact.

Existing campus research laboratories generate small amounts of solid and liquid low-level radioactive waste. Implementation of the proposed project could slightly increase radioactive waste generation, if imaging equipment using radionuclides is used in the facility. Increased radioactive waste generation, if not adequately managed, could pose health or safety threats analogous to those mentioned for radioactive materials use. Radioactive waste is segregated, sealed, and labeled by the generating researcher who contacts EH&S for pickup. This program would also apply to JAX West.

EH&S removes radioactive materials from laboratories and takes them to the ESF to prepare them for eventual disposal by one of three methods. The material is (1) held for decay followed by disposal as non-radioactive, (2) released to the sewer on campus, or (3) incinerated. UC Davis policy is to release no more than half the legal limit of radioactivity to the sewer. According to CCR, Title 17, Section 30253 and 10 CFR Section 20.2003, radioactive materials may not be released to uncontrolled areas in any concentration that, when averaged over an

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

entire year, exceeds specified limits given for each radioisotope. On the basis of these regulations, EH&S calculates daily limits and disposes of no more than half of these calculated limits. Radioactive waste to be incinerated is shipped off campus. UC Davis currently temporarily stores most of its radioactive waste for land disposal at ESF. Some of this radioactive waste has been shipped to an out-of-state radioactive waste landfill (Newman 2000).

California is attempting to site a low-level radioactive waste disposal facility, but its siting is not assured. Because long-term, legal disposal of radioactive waste was not readily available or guaranteed, the 1994 LRDP EIR considered the generation of radioactive waste on campus to be a potentially significant impact. To reduce this impact to a less-than-significant level, the 1994 LRDP EIR recommended implementation of either 1994 LRDP EIR Mitigation Measure 4.6-6(a) or 4.6-6(b) in combination with Mitigation Measures 4.6-6(c) and 4.6-6(d) prior to occupying the first project approved following adoption of the 1994 LRDP that involved use of radioactive materials.

Consistent with 1994 LRDP EIR Mitigation Measure 4.6-6(a), the campus has completed and occupied a new Environmental Services Facility and is closing the old one. Pursuant to Mitigation Measure 4.6-6(c), the campus has created a Waste Minimization Coordinator position and implemented a campus Hazardous Waste Minimization Plan. Furthermore, the campus has implemented a campus-wide radioactive waste minimization plan that specifies feasible programs to reduce generation of low-level radioactive wastes and mixed wastes, as required by Mitigation Measure 4.6-6(d). JAX West would be subject to these programs as a condition of its ground lease.

Compliance with the programs, controls and procedures currently implemented on campus to provide safe handling, treatment and disposal of radioactive waste would be required of JAX West as a condition of the ground lease; therefore, this impact is considered *less than significant*.

Mitigation Measures

No additional mitigation required.

3.1-5 The proposed project would increase the use of laboratory animals at UC Davis, thereby increasing the risk of animal bites and escapes. This is considered to be a less-than-significant impact.

Implementation of the proposed project could increase the number of laboratory mice to be prepared and housed on campus by up to 300,000 over existing numbers. The increased presence of animals in the laboratory could pose potential hazards to workers, building occupants, and the neighboring community if contacts between humans and animals were not properly managed. The mice at the proposed facility would present physical safety hazards, such as bites and scratches. No infected animals would be used in the proposed facility therefore bites would not pose a risk. While there is some risk to the animals of contamination by human handlers, there is no biohazard risk to the handlers, because no infectious materials or pathogens would be used at the facility. The greatest risk in a facility with a large number of laboratory mice is allergy. Facility workers could be exposed to animal allergies. However, the implementation of numerous controls and occupational health programs would minimize the risk. These standard measures include an occupational health program to inform the caretaker about risks, frequent air changes of non-circulated air in animal rooms, respiratory protection,

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

and direction of air from the animal rooms such that it does not flow into the non-vivarium portions of the building.

The U.S. Public Health Service Policy requires that the Jackson Laboratories IACUC oversee all aspects of animal care within Jackson facilities. Before any research involving live vertebrate animals can be initiated, a protocol for the activity must be prepared by the principal investigator and approved by the Jackson Laboratories IACUC. Approved protocols must comply with federal and state requirements as well as the National Institutes of Health *Guide for the Care and Use of Laboratory Animals* (please see Appendix C for more information on this guide).

Vertebrate animals cannot be obtained for research until experimental protocols are approved. Housing facilities for laboratory mice, such as the proposed project, must also conform to the National Institutes of Health guidelines. JAX West would comply with campus policies as a condition of its ground lease.

On-campus breeding and use of mice for research could result in potential hazards off site if animals escaped. Escaping animals could present a minor physical hazard such as bites. Very few incidents of escapes from the campus have been known to occur (UC Davis 1994b). In the unlikely event of an escape, genetically altered mice are unlikely to survive in the wild because they are maladapted to natural conditions, and have immune systems which often have been compromised as the result of breeding protocols. Potential off-site effects of animal use at the proposed facility would be minimal to non-existent, as the animals would be housed in cages in contained sterile spaces, and the facility is a sealed design. In addition, the operating procedures of the facility would include pest control protocols, which would further reduce the potential for any cross-contact between mice housed in the facility and any outside animals. These protocols are essential to ensure precise control on the genetic makeup of the research animals. For these reasons, no significant impacts are expected to result from animal escapes or disease transmission via pests.

Further to minimize risks to the community, animal cages would be washed in ways that inactivate any potential infectious agents. Cages in the facility would regularly be cleaned and autoclaved. Detergent and disinfectant solutions are believed to be effective against bacteria, and infectious agents generally cannot survive disinfectant cage washing. The effluent from these washing processes undergoes further treatment at the wastewater treatment plant and is greatly diluted before reaching the plant.

National Institutes of Health (NIH) animal care guidelines specify the use of protective wear and safe handling of the animals to decrease the chance of work-related hazards through incidents such as bites. Training is provided to workers to ensure proper animal and cage handling, surgical procedures, and personal hygiene. JAX West workers would be required to undergo this training.

Compliance with animal care and use guidelines, as overseen by the Jackson Laboratories IACUC, serves to minimize potential hazards; however, some campus injuries have been associated with animal bites and scratches. Increased campus research with animals could result in a greater number of individuals being exposed to potential hazards. The 1994 LRDP EIR identified implementation of Mitigation Measure 4.6-10 which required implementation of Mitigation Measures 4.6-1(a) through (c) to reduce this impact to a less-than-significant level. As explained under Impact 3.1-1, these mitigation measures have been implemented. Therefore, since compliance with the controls, policies, and plans currently in place to minimize hazards

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

from increased laboratory animal use would be required as a condition of the JAX West ground lease, this impact is considered *less than significant*.

Mitigation Measures

No additional mitigation required.

3.1-6 The proposed project could lead to an increase in the generation of biohazardous waste at UC Davis that could expose campus occupants to potential health or safety risks. With implementation of mitigation measures currently in place, this is considered to be a *less-than-significant* impact.

Animal care facilities at UC Davis, such as the proposed JAX West project, produce biohazardous waste. Most laboratory tissues, fluids, and cultures are considered to be potentially infectious waste. Potentially infectious animal care wastes from JAX West would include animal tissues, and “sharps” (including needles, scalpels, broken glass, etc.). Operation of the proposed laboratory would slightly increase the amount of biohazardous waste generated on campus.

Some of the research-generated biohazardous waste is placed in a biohazard labeled bag and autoclaved on campus. Most is taken to the UC Davis Medical Center in Sacramento for treatment. Autoclaving is a procedure that renders the waste non-hazardous by applying steam under high pressure. Autoclaving typically is performed in the generating laboratory immediately after the biohazardous waste is created. Biohazardous waste that also contains hazardous chemical or radioactive waste is categorized and handled as hazardous or radioactive waste; items without remaining hazardous constituents, once decontaminated, may be considered non-hazardous solid waste and disposed of at the campus landfill. EH&S ships most of its biohazardous and sharps waste off site to the UC Davis Medical Center for treatment and disposal. Generated wastes are segregated, handled, labeled, stored, transported, and disposed to minimize direct or indirect exposure of personnel. EH&S guides and assists with the disposal of medical waste.

Facility activities would also produce non-autoclavable potentially biohazardous waste, such as animal carcasses, which would be incinerated. Waste of this kind produced by the project’s operations would be double-bagged, refrigerated and transported to an incinerator on campus, or picked up by an outside contractor for incineration.

Existing health and safety practices established in compliance with 1994 LRDP EIR Mitigation Measure 4.6-9 minimize the potential for adverse health effects prior to disposal. JAX West would be required to comply with these practices as a condition of the ground lease; therefore, increased campus biohazardous waste generation is considered to be *less than significant*.

Mitigation Measures

No mitigation required.

3.1-7 Hazardous materials used at the proposed facility may be inadvertently released to the sewer or disposed with non-hazardous solid waste. Because procedures and protocols developed pursuant to the 1994 LRDP mitigation measures are in place at UC Davis, this is considered to be a *less-than-significant* impact.

The 1994 LRDP EIR identified Mitigation Measures 4.6-24(a) and (b) to reduce this impact to a less-than-significant level. Consistent with Mitigation Measure 4.6-24(a) and the revised Waste

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

Discharge requirements (Order No. 97-236) for the WWTP, the campus has established a Pretreatment Program.

Since 1995, the campus has implemented a comprehensive Pretreatment Program to establish safe sewer disposal guidelines, educate campus dischargers regarding these policies, and to monitor for inappropriate discharges to the sanitary sewer system. Campus sewer disposal guidelines include both narrative limits (e.g. "No discharge of flammable wastes") and numeric local limits (e.g. "No discharge of wastewater with a copper concentration exceeding 72 micrograms per liter"). These guidelines were established in accordance with the guidance provided by the U.S. Environmental Protection Agency and the Central Valley Regional Water Quality Control Board to protect worker health and safety, prevent upset conditions at the WWTP, protect against permit violations, and prevent adverse environmental impacts. The campus has a good record of compliance with these sewer disposal guidelines and inappropriate sewer disposal has not caused any significant problems at the WWTP in the time since this program was established. The vast majority of campus laboratory sinks and drains have been labeled with bright yellow reminders about the importance of keeping hazardous waste out of the sewers. This combination of firm guidelines and education reduced the potential for inappropriate sewer disposal.

A new tertiary WWTP was brought on line in March 2000. The new facility includes biological treatment, clarification, coagulation and filtration, and UV disinfection. Though only limited data are available, results from the first six months of operation have shown a dramatic increase in treatment efficiencies relative to the old facility. Except for an isolated problem related to startup, the new WWTP has been in full compliance with all permit limits, including those for "toxic" constituents such as heavy metals and organic wastes.

The proposed project does not have the potential to significantly impact water quality because the facilities and operations proposed are quite similar to existing facilities served by the campus WWTP. There is no evidence that campus facilities served by the WWTP are having significant adverse impacts on water quality.

