4.13 UTILITIES AND SERVICE SYSTEMS

This chapter evaluates the potential physical and environmental effects resulting from implementation of the 2020 LRDP and development of the Chang-Lin Tien Center for East Asian Studies related to water supply and distribution, wastewater collection and treatment, stormwater, steam heating, solid waste, and electricity and natural gas.

During the scoping period for this EIR, comments related to utilities and service systems focused on the potential impacts that 2020 LRDP development could have on the capacity of sewer, storm drainage and other service systems. These issues are addressed in this chapter.

4.13.1 WATER

4.13.1.1 ANALYTICAL METHODS

Potential impacts of the 2020 LRDP and Tien Center were assessed by determining utility demand factors appropriate for the proposed project and comparing anticipated utility requirements with existing and future planned capacity, considering any upgrading of systems that may be approved or in progress.

4.13.1.2 REGULATORY FRAMEWORK

Planning for water supply and distribution is regulated at the State level by Senate Bill (SB) 610, which is codified as Sections 10910-10915 of the California Public Resources Code. SB 610 requires local water providers to conduct a water supply assessment for projects proposing over 500 housing units or equivalent usage. Additionally, the local water supplier must prepare an Urban Water Management Plan to guide planning and development in the water supplier's service area.

4.13.1.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local land use regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policies of the Cities of Berkeley and Oakland related to utilities and service systems.

BERKELEY GENERAL PLAN

Berkeley General Plan policies related to water conservation and water supply include EM-26, to promote water conservation through drought tolerant landscaping and low flow irrigation systems and through consideration of an East Bay Municipal Utility District (EBMUD) recycled water project to make gray water available for irrigation and other non-potable uses; and EM-28 to restore a fresh water supply to creeks and the bay by eliminating conditions that pollute rainwater, reducing impervious surfaces and encouraging swales, cisterns and other devices that increase infiltration and replenish underground water supplies that nourish creeks.[1]

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The Berkeley General Plan EIR found the implementation of the General Plan would not require substantial extension or reconstruction of major water and wastewater lines to serve new development. A potentially significant impact regarding demand for water beyond the planned EBMUD water supply was identified for policies encouraging

increased commercial development and residential population in areas in the downtown, higher density housing and commercial development in commercial and mixed use districts and along transit corridors, and additional University housing.

Mitigation for this impact was the adoption and implementation of a recycled water ordinance. Although the city as a whole receives an adequate water supply from EBMUD, the ability to feed water from the central main to smaller mains and to hydrants has been determined by the city to require improvement.[2]

OAKLAND GENERAL PLAN

The Oakland General Plan contains policies that require use of drought-tolerant plants; promote the use of reclaimed water; encourage coordination between the city and EBMUD on water recycling and on public education about water conservation; encourage development patterns that are less water-consumptive; and require adequate existing or planned infrastructure as a condition of development approval.[3]

4.13.1.4 EXISTING SETTING

Water supply and distribution to much of Alameda and Contra Costa County is provided by EBMUD. The EBMUD water supply system consists of a network of reservoirs, aqueducts, treatment plants, and distribution facilities that extends from its principal water source, the Mokelumne River Basin in the Sierra Nevada range, to the East Bay. Untreated water from Pardee Reservoir is transported 91.5 miles to the East Bay treatment plants or terminal reservoirs through the Pardee Tunnel, the Mokelumne aqueducts, and the Lafayette aqueducts. The EBMUD system extends from Crockett in the north to Hayward in the south and Walnut Creek and San Ramon in the east.[4]

UC Berkeley is located within EBMUD's Berryman, Stonewall and Summit pressure zones with service elevation ranges of 200 to 400 feet, 400 to 500 feet and 500 to 700 feet, respectively.[5] There are nine major connecting points to the campus distribution system with metering and back flow prevention devices. There are also approximately 50 smaller connections to individual campus buildings, each with a separate meter.[6]

On average, 95 percent of the water used by EBMUD comes from the 577-square-mile protected watershed of the Mokelumne River, which collects melted snows of Alpine, Amador and Calaveras counties. The watershed is located on the west slope of the Sierra Nevada and is generally contained within national forests, EBMUD-owned lands, or other undeveloped lands with minimal human activity. EBMUD has water rights and facilities to divert up to a daily maximum of 325 million gallons per day (mgd) from the Mokelumne River, subject to the availability of Mokelumne River runoff and the prior water rights of other users.[7] In 2000, the entire EBMUD system had an average daily consumption of approximately 186.8 mgd,[8] of which 1.3 mgd, or 0.7 percent, represents water use on the Campus Park. [9]

The campus is served by two water supply systems: the East System and the Central Campus system. The Central Campus system serves water to the area bounded by Bancroft, Oxford, Hearst Avenues and Gayley Road and is fed by six EBMUD stations, three on the east side of campus and three on the west side. The East Campus system is located east of Memorial Stadium, where two of three metering backflow stations are shared with Lawrence Berkeley National Laboratory (LBNL).

Under a series of State-funded water distribution system upgrades in the 1990s, UC Berkeley has replaced and upgraded water mains and increased inter-connectivity to improve reliability and redundancy.[10]

CAMPUS PARK

EBMUD supplies water to the University-owned distribution system from its supply lines and meters along the periphery of the Campus Park. A 20-inch diameter EBMUD water main runs along Hearst Avenue, Gayley Road, Piedmont Avenue and Bancroft Way. A 48-inch diameter water main runs west under Hearst Avenue and Bancroft Way, and south along Oxford Street.[11]

The University owns, operates and maintains the distribution system that carries water from EBMUD's mains at the boundaries of the Campus Park to campus facilities. Water lines ranging in diameter from 2 to 12 inches are located throughout the Campus Park.[12] In general, UC Berkeley's water distribution system provides adequate and reliable water distribution to campus irrigation and building supply needs.[13]

HILL CAMPUS

UC Berkeley maintains the water lines in the Hill Campus. Existing line sizes and pressure are sufficient for current water usage. Part of the Hill Campus water system provides redundancy to the LBNL system.[14]

ADJACENT BLOCKS, SOUTHSIDE AND THE CITY OF BERKELEY

The City of Berkeley owns and maintains the distribution lines in the Adjacent Blocks, Southside, and the Berkeley portion of the LRDP Housing Zone.

CITY OF OAKLAND

The areas within the Oakland portion of the LRDP Housing Zone are all urban sites zoned for multi-unit housing with infrastructure to serve residential demand. Many of Oakland's water mains are 8 inches or less in diameter and are quite old. Most of the water delivery lines serving the LRDP Housing Zone in Oakland were constructed in the 1920s and 1930s. Storage capacity is generally adequate in the area.[15]

4.13.1.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on water supply and distribution was determined based on the following standards:

Standard: ***Would the project exceed the capacity of existing and planned water entitlements and resources?***

Standard: ***Would the project require or result in the construction of new or expansion of existing water facilities, the construction of which could cause significant adverse effects?***

4.13.1.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECT REVIEW

2020 LRDP

Review of individual projects under the 2020 LRDP would influence water use by guiding the location, scale, form and design of new University projects. Two of the Objectives described in Chapter 3.1 are particularly relevant to water use:

- **Provide the space, technology, and infrastructure we require to excel in education, research and public service.**
- **Plan every new project as a model of resource conservation and stewardship.**

The 2020 LRDP also includes more specific policies that would contribute to minimizing new water demand. Under the 2020 LRDP, UC Berkeley would design future projects to minimize energy and water consumption and wastewater production; design new buildings to a standard equivalent to LEED 2.1 certification and LABS 21 environmental performance criteria; and base capital investment decisions on life cycle costs. This last policy would help minimize water consumption by ensuring a more balanced consideration of initial and ongoing costs of buildings and infrastructure, and thus encourage investment in conservation technology.

CAMPUS POLICIES AND PROCEDURES

WATER SUPPLY REVIEW. Whenever UC Berkeley is in preliminary project design for a new development, the Physical Plant/Campus Services' Engineering and Utilities Department staff reviews each project to determine if the existing water supply is adequate at the point of connection. If water supply is judged inadequate, UC Berkeley upgrades the system to provide adequate water flow and pressure to the project site before or as part of the project.

WATER CONSERVATION PROGRAMS. The implementation of a number of campus water conservation programs has resulted in a net decrease in water use on the central campus from 1.8 million gpd in 1980 to 1.2 million gpd in 2001, a reduction of 33 percent, despite expanded development. These programs range from plumbing fixture retrofits in existing buildings and high efficiency fixtures in all new construction to monitoring programs that improve efficiency and provide early detection of system malfunction.