Non-hazardous solid waste generated by UC Davis is disposed in the campus landfill. In 1991, the Environmental Health Services Division of the Yolo County Department of Environmental health, acting as the Local Enforcement Agency for the UC Davis Landfill, issued the campus a Notice and Order of Compliance for the landfill that cited various violations of the Solid Waste Facilities Permit (issued in 1978). The campus has taken steps to correct the deficiencies noted by the County in the Notice and Order. Specifically, in accordance with the Terms and Conditions of the Notice and Order, the campus submitted a draft Comprehensive Waste Exclusion Program Plan to the County in May 1994. This plan included an updated and revised Load-Checking Program Plan. The plan was approved in June 1994 and has been implemented since then (Oatman 2000). This plan is also consistent with LRDP EIR Mitigation Measure 4.6-24(b) which, required the establishment of a waste exclusion program at the landfill. JAX West would be required to comply with these established programs as a condition of the ground lease.

As a result of programs and controls currently in place to detect inadvertent releases of hazardous material to the sanitary sewer and/or landfill, this impact is considered less-than-significant.

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

Mitigation Measures

No additional mitigation required.

Cumulative Impacts and Mitigation Measures

The cumulative context for the evaluation of hazardous materials and waste impacts is the proposed JAX West facility, combined with the laboratories that would be constructed under the 1994 LRDP, and growth anticipated in the Davis region.

3.1-8 Increased use of hazardous chemical materials related to the implementation of the 1994 LRDP, including the proposed project and other development in the region, would increase the number of people exposed to health hazards associated with such use. The proposed project would contribute to, but would not exceed, the *significant and unavoidable* cumulative impact previously identified in the 1994 LRDP EIR. The project's contribution to this cumulative impact would not be cumulatively considerable and would be considered *de minimis*.

Potential health and safety effects related to hazardous materials use at UC Davis generally are limited to those individuals using the materials or persons in the immediate vicinity of the use. For the most part, potential impacts associated with such development would be localized, but cumulative development could result in more people being exposed to hazardous chemicals, which would be considered a significant impact.

The 1994 LRDP EIR recommended implementation of the same mitigation measures as those recommended to reduce project-specific impacts of hazardous chemicals use (1994 LRDP EIR Mitigation Measures 4.6-1(a) through (c)). The 1994 LRDP EIR noted that while the mitigation measures would address the campus' contribution to this significant impact, the campus cannot guarantee that additional hazardous chemicals used at off-campus locations outside the control of the University would be managed safely because this authority falls within other jurisdictions to monitor and enforce. For this reason, the University conservatively considered the cumulative regional impact to be *significant and unavoidable*. However, as 1994 LRDP EIR mitigation measures have been and would continue to be implemented as part of the proposed project, the project's contribution to this cumulative regional impact would not be cumulatively considerable, and would be considered *de minimis*. Environmental conditions related to hazardous chemical materials would essentially be the same with and without the proposed project.

Mitigation Measures

No additional mitigation is required for the proposed project. No additional mitigation is available for the regional cumulative impact.

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

3.1-9 Implementation of the 1994 LRDP, including the proposed project, and other development in the region that generates hazardous chemical waste could place an additional load on hazardous waste management facilities. The proposed project would contribute to, but not exceed, the *significant and unavoidable* cumulative impact previously identified in the 1994 LRDP EIR. The project's contribution to this cumulative impact would not be cumulatively considerable and would be considered *de minimis*.

With respect to cumulative hazardous waste generation at facilities on campus, the 1994 LRDP EIR noted that the campus' cumulative hazardous waste, together with waste generated by cumulative development in California and the rest of the nation, could be managed at facilities that are not in compliance with applicable environmental laws and thus may cause human and environmental health hazards. It also discussed the complexity of applicable laws and the limited ability of generators to determine the compliance status of the disposal facilities, and conservatively concluded that the impact of cumulative waste generation would be significant.

The 1994 LRDP EIR further identified mitigation measures (1994 LRDP EIR Mitigation Measures 4.6-4(a) and (b)) to address the campus' contribution to the cumulative regional impact. In compliance with these mitigation measures, a Hazardous Waste Minimization Program has been implemented and the new ESF has been completed and is operational. However, the 1994 LRDP EIR conservatively noted that the actions of the campus alone could not mitigate this impact, and other government entities would need to take steps to mitigate this impact. For example, local governments could implement and facilitate hazardous waste minimization programs, states could set mandatory waste reduction targets, and state or federal governments could operate treatment or disposal facilities. However, the feasibility and implementation of such measures could not be guaranteed by the University of California because they fall within other jurisdictions to enforce and monitor. For this reason, the University conservatively considered the impact *significant and unavoidable*, even after implementation of mitigation measures. As described under Impacts 3.3-1 and 3.3-2 of this DEIR, adequate controls, procedures and plans have been and will continue to be implemented on campus to reduce the risk of hazardous chemical waste to a less-than-significant level. As a result, the project's contribution to the cumulative regional impact would not be cumulatively considerable, and would be considered *de minimis*. Environmental conditions related to hazardous chemical waste would essentially be the same with and without the proposed project.

Mitigation Measures

No additional mitigation is required for the proposed project. No additional mitigation is available for the regional cumulative impact.

3.1-10 Increased use of radioactive materials related to the implementation of the 1994 LRDP, including the proposed project, and other development in the region would increase the number of people exposed to health hazards associated with the use of radioisotopes. The proposed project would contribute to, but would not exceed, the *significant and unavoidable* cumulative impact previously identified in the 1994 LRDP EIR. The project's contribution to this cumulative impact would not be cumulatively considerable and would be considered *de minimis*.

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

Due to the short-range health effects of radioactivity, potential health and safety effects related to radioactive material use at UC Davis generally are limited to those individuals using the materials or persons in the immediate vicinity of the use. For the most part, potential impacts associated with such development would be localized, but increased radioactive materials use in the region would result in more people being exposed to radioactivity, a potentially significant impact.

The 1994 LRDP EIR recommended implementation of the same mitigation measures as those recommended to reduce project-specific impacts of radioactive materials use (1994 LRDP EIR Mitigation Measure 4.6-5(a) and (b)) to reduce the magnitude of this impact. The 1994 LRDP EIR noted that while the mitigation measures would address the campus' contribution to this significant impact, the campus cannot guarantee that additional radioactive materials used at off-campus locations outside the control of the University would be managed safely because this authority falls within other jurisdictions to monitor and enforce. For this reason, the University conservatively considered the impact significant and unavoidable. However, as 1994 LRDP EIR mitigation measures have been and would continue to be implemented as part of the proposed project and adequate safety controls, plans and procedures are in place to limit exposure to radiation, the project's contribution to this cumulative regional impact would not be cumulatively considerable, and would be considered de minimis. Environmental conditions related to radioactive materials would essentially be the same with and without the proposed project.

Mitigation Measures

No additional mitigation is required for the proposed project. No additional mitigation is available for the regional cumulative impact.

3.1-11 Implementation of the 1994 LRDP, including the proposed project, in conjunction with other development in the region that generates radioactive waste would place an additional load on radioactive waste management facilities. The proposed project would contribute to, but would not exceed, the *significant and unavoidable* cumulative impact previously identified in the 1994 LRDP EIR. The project's contribution to this cumulative impact would not be cumulatively considerable and would be considered de minimis.

The 1994 LRDP EIR noted that under the federal Low-Level Radioactive Waste Policy Act and its 1985 Amendments, out-of-state disposal sites that currently accept California's low-level radioactive waste and mixed waste (waste that contains radioactive materials and other hazardous constituents) may choose not to do so at any time. California currently is studying its options for Low-Level Radioactive Waste (LLRW) disposal, including the possibility of an in-state LLRW landfill. Two out-of-state low-level radioactive waste facilities currently are accepting LLRW shipments from California but one will phase out such shipments by 2008. The other site has applied to expand its license to accept the radioactive waste stream currently being shipped to the facility that is closing. The campus has no control over the availability of disposal facilities. In addition, the campus cannot guarantee that other jurisdictions will adopt, monitor, and enforce programs to minimize the generation of radioactive waste.

The 1994 LRDP EIR recommended implementation of the same mitigation measures as those recommended to reduce project-specific impacts of radioactive waste generation (1994 LRDP EIR Mitigation Measure 4.6-6(a) through (d)). As discussed under Impact 3.1-4, these

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

mitigation measures have been and would continue to be implemented. The 1994 LRDP EIR noted that while the mitigation measures would address the campus' contribution to this significant impact, the campus cannot guarantee that additional radioactive waste generated at off-campus locations outside the control of the University would be managed safely because this authority falls within other jurisdictions to monitor and enforce. For this reason, the University conservatively considered the impact *significant and unavoidable*. However, as 1994 LRDP EIR Mitigation Measures 4.6-6(a) through (d) have been implemented. Adequate programs, controls and procedures are currently in place on campus to provide safe handling, treatment and disposal of radioactive waste. Because these programs, controls and procedures would be applied to the proposed project as a condition of its ground lease, the project's contribution to this cumulative regional impact would not be cumulatively considerable, and would be considered de minimis. Environmental conditions related to radioactive waste would essentially be the same with and without the project.

Mitigation Measures

No additional mitigation is required for the proposed project. No additional mitigation is available for the regional cumulative impact.

3.1-12 Implementation of the 1994 LRDP, including the proposed project, in conjunction with other development in the region that uses biohazardous materials and research animals would increase the number of people exposed to health hazards associated with such use. The proposed project would contribute to, but would not exceed, the *significant and unavoidable* cumulative impacts previously identified in the 1994 LRDP EIR.

Potential health and safety effects related to research animal use at UC Davis are generally limited to those individuals using the materials or persons in the immediate vicinity of the use. For the most part, potential impacts associated with cumulative development would be localized, but cumulative development could increase the number of people in the Davis area exposed to the hazards of animal research, a possible significant impact.

The 1994 LRDP EIR recommended implementation of the same mitigation measures as those recommended to reduce project-specific impacts of research animals use (1994 LRDP EIR Mitigation Measures 4.6-9 and 4.6-10). As discussed under Impacts 3.1-5 and 3.1-6, these mitigation measures have been and will continue to be implemented, reducing the proposed project's contribution to this potentially significant impact. However, as discussed in the 1994 LRDP EIR, the University of California cannot guarantee that additional research animals used in the Davis area would be managed safely because this responsibility falls within other jurisdictions to enforce and monitor. For this reason, the University conservatively considered the impact *significant and unavoidable*. 1994 LRDP EIR Mitigation Measures 4.6-9 has been implemented, and adequate programs, controls and practices are in place on campus to minimize the risks associated with research animal use. Because these programs, controls and practices would be incorporated in the JAX West program as a condition of the ground lease, the proposed project's contribution to this cumulative regional impact would not be cumulatively considerable.

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

Mitigation Measures

No additional mitigation is required for the proposed project. No additional mitigation is available for the regional cumulative impact.

3.1-13 Implementation of the 1994 LRDP, including the proposed project, in conjunction with other development in the region that generates biohazardous waste would place an additional load on available biohazardous waste management facilities. This is considered to be a *less-than-significant* impact.

As discussed in Impact 3.1-6, the impact of increased biohazardous waste generation at the proposed facility would be less than significant provided that appropriate waste management policies and practices continue to be followed. Much of the biohazardous waste generated on campus is sterilized immediately at the point of generation, thereby precluding any cumulative impact associated with similar waste generation nearby. Some biohazardous waste must be shipped off campus for treatment, and certain other activities in the region also generate biohazardous waste that must be treated and disposed. For instance, any increase in hospital, convalescent care, clinical laboratory, or biological research facility operations in the region could also generate biohazardous waste. However, adequate treatment capacity exists in the region to support reasonably foreseeable cumulative increases in biohazardous waste generation. The potential cumulative impact of increased biohazardous waste generation in the region is therefore considered *less than significant*.

Mitigation Measures

No mitigation required.

3.2 UTILITIES AND SERVICE SYSTEMS

This section addresses the potential effects of implementing the proposed JAX West project on stormwater, water supply, wastewater, electrical, natural gas, and telecommunications systems. For a discussion of impacts of the proposed project on other utilities and related service systems, please see Checklist Item 16 (Utilities and Service Systems on pages 123 through 132) of the Tiered Initial Study for this project included as Appendix A of this EIR. All relevant information, including applicable environmental and regulatory settings, standards of significance, and mitigation measures identified in Sections 4.14 and 4.15 of the 1994 LRDP EIR and in Chapter 8 of the 1997-98 Major Capital Improvement Projects SEIR, is incorporated by reference and summarized below as appropriate.

3.2.1 Environmental Setting

Domestic Water

The West Campus is not served by utility water, which is used mainly for landscape irrigation. Domestic water for the campus is supplied by the campus domestic water/fire system for which the deep aquifer is the source, and is used on the West Campus for both domestic and utility uses. The overall capacity of the deep aquifer is unknown. The current capacity of the campus domestic water supply reservoir and wells is 8,810 gallons per minute (gpm). Total demand at buildout of the 1994 LRDP is estimated to be 8,000 gpm. Existing domestic water lines are

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

present in the immediate project vicinity along Hopkins Road, the airport entry road and in the service road immediately north of the project site. However, the domestic water supply to the West Campus is inadequate to provide the necessary fire flow needed for the project (O'Hearn 2000).

Stormwater

Stormwater and other surface runoff from the West Campus drain southward to a storm drain outfall at Putah Creek. There is occasional flooding on campus, particularly in low areas such as swales, during 10 to 15 year storm events. Buildings on campus are designed to be elevated above the surrounding ground plane as protection against flooding. In the immediate project vicinity, an existing storm drain runs through the agricultural field parallel with Hopkins Road. Additional storm drains are present in the airport entry road and Hutchison Road. The storm drain outfall that discharges into Putah Creek has inadequate capacity to handle additional flows (O'Hearn 2000).

Sanitary Sewer

Wastewater collection and treatment is provided by the campus sanitary sewer system. The existing campus wastewater system is operated by the campus and is not connected to any regional facility. Major system elements include collectors, sanitary sewer mains, eight lift stations, a treatment plant, and an effluent outfall to the South Fork of Putah Creek near Old Davis Road. In 1999, the campus completed construction of a new Wastewater Treatment Plant (WWTP) to replace an older plant. The new plant is more reliable to operate than the outdated treatment system and has a permitted capacity of 2.7 mgd.

Sanitary sewer lines in the project vicinity presently run south along Hopkins Road and airport entry road. These lines have sufficient capacity to collect wastewater from the proposed project (O'Hearn 2000).

Electricity

Electrical service is provided to the campus by Pacific Gas and Electric Company (PG&E) and the Western Area Power Administration (WAPA) (discussed in Section 4.15 of the 1994 LRDP EIR) and ENRON (added after the publication of the 1994 LRDP EIR) through the Main Substation located south of I-80. This substation converts 60 kilovolt (kV) service voltage to 12 kV for distribution to campus facilities. The Main Substation contains five 10,500 kilovolt amperes (kVA) transformers. All five transformers are dual voltage of 60 kV and 115 kV. The existing electrical system has a capacity of 42,000 kVA with a summer peak of 32,000 kVA (UC Davis 1999g). The current annual electrical usage on campus is approximately 170 million kilowatt hours/year (kWh/yr) (UC Davis 1998a).

As described on page 4.15-3 of the 1994 LRDP DEIR, PG&E anticipated that there would be adequate electrical supply available to meet growth projected to occur under the 1994 LRDP. WAPA also anticipated that an annual supply of 88 million kW/hrs of electricity would be provided to the campus through 2004 (UC Davis 1998a). UC Davis currently is negotiating an extension to the WAPA contract that would supply power to the campus beyond 2004 through 2024.

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

California is currently (fall/winter 2000) experiencing instability with regard to the price and/or supply of electricity.

In the event that electric supply continues to be erratic, possible effects would be further stage 2 and 3 alerts, and rolling “brown/black outs,” which could cause reduced or interrupted electric supply during peak usage hours. To address the likely impacts of such events, the campus voluntarily implements a load management program that informs campus faculty, staff and students to cut back the use of electricity in the non-critical facilities. The campus also requires that all critical facilities (laboratories and animal holding buildings) are fitted with standby electric generators.

To accommodate anticipated demand for electricity from buildout of the 1994 LRDP, the campus is in the process of implementing the Electrical Improvements Phase 2B project (EI2B). This project includes improvements to the existing network to improve system reliability and provide sufficient capacity to meet the electrical needs of recently completed facilities and anticipated new development that is expected to occur on campus. EI2B includes installation of a new power transformer, circuit switch, circuit breaker switchgear, duct bank, and feeder cables to increase capacity; recabing of overhead power distribution lines and installation of underground feeder cables to improve distribution; and removal of a substation that has become obsolete (UC Davis 1998b; UC Davis Facility Services). EI2B improvements will provide a new system capacity of 60,000 kVA when completed in 2002 (UC Davis 2000c). The first stage of that project, to be completed by October 2001, will include recabing of the overhead electrical system on the West Campus to increase power capacity in this area prior to completion of this project. In the event that the project is delayed, electrical service would be provided using the campus backup feeder (O’Hearn 2000).

Natural Gas

Natural gas is purchased from outside vendors and provided to the campus through PG&E pipelines (discussed on page 4.15-2 of the 1994 LRDP DEIR). Natural gas is supplied to four locations on campus: the Central Plant, the Primate Plant, the Co-generation Plant, and the Master Meter #1. Natural gas capacity on the West Campus currently is not sufficient to serve the proposed project. However, the campus has developed a proposal to upgrade natural gas supply to serve the project via a new natural gas pipeline. Two alternatives are under consideration – a PG&E line from Russell Road south to the project site, or a campus pipeline from Central Campus along Hutchison Road and Hopkins Road. Both alignments are shown on Figure 8 (O’Hearn 2000).

Telecommunications Systems

The campus installed its current telecommunications system in 1987 (discussed on page 4.14-8 of the 1994 LRDP EIR). All voice and data switching equipment and network service systems facilities are owned and operated by the campus (UC Davis Communications Resources Service). The main switching facility is located in the Telecommunications Building, east of the Central Heating and Cooling Plant. As new buildings are constructed, Communications Resources coordinates with the UC Davis Office of Architects and Engineers to design and direct the installation of intra- and inter-building telecommunications facilities in accordance with established standards.

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

At present, the West Campus telecommunications system is near capacity. All current telecommunications facilities in the area are dedicated to existing and future projects, specifically, the Contained Research Facility Project and the Swine Facility. The telephone service point on Hopkins Road, with a cross-connect box near Bee Biology Lane, is near capacity.

The University recently approved a new telecommunications project, UCD Net 2, that will upgrade telecommunications throughout the campus, including the communications cable under Hopkins Road that serves the West Campus. Once the UCD Net 2 project is complete, in the Fall of 2002, there will be system capacity for the project. During the interim one-year period until UCD Net 2 is completed, JAX West would be provided temporary telecom service via the existing system.

3.2.2 Impacts and Mitigation Measures

Standards of Significance

For the purpose of this EIR, an impact to utilities and related service systems is considered to be significant if the proposed project would:

- Result in a significant increase in the consumption of domestic water and require substantial expansion of the water supply treatment or distribution;
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or increase the risk of flooding on- or off-site;
- Require substantial expansion of wastewater treatment and distribution capacity;
- Create an energy demand in excess of supply or major service systems;
- Require the development of new sources of energy; or
- Require substantial expansion of the telecommunication service and distribution system.

Project Impacts and Mitigation Measures

No new sources of energy would be needed for the project. Project impacts on utility capacity and connections are described below. Demands are described in Table 2-2 in the Project Description.

3.2-1 Development of the proposed JAX West project would contribute runoff water to existing stormwater drainage systems and could require the construction of new storm drain facilities or extension of existing facilities. With standard design measures in place, this is considered a *less-than-significant* impact.

Projected storm drain demand peak rate from the project is 3.2 cubic feet per second. Flooding is not anticipated based on a design storm of 10 to 15 years. Severe storms may cause localized flooding. Generally this is restricted to roadways and, in the case of UC Davis West Campus, to swales. As is standard design practice on the campus, the facility would be protected by constructing the finished floor elevation higher than the surrounding ground plane.

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

The proposed project includes the construction of stormwater detention basins along the northern, eastern and southern sides of the project site. These would be constructed to hold the flows from a 10-year/24-hour storm event, and would detain waters so that the storm drain outfall at Putah Creek is not affected.

The entire West Campus Enterprise Reserve, including the project site, previously was assessed with respect to biological and cultural resources, and no significant resources were found to be present on the project site (UC Davis 1998a). Since construction of the detention basins would be confined to those areas previously assessed, including the project site and existing roadways, these basins also would not result in any significant impacts to these resources. The impact of the project would be *less than significant*.

The Initial Study checklist for Hydrology, Items (9a), (c) and (d), identified potentially significant impacts with respect to erosion, siltation and flooding, because at the time that document was prepared detailed utility siting and capacity information was not available. Analysis of the new data as described above indicates that impacts in the areas of siltation and flooding would be *less than significant*.

Mitigation Measures

No mitigation required.

3.2-2 Development of the proposed JAX West project would increase the demand for wastewater collection and treatment. Because both collection and treatment capacity are sufficient to serve the project, and points of connection with adequate capacity are available, this is considered a *less-than-significant* impact.