Beginning in the mid 1980s, UC Berkeley began installing efficient plumbing fixtures to replace existing high volume units when restrooms were upgraded as part of seismic or other major retrofit programs. Replacement lab buildings or major retrofits of existing lab buildings typically eliminated wasteful once-through cooling systems, replacing them with highly efficient recirculating systems. Also, in accordance with current building standards, all new campus buildings contain low-flow plumbing fixtures.

A small number of Campus Park building water meters are being replaced each year as part of on-going maintenance work. As funds permit, the campus plans to implement real time monitoring of meters via the campus energy management system: this would allow the University to detect water leaks and malfunctioning plumbing fixtures, enabling more rapid repair and reduced water use. Housing and dining services facilities and fixtures have also been retrofit: replacement of 35 spray nozzles in campus dining facilities allowed an estimated savings of as much as 300 gallons per day (gpd) per nozzle.[16]

TABLE 4.13-1 PROJECTED WATER DEMAND	2020 LRDP Max Net Addl	Demand Factor (gpd)	Projected Addl Demand (gpd)
Academic & Support: Labs (gsf)	700,000	0.32	224,000
Academic & Support: Other (gsf)	1,500,000	0.03	45,000
Residential: Student (beds)	2,500	50	125,000
Residential: Faculty/Staff (units)	200	153	30,600
Total Addl Water Demand (gpd)			**424,600**

Virtually the entire campus irrigation system has been automated. Since the mid 1980s, the University has upgraded irrigation by installing automated controllers with repetitive cycles and low volume heads, both of which reduce consumption and runoff waste. Recently the campus has connected about one-third of all campus irrigation to the SCADA (Supervisory Control and Data Acquisition) system that monitors environmental conditions to improve irrigation efficiency. Centralized control allows rapid reprogramming of many circuits to adapt to leaks or other system failure. SCADA controlled irrigation continues to be installed on a project-by-project basis. As funds permit, the system will be enhanced to also enable monitoring of soil moisture.

4.13.1.7 2020 LRDP IMPACTS

This section describes the potential water supply and distribution impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact USS-1.1: Implementation of the 2020 LRDP would increase water demand, but this increase is not anticipated to result in a significant impact on water entitlements and resources, nor result in construction of new or altered facilities.

According to EBMUD, water demand in the EBMUD service area will total 277 mgd in 2020. As noted above, EBMUD's entitlement for the Mokelumne River is 325 mgd.[17] Implementation of the 2020 LRDP would increase water demand by 424,600 gpd. This additional LRDP-related growth would require 0.13 percent of the total EBMUD entitlement, and would represent an increase of only 0.15 percent of EBMUD's predicted demand for 2020. The portion of water demand attributable to the 2020 LRDP is minimal and thus creates a *less than significant* impact on the overall water demand.

EBMUD conducted a water supply assessment of the 2020 LRDP in January 2004. EBMUD indicated that, based on extensive forecasting in its water supply management program as well as recent land used based demand forecasting, the projected water demand of 277 mgd can be reduced to 229 mgd with successful water recycling and conservation programs in place. The 2020 LRDP would not change the EBMUD 2020 demand projection.[18]

Although EBMUD has adequate water supply to meet the needs of anticipated future development during normal years, Mokelumne River water is not adequate to meet the 325 mgd entitlement during periods of drought. EBMUD is studying a groundwater project and other strategies to increase the water supply for drought years.[19]

While new Hill Campus development would largely occur in areas already served by the campus water distribution system,[20] provision of water service to new Hill Campus facilities may require increased system pressure. Existing facilities would be surveyed for the possibility of excessive leakage due to increased pressure, especially at pressure reducing valve stations.

UC Berkeley continues to explore system improvements and retrofit to reduce water consumption. The feasibility of providing recycled water for irrigation, with an on-site wastewater treatment plant is currently being explored with EBMUD.[21] This would further reduce new water supply demands of the 2020 LRDP by generating reclaimed and recycled waters for landscape irrigation or other non-potable uses.