The proposed project would result in a maximum discharge of 57,000 gallons per day (gpd) of wastewater. This volume would not exceed the capacity of the WWTP or of the existing collection system (O'Hearn 2000). The project would be connected to an existing sanitary sewer line in Hopkins Road. Construction of the utility connection has the potential to disturb land-based resources, such as biological and cultural resources. However, the entire West Campus Enterprise Reserve, including the project site, previously was assessed with respect to biological and cultural resources, and no significant resources were found to be present on the project site (UC Davis 1998a). Since utilities construction would be confined to those areas previously assessed, including the project site and existing roadways, utility connections also would not result in any significant impacts to these resources. The impact of the project would be *less than significant*.

Mitigation Measures

No mitigation required.

3.2-3 Development of the proposed JAX West project would increase the demand for electricity and related service systems. Electrical facilities would be in place to serve the proposed project. This is considered a *less-than-significant* impact.

The proposed project would require construction power in April or May, 2001, power for testing and commissioning in July, 2001, and full electrical service by Winter, 2001-2002. It is estimated that the proposed project would result in an increased peak demand of approximately 2030 kVA of electricity (O'Hearn 2000). While the proposed project would increase demand for energy, it would comply with the standards of Title 20, Energy Building Regulations, and Title

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

24, Energy Conservation Standards of the California Code of Regulations. As stated on page 4.15-2 of the 1994 LRDP DEIR, all new buildings constructed in California must comply with Titles 20 and 24, and it is a policy of the University of California to comply with these regulations. JAX West would be required to comply as a condition of its ground lease.

There is current uncertainty regarding the cost and/or supply of electricity in California. In the event of a reduced or interrupted electric supply, the campus implements load management measures to further minimize consumption of energy when the State's energy reserves drop below critical levels. That program would continue to be implemented. Furthermore, the proposed project includes a standby generator that would be utilized in the event of "brown outs" or interruption of electrical service. Such load management measures would not lead to any significant effects on the environment. Furthermore, there is no evidence that the proposed project will require the construction of new electrical generating facilities. Therefore, the project's impact on energy supply would be less than significant.

The 1994 LRDP EIR noted that existing major distribution systems on the campus would not provide adequate capacity for future energy needs of development addressed in the 1994 LRDP. Discussions between campus energy personnel and PG&E confirm that if additional major distribution systems (i.e. substations, high-power transmission lines, power generation facilities) are required for buildout, installation of such service systems is feasible given the proximity of the main PG&E electrical and gas lines (UC Davis 1994b). The campus is in the process of upgrading distribution systems in phases.

It is proposed that the JAX West project would be operational by winter 2001-2002, at which time full electrical service would be required. Building power would be required in about July 2001, for testing and commissioning. Although power to the West Campus currently is not sufficient to serve the project, the first component of the new EI2B project (described under Environmental Setting, above) will be completed in time to provide the West Campus with electrical supply sufficient to serve the JAX West project. These improvements would increase electrical capacity on campus to 60,000 kVA, which would be sufficient to meet the needs of the proposed project. In the event that EI2B project is not constructed in time for the proposed project, the campus backup feeder would be used to serve the proposed project.

Service would be provided to the new building from an existing pole just north of the proposed building. Construction of utility lines has the potential to disturb land-based resources, such as biological and cultural resources. However, the entire West Campus Enterprise Reserve, including the project site, previously was assessed with respect to biological and cultural resources, and no significant resources were found to be present on the project site (UC Davis 1998a). Elderberry bushes located near the Bee House would be avoided consistent with USFWS Guidelines for the Valley Elderberry Longhorn Beetle. The Initial Study for the current project (Appendix A) determined that, with the incorporation of mitigation measures established by the 1994 LRDP EIR, the project would result in no significant impacts to biological or cultural resources. Since utilities construction would be confined to those areas previously assessed, including the project site and existing roadways, utility connections also would not result in any significant impacts to these resources. Potential short term construction-related impacts to air quality, biological resources, water quality, geology and soils, and cultural resources have been addressed in the Tiered Initial Study (Items 6, 8, 9, 10, and 12) and by implementation of the previously approved 1994 LRDP EIR mitigation measures. As a result, this impact is considered *less than significant*.

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

Mitigation Measures

No mitigation required.

3.2-4 Development of the proposed JAX West project would increase the demand for natural gas and related service systems. However, a new pipeline would be constructed to serve the project. This is considered a *less-than-significant* impact.

Natural gas capacity on the West Campus currently is not sufficient to serve the JAX West project. As described in the Environmental Setting above, the campus or PG&E would construct a new natural gas pipeline to serve the project.

Work on the new natural gas pipeline would require some trenching off-site in agricultural land or along existing roads and has the potential to disturb land-based resources, such as biological and cultural resources. However, no significant resources are known to be located along the proposed alignment. Potential short-term construction-related impacts to air quality, biological resources, water quality, geology and soils, and cultural resources and by implementation of the previously approved 1994 LRDP EIR mitigation measures. The impacts from pipeline construction would be *less than significant*.

Mitigation Measures

No mitigation required.

3.2-5 Development of the JAX West project would result in a direct increase in demand for telecommunication services on campus. Telecommunication improvements will be in place to serve the proposed project. This is considered a *less-than-significant* impact.

The JAX West project ultimately would require about 100 phone and data lines. The project would be functional with fewer connections in its early stages, and might be able to share voice/data connections initially.

The telecommunications system that serves the West Campus currently is at capacity. All existing telecommunications facilities in the area are dedicated to existing and approved future projects. The closest Telephone Service Point, on Hopkins Road at Bee Biology Lane, is at capacity. The campus has commissioned a study of alternative means of ensuring adequate telecommunications service to the project vicinity. Master planning for the entire West Campus Enterprise Reserve is under discussion.

A major upgrade to the campus telecommunications system, UCD Net 2, has been approved. This project will provide significant upgraded capacity to the campus, including adequate capacity on the West Campus to serve JAX West and other proposed facilities. Therefore, in the long term there would be adequate telecommunications service to the proposed project. Once UCD Net 2 is on line, the project would connect to this system for voice connections as needed, and to upgrade networking capacity. A short connector from near the northeast corner of the proposed facility to an existing pole near the southwest corner of the facility would link the project into the telecommunications system. However, the UCD Net2 project will not be complete until Fall, 2002. In the interim, temporary service would be provided to the project via the existing system (O'Hearn 2000).

Local connections to the campus-wide distribution system could require some off-site trenching along Hopkins Road. Potential short term construction-related impacts to air quality, biological

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

resources, water quality, geology and soils, and cultural resources have been addressed in the Tiered Initial Study (Items 6, 8, 9, 10, and 12) for this project, and by implementation of the previously approved 1994 LRDP EIR mitigation measures. Elderberry bushes near the Bee House would be avoided consistent with the USFWS guidelines for the Valley Elderberry Longhorn Beetle. Impacts related to telecommunications connections are considered *less than significant*.

Mitigation Measures

No mitigation required.

Cumulative Impacts and Mitigation Measures

3.2-6 Cumulative development in the Davis area, including development of the proposed project in conjunction with development included in 1994 LRDP EIR as amended, would result in increased demand for use of electricity and related service systems. This is considered a *less-than-significant* impact.

Total demand for electricity with buildout of the 1994 LRDP would be approximately 55.7 million kWh/yr, including the proposed project. As discussed on page 4.15-4 of the 1994 LRDP DEIR, to reduce energy consumption, the campus implements established policies and complies with state standards (Title 20 and 24) for energy conservation and all new buildings incorporate standard energy conservation measures. In addition, the City of Davis General Plan includes energy conservation policies to help reduce excess use of energy in all types of development in the City. As described in the Environmental Setting, UC Davis is renegotiating its contract with WAPA for supply of electricity from 2004 through 2024. There is current uncertainty with respect to the cost and/or supply of electricity, throughout California. However, there is no evidence at this time that the cumulative development at UC Davis will contribute to the need for construction of new electrical generation facilities. Therefore, this cumulative impact is considered *less than significant*. It should be noted that the California Energy Commission conducts environmental review of all proposed power plants in the state and prepares a CEQA-equivalent document that analyzes and discloses environmental impacts from the construction and operation of new power plants, and imposes mitigation measures as conditions of project approval to address significant impacts.

3.2-7 Cumulative development related to the implementation of the 1994 LRDP, including the proposed project, and other development in the region would result in an increase in the consumption of domestic water. The capacity of the deep aquifer that provides domestic water to the campus and the region is unknown. Consistent with the findings of the 1994 LRDP, the proposed project would contribute to, but would not exceed, the *significant and unavoidable* cumulative impact previously identified in the 1994 LRDP EIR.

Domestic water would be used for the laboratory and for irrigation, with backflow preventers on irrigation lines. The proposed project would be connected to water lines in Hopkins Road and in a service road immediately north of the project site via connectors along the south, east and north perimeters of the facility. Construction of utility connectors has the potential to disturb land-based resources, such as biological and cultural resources. However, the entire West Campus Enterprise Reserve, including the project site, previously was assessed with respect to biological

SECTION THREE Environmental Setting, Impacts, and Mitigation Measures

and cultural resources, and no significant resources were found to be present on the project site (UC Davis 1998a). Since utilities construction would be confined to those areas previously assessed, including the project site and existing roadways, utility connections also would not result in any significant impacts to these resources. Since the capacity of the deep aquifer which supplies domestic water is unknown, the impact of project demands upon that aquifer cannot be assessed adequately. Water conservation measures, required for all campus facilities to reduce demand as much as possible, would be utilized in the construction and operation of the JAX West project. The 1994 LRDP EIR nonetheless determined that demands upon the deep aquifer represent a *significant unavoidable* impact.

Mitigation Measures

The 1994 LRDP EIR Mitigation Measures 4.14-1(a) would be implemented to reduce the magnitude of the impact to the deep water aquifer.

4.14-1(a) *The Campus shall ensure that each project is designed to include the following domestic water conservation measures.*

- (i) *Low flow shower heads (2.0 gpm or less) shall be installed in all new showers.*
- (ii) *Toilets with low-water-use flush devices (with average savings of 1 gallon per flush) shall be installed in all new facilities and existing facilities should be retrofitted at a pace at least equal to new development.*

The implementation of these measures would conserve water and reduce potential impacts of the project to a less-than-significant level, but the cumulative impact would nonetheless remain *significant and unavoidable*.

3.2-8 Cumulative development in the PG&E service area, including development of the proposed project in conjunction with the development included in 1994 LRDP EIR as amended, would result in increased demand for use of natural gas and related service systems. This is considered a *less-than-significant* impact.

Total demand for natural gas with buildout of the 1994 LRDP, including the proposed project, would be approximately 1.98 million therms/yr. In addition, as described on page 4.15-6 of the 1994 LRDP DEIR, PG&E indicates that it has the ability to provide the additional natural gas needs of future development in the service area (including service systems). Therefore, adequate capacity exists to meet cumulative demand and the impact is considered *less than significant*.

3.2-9 Development of the proposed project, in conjunction with the development included in the 1994 LRDP EIR as amended, would result in increased demand for telecommunication services on campus. This is considered a *less-than-significant* impact.

Buildout of the 1994 LRDP, including the proposed Jackson Laboratory Facility, would result in an increase in demand for telecommunication services on campus. It is anticipated that the UC Davis Communications Resources Service would coordinate with the Office of the Architect and Engineers to assure that the design and installation of the telecommunications systems will be in accordance with established standards. UCD Net 2, soon to be constructed, will meet anticipated needs. Therefore, adequate telecommunication service would be provided and the impact is considered *less than significant*.

4.1 GROWTH INDUCEMENT

As required by CEQA, an EIR must discuss the ways in which the proposed project could directly or indirectly foster economic or population growth or the construction of additional housing and how that growth could, in turn, affect the environment. Growth can be induced in a number of ways, including eliminating obstacles to growth and stimulating economic activity outside of the project. CEQA Guidelines also note that it must not be assumed that growth is necessarily beneficial, detrimental, or of little significance.

The proposed project involves the construction and operation of a new JAX West project, which would breed and house mice for use in research at UC Davis and by other researchers throughout the western United States. The proposed project would add gross square feet (about 81,123 assignable square feet) of space to the campus and would increase campus employment by approximately 131 employees. In addition, the proposed project would result in the expansion of campus utility distribution systems to serve not only the project but also the planned development on the West Campus. This increase in employee population and potential growth in campus service systems was anticipated in the 1994 LRDP, and the impact of this growth was fully evaluated in the 1994 LRDP EIR as amended and in the Major Capital Improvement Projects EIR. For a more detailed discussion of growth inducing impacts, please see Chapter 5.1 of the 1994 LRDP EIR. The project would not directly or indirectly result in growth other than that described above.

4.2 SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACTS

CEQA requires that an EIR identify any significant impacts that cannot be reduced to a less-than-significant level through mitigation. All significant project-level impacts can be mitigated to a less-than-significant level.

As described in the project Initial Study, the proposed project would contribute to, but not exceed, cumulative impacts previously identified as significant and unavoidable in the 1994 LRDP EIR. These significant and unavoidable cumulative impacts were analyzed adequately in the 1994 LRDP EIR and fully addressed in the Finding and Statement of Overriding Considerations adopted by The Regents in connection with its approval of the 1994 LRDP. The project would contribute to significant and unavoidable cumulative impacts with respect to the loss of prime farmland (Initial Study Section 2); impacts on the future transportation network (Initial Study Section 4) due to development planned under the 1994 LRDP; and regional impacts on biological resources (Initial Study Section 8) that would result from the development planned under the 1994 LRDP and from the projected development in the Davis region. The proposed project would contribute to significant and unavoidable cumulative impacts related to air quality (Initial Study Section 6) and hazards and hazardous materials (Initial Study Section 7; this document Section 3.1). These impacts were fully analyzed in the 1994 LRDP EIR and were found to be significant and unavoidable because the feasibility and/or implementation of the mitigation measures were within the jurisdiction of other entities to enforce and monitor and the University of California could not guarantee the implementation of the mitigation measures. The project's contribution to cumulative hazards and hazardous materials impacts would not be cumulatively considerable with implementation of 1994 LRDP mitigation measures, and the project's contribution is considered to be de minimis because the environmental conditions

would be the same with and without the project. The proposed project would contribute to a significant and unavoidable cumulative regional impact with respect to toxic air contaminants from mobile and stationary sources on campus and the Davis area (Initial Study Section 6). This impact was fully addressed in the 1994 LRDP EIR and was found to be significant and unavoidable because inadequate methods exist to assess the magnitude of this impact. The project would also contribute to significant and unavoidable cumulative regional impacts to the deep aquifer (Initial Study Section 9 and this document Section 3.2.2). This impact was fully addressed in the LRDP EIR and found to be significant and unavoidable because the capacity of the deep aquifer is unknown.

4.3 IRREVERSIBLE ENVIRONMENTAL CHANGES

CEQA Guidelines require that an EIR discuss the extent to which a project, during its initial or continued phases (i.e., construction and operations), would commit nonrenewable resources to uses that future generations would be unable to reverse. In this regard, the proposed project would commit about 6 acres of agricultural land to the proposed use. It is unlikely that once the proposed use is established the land would be changed to another use or revert back to agricultural use. The 1994 LRDP EIR acknowledged the loss of prime farmland as a significant unavoidable impact of campus buildout. The site provides foraging habitat for the Swainson's hawk and other avian species, and the implementation of the project would remove approximately 6 acres of this foraging habitat. The removal of this habitat was anticipated in the 1994 LRDP EIR (Impact 4.7-5, as amended). The 1994 LRDP EIR identified Mitigation Measures 4.7-5 and 4.7-9(a) to reduce impact on foraging habitat from the conversion of agricultural lands and annual/ruderal grasslands to other uses. Mitigation measures implemented as part of the 1994 LRDP EIR would minimize impacts on these biological resources.

Implementation of the proposed project would result in an irreversible commitment of energy resources, primarily in the form of fossil fuels, including fuel oil, natural gas, and gasoline for automobiles and construction equipment. The consumption or destruction of other non-renewable resources would also result during construction and operation of the proposed development. These resources include, but are not limited to, lumber, sand, gravel, asphalt, metals, and water. An increased commitment of public services would also result from project implementation such as domestic and utility water, wastewater, storm drainage, electricity and natural gas, and telecommunication services. Irretrievable commitments of the above-named resources are considered justified to achieve the overall goals and objectives of the proposed project as discussed in Section 2.

CEQA requires an EIR to describe and evaluate a range of alternatives to the proposed project or alternatives to the location of the proposed project. The purpose of the alternatives analysis is to disclose other ways that the objectives of the proposed project could be attained while reducing or avoiding significant environmental impacts of the proposed project. This process is intended to foster informed decision-making and public participation in the environmental process.

Alternatives considered in the EIR should be feasible, and should attain most of the basic project objectives. The overall project objective is to provide a state-of-the-art facility that will ensure a reliable high quality supply of appropriately prepared research specimens for genetic research at UC Davis and other western United States research facilities. Both the University and The Jackson Laboratory have identified objectives for the project.

The objectives of the proposed project for UC Davis are to:

- Advance the University's capabilities and establish its leadership in mammalian genetic research, in support of its mission of teaching, research and public service, and of its Genomics Initiative;
- Ensure a reliable and stable long term supply of high-quality research mice for the growing genetic research programs of UC Davis;
- Contribute to attracting world-class scientists in mouse biology and genomics to the UC Davis campus; and
- Contribute to the University's initiative for the collaborative development of private and non-profit enterprises on campus, which enhance campus programs.

The objectives of the proposed project for The Jackson Laboratory are to:

- Establish a state-of-the-art western United States facility for the production of genetically standardized mice to supply to the research community in the western United States; and
- Support scientific collaboration among genetic researchers at JAX West and UC Davis.

5.1 RANGE OF ALTERNATIVES CONSIDERED

The range of alternatives studied in the EIR must be broad enough to permit a reasoned choice by decision makers when considering the merits of the project. The analysis should attempt to focus on alternatives that are feasible (i.e., capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors), and should avoid alternatives that are remote or speculative.

The alternatives analyzed for a project should focus on reducing or avoiding significant environmental impacts associated with the project as proposed. Applicable 1994 LRDP EIR mitigation measures are incorporated into and are considered part of the proposed project. As discussed in Section 3, potentially significant project-level impacts were identified with respect to utilities and service systems. The proposed project would increase demand for water from the deep aquifer (Impact 3.2-3), an impact that is considered significant and unavoidable. The project would also increase demand for telecommunication service on campus (Impact 3.2-6). Impacts with respect to other utilities were considered less than significant.

At the cumulative regional level, the proposed project would contribute to significant impacts on hazards and hazardous materials (Impacts 3.1-8 through 3.1-12). The project's contribution to most of the cumulative impacts would not be cumulatively considerable. The identification and evaluation of alternatives focuses on those alternatives that may reduce or avoid project-level impacts.

The analysis below presents the alternatives that were considered for this project. A No Project alternative was analyzed as required by CEQA Guidelines. Four "build" or "action" alternatives also were considered. Each build alternative was examined for its ability to meet project objectives with the purpose of analyzing only those alternatives that are feasible and meet the majority of the project objectives. Based on this review, two build alternatives were carried forward for environmental analysis. Two alternatives were not carried forward because they were not feasible or did not appear to meet most of the project objectives.

5.2 ALTERNATIVES CONSIDERED BUT REJECTED AS INFEASIBLE

This section presents a qualitative analysis of alternatives that were considered for the project but were rejected because they did not meet project objectives.

5.2.1 Construction of the Proposed Facility at an Alternate Location Off-Campus

Use of an off-campus location would meet one of the objectives of The Jackson Laboratory in that it would allow for the establishment of a western United States mouse preparation facility. Although it might improve the western United States supply of research specimens, such a facility would not contribute to the objective of supporting scientific collaboration among genetic researchers at UC Davis and The Jackson Laboratory. An off-campus location would not support directly any of the UC Davis project objectives. The prestige of UC Davis in the genetic research community would not be enhanced, nor would world-class scientists be drawn to the campus. The campus' research capabilities would not be enhanced, and the University would not be assured the production of a steady and reliable supply of high quality research specimens dedicated to UC Davis users. Further, there would be no contribution to the University's initiative for collaborative development in support of the Genomics Initiative. It was concluded that this alternative would not meet most of the project objectives, and the alternative therefore was rejected for further analysis.

5.2.2 Use of Alternative Research Techniques that would Reduce the Need for Mice

It has been suggested that alternative genetic research techniques should be investigated in order to reduce the need for animal experimentation. Currently, animal research plays a vital role in genetic research. Mice are particularly valuable in these studies, as they provide good models of the human genome. Human genetic research in general, and on the UC Davis campus in particular, depends critically on animal/human disease model research, which involves in large part the study of naturally occurring diseases in one species to examine comparable diseases in another species. In genetic research, the mouse serves as a model for the study of human genetically-related diseases including cancer, diabetes and obesity. Scientists have developed and continue to develop and use scientifically valid adjunctive or alternative methods to animal experimentation. As new techniques are developed in the future, it may be possible to reduce the

need for the use of animals; however, at present animal studies are the most effective means of conducting this research.

If the use of animals could be reduced, the proposed project could be reduced in size or eliminated. However, at present there is still a significant demand for genetically standardized mice for use in research. Alternative research techniques have not been developed sufficiently that the use of animals can be eliminated without detriment to existing on-going research programs. For this reason, this alternative is infeasible and it was not carried forward for further analysis.

5.3 ALTERNATIVES EVALUATED IN DETAIL

This section presents a qualitative evaluation of two alternatives to the project that are considered potentially feasible and that would meet some of the project objectives. The No Project alternative is also considered. For each alternative, a brief description is first presented followed by an impact analysis and a summary comparison with the proposed project.

5.3.1 Alternative 1: Construction of the Proposed Facility at an Alternate Location On Campus

5.3.1.1 Description of the Alternative

The use of an alternate site on campus was considered. A desirable site would include the following characteristics:

- Sufficient size (4 to 6 acres) to provide space for both the facility and associated parking;
- Compatible low density land uses on and adjacent to the site, consistent with LRDP planning;
- Would not impinge on existing or future programs planned for the location.

The Central Campus was rejected as a project location because it is designated primarily for higher density uses. A secure animal facility is not compatible with these uses or with planning for this part of the campus. The Enterprise Reserve south of Interstate 80 was also considered as a project site, but rejected because the area is not served by any utilities and service systems, and major extensions of most utility systems would be necessary to serve any project in that site. This site is also designated for higher density uses.

A preliminary analysis was made of an alternative project site in the Animal Resource Services Area of the South Campus. The proposed project could be constructed on an approximately 2.5-acre fenced site adjacent to Interstate 80 on the east side of Old Davis Road. If this site were used, the facility itself would cover almost the entire parcel, and it would be necessary to place parking on another site. All other aspects of the proposed project essentially would be unchanged.

5.3.1.2 Impact Analysis

Hazards and Hazardous Materials. Impacts related to hazardous chemicals, radioactive materials, biohazardous materials, hazardous waste and laboratory animal use would be

essentially the same as under the proposed project. All impacts would be less than significant due to implementation of 1994 LRDP EIR mitigation measures.

Utilities and Service Systems. This alternative would result in similar demands on the campus utility systems as the proposed project. Laboratory space and functions would be unchanged relative to the proposed project. Because the ARS is developed with other animal facilities, utilities (other than steam and chilled water) are available in the district. Short new connections would be necessary. Water, telecommunications and other resource capacity would be subject to the same limitations as for the proposed project.

5.3.1.1 Summary Comparison with the Proposed Project

This alternative would not reduce the less-than-significant impacts of the proposed project with respect to hazards and hazardous materials and utilities and service systems. Construction of the project at the Animal Resource Services site would address the majority of the project objectives. It would allow development of the collaborative facility, provide for scientific collaboration between UC Davis and The Jackson Laboratory, enhance the stature of UC Davis genetic research programs, attract researchers to the campus, and ensure a supply of suitably prepared high quality research specimens for genetic researchers on the western United States and at UC Davis. However, the proposed project would impinge upon existing programs were it to be sited in the Animal Resource Services District by using space currently dedicated to or planned for other uses. It also likely would require the conversion of Prime Farmland as well as redesignation of Research/Teaching Fields. The alternate site also would place the proposed collaborative venture outside a designated Enterprise Reserve. The alternative would not be environmentally superior to the proposed project.

5.3.2 Alternative 2: Construction of a Reduced Project at the Proposed Site

5.3.2.1 Description of the Alternative

This alternative would involve constructing a smaller version of the proposed project at the proposed site. This reduced alternative would be achieved through constructing the proposed structure with a smaller square footage of about 48,000 gross square feet. Laboratory and other support functions within the facility would be as proposed, but mice housing space and the number of mice housed would be reduced by about 60 percent in comparison to the proposed project. Required staff would be reduced to about 80. Associated parking could also be reduced, which would allow for use of a smaller site.

5.3.2.2 Impact Analysis

Hazards and Hazardous Materials. Impacts related to hazardous chemicals, radioactive materials, biohazardous materials, hazardous waste and laboratory animal use would be similar to the proposed project, although slightly smaller in scope. All impacts would be less than significant either due to implementation of 1994 LRDP EIR mitigation measures. The less-than significant impacts of the reduced project would be of slightly lesser magnitude than the less-than-significant impacts of the proposed project.

Utilities and Service Systems. This alternative would result in similar demands on the campus utility systems as the proposed project since the size reduction would be achieved primarily through reduction in the number of animals housed. Laboratory space and functions, which are the most demanding of utility resources, would be unchanged. Telecommunications and water capacity would be subject to the same limitations as for the proposed project. A new natural gas pipeline would be required to serve the reduced project, similar to the pipeline needed for the proposed project, and the impacts to utility systems would generally be the same as for the proposed project.

5.3.2.3 Summary Comparison with the Proposed Project

This alternative would slightly reduce the less-than-significant impacts of the proposed project with respect to hazards and hazardous materials, and to other resource areas discussed in the Initial Study. Construction of a reduced project would address the majority of the project objectives. It would allow development of the collaborative facility, provide for scientific collaboration between UC Davis and TJL, enhance the stature of UC Davis genetic research programs, attract researchers to the campus, and ensure a supply of suitably prepared high quality research specimens for genetic researchers in the western United States and at UC Davis. However, the reduced size of the facility would result in a reduced capacity for research specimens so that the supply might not be as abundant or reliable as would be desirable for western United States researchers. A smaller JAX West project also would have a reduced capacity to provide space dedicated to UC Davis uses, and might limit opportunities for scientific collaboration. The alternative would not achieve the project objective of providing an adequate supply of mice to western United States researchers. If this alternative were adopted, JAX might need to build an additional western United States facility, which would have additional, unknown environmental impacts.

5.3.3 Alternative 3: No Project Alternative

5.3.3.1 Description of the Alternative

As required by CEQA Guidelines, the No Project alternative is analyzed below. Under the No Project alternative, although the proposed facilities would not be built, campus researchers will nonetheless continue to have a need for a reliable high quality supply of appropriately prepared research specimens, and The Jackson Laboratory would continue to seek to establish a facility in the western United States to meet these demands.

Under the No Project alternative, it is likely that The Jackson Laboratory would abandon its collaboration with the UC Davis campus and seek a new facility off campus. The campus would meet its need for research specimens by purchasing them from the off-site facility, and would have the same status with respect to supply and to opportunities for collaboration as other Jackson Laboratory customers. Scientific collaboration between scientists at The Jackson Laboratory and UC Davis researchers likely would not occur if the project were not located on campus.

5.3.3.2 Impact Analysis

Hazards and Hazardous Materials. Because there would be no increase in laboratory space, this alternative would avoid related less-than-significant impacts of the proposed project with respect to hazardous materials use, hazardous waste generation, and laboratory animal use.

Utilities and Service Systems. This alternative would not result in any increased demand on campus utilities and service systems. Therefore, the No Project alternative would avoid the less-than-significant impacts to campus utilities and service systems that would result from the proposed project.

5.3.3.3 Summary Comparison with the Proposed Project

In contrast to the proposed project, this alternative would avoid all impacts of the proposed project. A number of project objectives would not be met or would be met only partially by the No Project alternative. The reliability of research specimen supply, the degree of collaboration between scientists, and the accrual of stature and attractiveness of the campus to genetic researchers would be reduced relative to the proposed project. There would be no collaborative expansion and relatively less support of the Genomics Initiative.

5.4 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

For the JAX West project, the No Project alternative is environmentally superior to all other alternatives because it avoids all impacts of the proposed project. However, CEQA requires identification in an EIR of an environmentally superior alternative besides the No Project Alternative.

Construction of the project at an alternative location (Alternative 1) would not reduce the impacts of the proposed project and further would require an amendment to the LRDP to allow for a change of land use. All other impacts of this alternative would be similar to the proposed project. The reduced project alternative (Alternative 2) would reduce less-than-significant impacts of the proposed project on hazards and hazardous materials and utilities and service systems. It is concluded that Alternative 2 is very slightly environmentally superior to the proposed project.

California Code of Regulations, Title 22, Division 4.5 *Environmental Health Standards for the Management of Hazardous Wastes*, Chapter 10, Article 2 (Definitions), Section 66260.10 -- Definitions.

DKS Associates. 2000. Technical Analysis of Cumulative Traffic Conditions. Prepared for UC Davis. May.

England, S.A. 2000. Facsimile from Dr. A. Sidney England of the Office of Resource Management and Planning to Brodie Hamilton dated April 4, 2000.

ESA, Inc. 1994. Written Correspondence to Sid England from Kathy Cuneo and Lisa Weber regarding Rare Status Plant Survey Results. June 20.

National Research Council. 1996. Guide for the Care and Use of Laboratory Animals. National Academy Press. Washington, D.C.

Newman, J. 2000. Personal communication with Jim Newman, Environmental Health and Safety. UC Davis. April 26, 2000.

Oatman, B. 2000a. Personal communication with Brain Oatman, Environmental Health and Safety. UC Davis. March 8, 2000.

Oatman, B. 2000b. Personal communication with Brain Oatman, Environmental Health and Safety. UC Davis. December 4, 2000.

O'Hearn, J. 2000. Personal communication with Jerry O'Hearn, UC Davis Architects and Engineers. UC Davis. September and December, 2000.

Pacific Legacy Inc. 1998. Archaeological Investigation for the Proposed West Campus Enterprise Reserve. Prepared for UC Davis Office of Planning and Research. March.

UC Davis. 1994a. UC Davis Long Range Development Plan: 1994-2005. Prepared by the Office of Resource Management and Planning. Davis, CA. September.

UC Davis. 1994b. UC Davis Long Range Development Plan: 1994-2005, Environmental Impact Report. Prepared by EIP Associates. Sacramento, CA. April.

UC Davis. 1996a. Wastewater Treatment Plant Replacement Project Draft Environmental Impact Report. Prepared by Jones & Stokes Associates, Inc. Sacramento, CA. October.

UC Davis. 1996b. Contained Research Facility Tiered Environmental Impact Report. Prepared by Environmental Sciences Associates. April.

UC Davis. 1996c. UC Davis Environmental Health and Safety Biosafety Manual. Davis, CA

UC Davis. 1998a. UC Davis 1997-98 Major Capital Improvement Projects Draft Environmental Impact Report. Prepared by EIP Associates. Sacramento, CA. March.

UC Davis. 1998b. Tiered Initial Study Center for the Arts Performance Hall and South Entry Roadway and Parking Improvements, University of California, Davis. Prepared by EIP Associates. Sacramento, CA. November.

UC Davis. 1999a. USDA Western Human Nutrition Research Center Update Health Risk Assessment of Air Emissions. Prepared by EIP Associates. Sacramento, CA. September.

UC Davis. 1999b. Tiered Initial Study USDA Western Nutrition Research Center, University of California, Davis. Prepared by EIP Associates. Sacramento, CA. October.

UC Davis. 1999c. Chemical Inventory Report for Yolo County. Prepared by UC Davis Environmental Health and Safety. December 28, 1999.

UC Davis. 2000a. Genome and Biomedical Sciences Facility. Draft Tiered Initial Study and Draft Focused Tiered EIR. Prepared for UC Davis Office of Resource Management and Planning by URS Greiner Woodward Clyde. Oakland.

UC Davis. 2000b. Veterinary Medicine Laboratory and Equine Athletic Performance Laboratory Facilities Focused Tier EIR. Prepared by URS Greiner Woodward-Clyde. July.

UC Davis. 2000c. Information from Environmental Health and Safety website at www.ehs.ucdavis.edu. "Radiation Producing Machines."

UC Davis. 2000d. March 2000 Infrastructure Update Presentation. Prepared by UC Davis Office of Architects and Engineers. Davis, CA. March.

UC Davis. 2000e. August 22 Utility Demand Form and Site Utility Estimate. Prepared by UC Davis Office of Architects and Engineers. Davis, CA. August.

UC Davis. 2000f. Information from Environmental Health and Safety website at www.ehs.ucdavis.edu. "Detoxification of Ethidium Bromide Solutions"

UC Davis 2000g. Information from UC Davis Veterinarian via fax to URS.

UC Davis Facility Services. n.d. UC Davis Project Planning Guide Electrical Improvements: Phase 2B Project.

U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and National Institutes of Health. 1993. Biosafety in Microbiological and Biomedical Laboratories.

7.1 REPORT PREPARERS

Shabnam Barati, Project Manager, URS, Oakland.

Sally Morgan, Senior Project Scientist, URS, Oakland.

Janet Frentzel, Senior Staff Scientist, URS, Oakland.

John Koehler, Senior Air Quality Specialist, URS, Oakland.

Joy Mashaal, Senior Staff Scientist, URS, Oakland.

Technical Studies

Pacific Legacy Inc., Archaeological Resource Surveys.

ESA, Inc., Rare Plant Surveys.

7.2 INDIVIDUALS CONSULTED

James Burns, Senior Engineer, UC Davis Communications Resources.

Tess Chandler, Project Manager Research Outreach, UC Davis.

Chuck Dawes, The Jackson Laboratory, Bar Harbor, Maine.

Sidney England, Environmental Planner, UC Davis.

Clayton Halliday, Project Manager, Architects and Engineers, UC Davis.

Dan Kermoyan, UC Davis, Environmental Health and Safety.

John Leonard, JPL Properties, Sacramento.

Jim Newman, UC Davis Environmental Health and Safety

Brian Oatman, UC Davis Environmental Health and Safety

Jerry O'Hearn, Assistant Director Design and Engineering, UC Davis Architects and Engineers

Appendix B
Guidelines For Laboratory Animal Care

INTRODUCTION

The scientific community has long recognized both a scientific and an ethical responsibility for the humane treatment of animals used in scientific research, and all who care for or use animals in education, research, and testing must assume responsibility for their general welfare. Scientists have developed, and should continue to develop and use, scientifically valid adjunctive or alternative methods to animal experimentation. However, when needed, proper care and humane treatment of animals used in education, research, and testing requires scientific and professional judgement, which is based on knowledge of the husbandry needs of each species and the special requirements of educational, research, and testing programs (NRC 1996).

To encourage optimal care for laboratory animals, various types of accreditation and professional societies have been created to provide a mechanism for peer evaluation of animal care programs by the scientific community. Humane treatment of laboratory animals, protection of personnel from hazards associated with the use of laboratory animals, and control of variables that could affect animal research adversely are among the principal objectives of these programs. These activities are not intended to limit the freedom of scientific inquiry or to limit the investigators' obligation to conduct experiments in accord with humane principles.

REGULATORY SETTING

Federal and state law specify standards for registration, record keeping, handling, care, treatment, and transportation of animals. They require research facilities to keep record of acquisitions, births, sales, deaths, disposals, and transportation of animals. In addition, annual reports must be filed that include the location of facilities and the numbers and types of animals that did or did not experience pain and distress.

The Animal Welfare Act, administered by the United States Department of Agriculture (USDA), applies to the transportation, purchase, sale, housing, care, handling, and treatment of vertebrate animals by carriers, persons, or organizations engaged in using animals for research or experimental purposes. Currently, rats and mice are excluded from USDA inspections implementing the Animal Welfare Act.

Regulators, agencies and professional organizations that guide and determine the appropriateness of animal care at campus facilities are provided in Table 3.3-1 of this DEIR. Most inspections that occur are closely connected to the funding of animal research itself. However, some of the most beneficial guidance can be provided by institutional policies or campus animal care committees that routinely interact with researchers. National Institutes of Health (NIH) recommendations for the responsibilities of such a committee include:

- Meeting at regular intervals, appropriate to program needs but not less than yearly
- Ensuring a mechanism exists to review the appropriateness of animal care
- Providing a written report, at least annually, to the responsible administrative official on the status of animal care
- Performing other functions to meet the needs of federal, state, and local regulations and policies.

GUIDE FOR THE CARE AND USE OF LABORATORY ANIMALS

The primary source for guidelines used by the agencies listed in Table 3.1-1 is the American Association for Accreditation of Laboratory Animal Care (AAALAC). Since its inception in 1965, AAALAC has been recognized by the NIH as a means of complying with NIH policies contained in the *Guide for the Care and Use of Laboratory Animals* by the National Research Council (NRC) (NRC 1996). AAALAC is a non-profit corporation directed by representatives of 31 scientific and professional organizations that are members of the corporation. The accreditation program is concerned with encouraging high standards for the care and use of laboratory animals including appropriate veterinary care, controlling research quality, and protecting the health of workers. A summary of issues addressed by the guide includes animal care concerns that are described as follows:

- **Laboratory Animal Husbandry** – A good husbandry program provides a system of housing and care that permits animals to grow, mature, reproduce and maintain good health. It includes a comfortable, escape-proof, dry, and clean housing system that takes care of animal biological needs, protects animals from known hazards, provides adequate activity for the species, and avoids unnecessary physical restraint. Housing should meet minimum space requirements, humidity, ventilation, illumination, temperature, and noise recommendations. Animals should receive adequate food, bedding, sanitation, waste disposal and vermin control attention in addition to emergency, weekend and holiday care.
- **Veterinary Care** – Adequate veterinary care consists of observing all animals daily to assess their health and welfare, using appropriate methods to prevent, control, diagnose and treat diseases and injuries, providing guidance to users regarding handling, immobilization, anesthesia, analgesia and euthanasia, and monitoring surgery programs and postsurgical care. Adequate identification and records on each animal is paramount to assuring quality care.
- **Physical Plant** – The physical condition and design of animal facilities determines the efficiency and economy of their operators. In addition to meeting applicable state and local building codes, animal facilities should be separate from personnel areas such as offices, conference room, and most laboratories. They should provide for special activities, quarantine, animal housing, personal hygiene and hazardous agents or service equipment. Corridors, doors, windows, floors, drains, walls, ceilings, power, storage, and sanitizing areas must meet construction guidelines.
- **Personnel Qualifications and Occupational Health** – Adequate number of full-time personnel technically qualified in animal care should be employed on staff.

Selected text from the guide regarding animal housing, research and teaching facilities, space recommendations, temperature and ventilation, and lighting and power is presented below.

Animal Housing, Research and Teaching Facilities

NRC policies indicate that animal enclosures be constructed with materials that balance the needs of the animal with the ability to provide for sanitation. They should have smooth, impervious surfaces with minimal ledges, angles, corners, and overlapping surfaces so that accumulation of dirt, debris, and moisture is reduced and satisfactory cleaning and disinfecting are possible. For sheltered or outdoor housing, such as barns, corrals and pastures, floors or ground-level surfaces should be covered with dirt, absorbent bedding, sand, gravel, grass or

similar materials that can be removed or replaced when that is needed to ensure appropriate sanitation. All enclosures should be constructed of durable materials that resist corrosion and withstand rough handling without chipping, cracking, or rusting. All enclosures should be kept in good repair to prevent escape of or injury to animals, promote physical comfort, and facilitate sanitation and servicing.

In general, for research and training facilities, space is required for:

- Animal housing, care, and sanitation
- Receipt, quarantine, and separation of animals
- Separation of species or isolation of individual projects when necessary
- Storage

Most multipurpose animal facilities also include the following:

- Specialized laboratories or space contiguous with or near animal-housing areas for such activities as surgery, intensive care, necropsy, radiography, preparation of special diets, experimental procedures, clinical treatment, and diagnostic laboratory procedures.
- Containment facilities or equipment, if hazardous biologic, physical, or chemical agents are to be used.
- Receiving and storage areas for food, bedding, pharmaceuticals, biologics, and supplies.
- Space for washing and sterilizing equipment and supplies and, depending on the volume of work, machines for washing cages, bottles, glassware, racks, and waste cans; a utility sink; an autoclave for equipment, food, and bedding; and separate areas for holding soiled and clean equipment.
- Space for storing wastes before incineration or removal.
- Space for cold storage or disposal of carcasses.
- Space for administrative and supervisory personnel, including space for training and education of staff.
- Showers, sinks, lockers, toilets, and break areas for personnel.
- Security features, such as card-key systems, electronic surveillance, and alarms.

Facilities for Sanitizing Materials

A dedicated, central area for sanitizing cages and ancillary equipment should be provided. Mechanical cage-washing equipment is generally needed and should be selected to match the types of caging and equipment used. Consideration should be given to such factors as:

- Location with respect to animal rooms and waste-disposal and storage areas.
- Ease of access, including doors of sufficient width to facilitate movement of equipment.
- Sufficient space for staging and maneuvering of equipment.
- Provision for safe bedding disposal and prewashing activities.

- Traffic flow that separates animals and equipment moving between clean and soiled areas.
- Insulation of walls and ceilings where necessary.
- Sound attenuation.
- Utilities, such as hot and cold water, steam, floor drains, and electric power.
- Ventilation, including installation of vents and provision for dissipation of steam and fumes from sanitizing processes.

Facilities for Aseptic Surgery

The design of a surgical facility should accommodate the species to be operated on and the complexity of the procedures to be performed (Hessler 1991; see also Appendix A, "Design and Construction of Animal Facilities" *in* NRC 1996). For most mice surgery, a facility may be small and simple, such as a dedicated space in a laboratory appropriately managed to minimize contamination from other activities in the room during surgery. The facility often becomes larger and more complex as the number of animals, the size of animals, or the complexity of procedures increases, for instance, large-volume mice procedures, the need for special restraint devices, hydraulic operating tables, and floor drains for farm-animal surgery, and procedures that require large surgical teams and support equipment and thus large space. The relationship of surgical facilities to diagnostic laboratories, radiology facilities, animal housing, staff offices, and so on should be considered in the overall context of the complexity of the surgical program. Surgical facilities should be sufficiently separate from other areas to minimize unnecessary traffic and decrease the potential for contamination (Humphreys 1993 *in* NRC 1996). Centralized facilities provide important advantages in cost savings in equipment, conservation of space and personnel resources, reduced transit of animals, and enhanced professional oversight of facilities and procedures.

For most surgical programs, functional components of aseptic surgery include surgical support, animal preparation, surgeon's scrub, operating room, and postoperative recovery areas. The areas that support those functions should be designed to minimize traffic flow and separate the related, nonsurgical activities from the surgical procedure in the operating room. The separation is best achieved by physical barriers (AORN 1982 *in* NRC 1996) but might also be achieved by distance between areas or by the timing of appropriate cleaning and disinfection between activities. The number of personnel and their level of activity have been shown to be directly related to the level of bacterial contamination and the incidence of postoperative wound infection (Fitzgerald 1979 *in* NRC 1996). Traffic in the operating room itself can be reduced by the installation of an observation window, a communication system (such as an intercom system), and judicious location of doors.

Control of contamination and ease of cleaning should be key considerations in the design of a surgical facility. The interior surfaces should be constructed of materials that are monolithic and impervious to moisture. Ventilation systems supplying filtered air at positive pressure can reduce the risk of postoperative infection (Ayscue 1986; Bartley 1993; Bourdillon 1946; Schonholtz 1976 *in* NRC 1996). Careful location of air supply and exhaust ducts and appropriate room-ventilation rates are also recommended to minimize contamination (Ayliffe 1991; Bartley 1993; Holton and Ridgway 1993; Humphreys 1993 *in* NRC 1996). To facilitate cleaning, the operating

rooms should have as little fixed equipment as possible (Schonholtz 1976; UFAW 1989 *in* NRC 1996 *in* NRC 1996). Other features of the operating room to consider include surgical lights to provide adequate illumination (Ayscue 1986 *in* NRC 1996), sufficient electric outlets for support equipment, and gas-scavenging capability.

The surgical-support area should be designed for washing and sterilizing instruments and for storing instruments and supplies. Autoclaves are commonly placed in this area. It is often desirable to have a large sink in the animal-preparation area to facilitate cleaning of the animal and the operative site. A dressing area should be provided for personnel to change into surgical attire; a multipurpose locker room can serve this function. There should be a scrub area for surgeons, equipped with foot, knee, or electric-eye surgical sinks (Knecht and others 1981 *in* NRC 1996). To minimize the potential for contamination of the surgical site by aerosols generated during scrubbing, the scrub area is usually outside the operating room.

A postoperative recovery area should provide the physical environment to support the needs of the animal during the period of anesthetic and immediate postsurgical recovery and should be so placed as to allow adequate observation of the animal during this period. The electric and mechanical requirements of monitoring and support equipment should be considered. The type of caging and support equipment will depend on the species and types of procedures but should be designed to be easily cleaned and to support physiologic functions, such as thermoregulation and respiration. Depending on the circumstances, a postoperative recovery area for farm animals might be modified or nonexistent in some field situations, but precautions should be taken to minimize risk of injury to recovering animals.

Storage Areas

Adequate space should be provided for storage of equipment, supplies, food, bedding, and refuse. Corridors used for passage of personnel or equipment are not appropriate storage areas. Storage space can be minimized when delivery is reliable and frequent. Bedding and food should be stored in a separate area in which materials that pose a risk of contamination from toxic or hazardous substances are not stored. Refuse-storage areas should be separated from other storage areas. Refrigerated storage, separated from other cold storage, is essential for storage of dead animals and animal-tissue waste; this storage area should be kept below 7°C (44.6°F) to reduce putrefaction of wastes and animal carcasses.

Space Recommendations

The NRC guide provides specific guidelines for the amount of space needed to house animals that is dependent on an animal's weight and height as well as other factors such as animal behavior. Space allocations should be reviewed and modified as necessary to address individual housing situations and animal needs (for example, for prenatal and postnatal care, obese animals, and group or individual housing). Such animal performance indices as health, reproduction, growth, behavior, activity, and use of space can be used to assess the adequacy of housing. At a minimum, an animal must have enough space to turn around and to express normal postural adjustments, must have ready access to food and water, and must have enough clean-bedded or unobstructed area to move and rest in. Space for group-housed animals should be based on individual species needs, behavior, compatibility of the animals, numbers of animals, and goals of the housing situation..

Temperature and Ventilation

Temperature and ventilation of housing facilities are also addressed in the NRC guidelines. Recommended temperatures are presented in Table B-1. The range of daily temperature fluctuations should be kept to a minimum to avoid repeated large demands on the animals' metabolic and behavioral processes to compensate for changes in the thermal environment. Relative humidity should also be controlled, but not nearly as narrowly as temperature; the acceptable range of relative humidity is 30 to 70%. The temperature ranges in Table B-1 might not apply to captive wild animals, wild animals maintained in their natural environment, or animals in outdoor enclosures that are given the opportunity to adapt by being exposed to seasonal changes in ambient conditions.

TABLE B-1
RECOMMENDED DRY-BULB TEMPERATURES
FOR COMMON LABORATORY ANIMALS

Animal	Temperature (°C)	Temperature (°F)
Mouse, rat, hamster, gerbil, guinea pig	18-26	64-79
Rabbit	16-22	61-72
Cat, dog, non-human primate	18-29	64-84
Farm animals, poultry	16-27	61-81

Source: NRC 1996

The purposes of ventilation are to supply adequate oxygen; remove thermal loads caused by animal respiration, lights, and equipment; dilute gaseous and particulate contaminants; adjust the moisture content of room air; and, where appropriate, create static-pressure differentials between adjoining spaces. Although a guideline of 10-15 fresh air changes per hour has been used for many years, the minimal ventilation rate for an animal enclosure should be calculated for a more accurate determination of the amount of ventilation required. The minimal required ventilation is determined by calculating the amount of cooling required (total cooling load) to control the heat load expected to be generated by the largest number of animals to be housed in the enclosure in question plus any heat expected to be produced by non-animal sources and heat transfer through room surfaces. The total-cooling-load calculation method can also be used for an animal space that has a fixed ventilation rate to determine the maximal number of animals (based on total animal mass) that can be housed in the space.

Heating ventilation and air-conditioning (HVAC) systems should be designed for reliability, ease of maintenance, and energy conservation. They should be able to meet requirements for animals as discussed above. A system should be capable of adjustments in dry-bulb temperatures of $\pm 1^{\circ}\text{C}$ ($\pm 2^{\circ}\text{F}$). Temperature is best regulated by having thermostatic control for each room. Use of a zonal control for multiple rooms can result in temperature variations between the "master-control" animal room and the other rooms in the zone because of differences in animal densities within the rooms and heat gain or loss in ventilation ducts and other surfaces within the zone.

Regular monitoring of the HVAC system is important and is best done at the individual-room level. Previously specified temperature and humidity ranges can be modified to meet special animal needs in circumstances in which all or most of the animal facility is designed exclusively

for acclimated species with similar requirements (for example, when animals are held in a sheltered or outdoor facility).

When extremes in external ambient conditions that are beyond design specifications occur, provisions should be in place to minimize the magnitude and duration of fluctuations in temperature and relative humidity outside the recommended ranges. Such measures can include partial redundancy, partial recycling of air, altered ventilation rates, or the use of auxiliary equipment. In the event of a partial HVAC system failure, systems should be designed to supply facility needs at a reduced level. It is essential that life-threatening heat accumulation or loss be prevented during mechanical failure. Totally redundant systems are seldom practical or necessary except under special circumstances (as in some biohazard areas). Temporary needs for ventilation of sheltered or outdoor facilities can usually be met with auxiliary equipment.

In some instances, high-efficiency particulate air (HEPA) filters are recommended for air supplied to animal-holding, procedural, and surgical facilities. Also, consideration should be given to the regulation of air-pressure differentials in surgical, procedural, housing, and service areas. For example, areas for quarantine, housing, and use of animals exposed to hazardous materials and for housing of non-human primates should be kept under relative negative pressure, whereas areas for surgery, for clean-equipment storage, and for housing of pathogen-free animals should be kept under relative positive pressure with clean air. Maintaining air-pressure differentials is not the principal or only method by which cross contamination is controlled and should not be relied on for containment. Few air-handling systems have the necessary controls or capacity to maintain pressure differentials across doors or similar structures when they are opened for even brief periods. Containment requires the use of biologic-safety cabinets and exhausted airlocks or other means. If re-circulated air is used, its quality and quantity should be in accord with recommendations provided. The type and efficiency of air treatment should be matched to the quantity and types of contaminants and to the risks that they pose.

Lighting and Power

Light can affect the physiology, morphology, and behavior of various animals (Brainard and others 1986; Erkert and Grober 1986; Newbold et al. 1991; Tucker et al. 1984 *in* NRC 1996). Potential photostressors include inappropriate photoperiod, photointensity, and spectral quality of the light (Stoskopf 1983 *in* NRC 1996). Numerous factors can affect animals' needs for light and should be considered when an appropriate illumination level is being established for an animal holding room. These include light intensity, duration of exposure, wavelength of light, light history of the animal, pigmentation of the animal, time of light exposure during the circadian cycle, body temperature, hormonal status, age, species, sex, and stock or strain of animal (Brainard 1989; Duncan and O'Steen 1985; O'Steen 1980; Saltarelli and Coppola 1979; Semple-Rowland and Dawson 1987; Wax 1977 *in* NRC 1996).

In general, lighting should be diffused throughout an animal holding area and provide sufficient illumination for the well-being of the animals and to allow good housekeeping practices, adequate inspection of animals-including the bottom-most cages in racks and safe working conditions for personnel. Recessed energy-efficient fluorescent lights are most commonly used in animal facilities. Light bulbs or fixtures should be equipped with protective covers to ensure the safety of the animals and personnel.

Light in animal holding rooms should provide for adequate vision and for neuroendocrine regulation of diurnal and circadian cycles (Brainard 1989 *in* NRC 1996). Photoperiod is a critical regulator of reproductive behavior in many species of animals (Brainard and others 1986; Cherry 1987 *in* NRC 1996) and can also alter body-weight gain and feed intake (Tucker et al. 1984 *in* NRC 1996). Inadvertent light exposure during the dark cycle should be minimized or avoided. Because some species will not eat in low light or darkness, such illumination schedules should be limited to a duration that will not compromise the well being of the animals. A time-controlled lighting system should be used to ensure a regular diurnal cycle, and timer performance and timer-overriding systems should be checked periodically to ensure proper cycling.

The electric system should be safe and provide appropriate lighting, a sufficient number of power outlets, and suitable amperage for specialized equipment. In the event of power failure, an alternative or emergency power supply should be available to maintain critical services (for example, the HVAC system) or support functions (for example, freezers, ventilated racks, and isolators) in animal rooms, operating suites, and other essential areas. Light fixtures, timers, switches, and outlets should be properly sealed to prevent vermin from living there. Moisture-resistant switches and outlets and ground-fault interrupters should be used in areas with high water use, such as cage-washing areas and aquarium-maintenance areas.