While development on campus has increased, overall campus water usage has been reduced from 1.8 mgd in 1980 to 1.3 mgd in 2000 and 1.2 mgd in 2001, with proportional reductions in wastewater generation.[22] The campus water distribution system would be able to accommodate an increase in water demand to 1980 levels. With the additional demand projected as a result of the 2020 LRDP, water consumption would remain below 1980 levels.

> **Continuing Best Practice USS-1.1:** For campus development that increases water demand, UC Berkeley would continue to evaluate the size of existing distribution lines as well as pressure of the specific feed affected by development on a project-by-project basis, and necessary improvements would be incorporated into the scope of work for each project to maintain current service and performance levels. The design of the water distribution system, including fire flow, for new buildings would be coordinated among UC Berkeley staff, EBMUD, and the Berkeley Fire Department.

4.13.1.8 TIEN CENTER IMPACTS

The water demands generated by the Tien Center would fall within the water demands generated by the 2020 LRDP, which are described above. Thus no additional impact on water supply would occur beyond that already foreseen for the 2020 LRDP.

4.13.2 WASTEWATER

4.13.2.1 ANALYTICAL METHODS

Potential impacts of the 2020 LRDP and Tien Center were assessed by determining utility demand factors appropriate for the proposed project and comparing anticipated utility requirements with existing and future planned capacity, considering any upgrading of systems that may be approved or in progress.

4.13.2.2 REGULATORY FRAMEWORK

Wastewater discharge is regulated under the National Pollutant Discharge Elimination System (NPDES) permit program for direct discharges into receiving waters and by the National Pretreatment Program for indirect discharges to a sewage treatment plant. Campus wastewater is treated by EBMUD which has an NPDES Direct Discharge permit to discharge treated wastewater into the San Francisco Bay. Under this permit, EBMUD imposes effluent guidelines and discharge limitations pursuant to the National

Pretreatment Program on the campus via the local EBMUD ordinance and by the EBMUD discharge permit issued to the campus.[23]

4.13.2.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local land use regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policies of the Cities of Berkeley and Oakland related to utilities and service systems.

BERKELEY GENERAL PLAN

Berkeley General Plan policies related to wastewater collection and treatment include EM-24, to protect and improve water quality by improving the citywide sewer system; and EM-28 to restore a fresh water supply to creeks and the bay by eliminating conditions that pollute rainwater, reducing impervious surfaces and encouraging swales, cisterns and other devices that increase infiltration and replenish underground water supplies that nourish creeks.[24]

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The Berkeley General Plan EIR estimated that combined residential and non-residential wastewater generation resulting from policies encouraging increased commercial development and residential population in the downtown, as well as higher density housing and commercial development in commercial and mixed use districts and along transit corridors, would result in approximately a 1.2 percent increase over the current average dry weather flow of 75 mgd to the wastewater treatment plant.[25]

The city's inflow/infiltration correction program, now underway, would allow for a base wastewater flow increase of up to 20 percent in each of the city's 89 sub-basins.[26] The Berkeley General Plan Final EIR found that the area bounded by the city boundary to the east, Virginia Street to the north, MLK Way to the west, and Dwight Way to the south could accommodate over 4,100 new jobs and 1,600 new housing units without generating a 20 percent increase in any single sewer sub-basin, based on a growth distribution scenario formulated for the EIR.[27] However the city cautions actual growth could be distributed among sub-basins differently than envisioned in the scenario.

OAKLAND GENERAL PLAN

The Oakland General Plan includes policies that encourage reduction of inflow/infiltration and require approval of development based on availability of existing or planned infrastructure.[28]

4.13.2.4 EXISTING SETTING

EBMUD provides wastewater collection for the entire 2020 LRDP area located in Alameda County, and provides wastewater treatment for all of the 2020 LRDP area. Sanitary sewage flows toward the San Francisco Bay through a network of pipes and mains that connect into the EBMUD regional interceptor line, which conveys the sewage south to the EBMUD Special District No. 1 (SD-1) Wastewater Treatment Plant, which then discharges the treated effluent into the Bay from a submerged outfall pipe under the Bay Bridge.[29]

The SD-1 plant presently has a dry weather flow treatment capacity of 168 mgd. Average dry-weather flows to the plant currently totals 77 mgd. This leaves 91 mgd or 54 percent surplus treatment capacity. Peak wet-weather capacity is 415 mgd. EBMUD has indicated that the SD-1 plant will continue operating at roughly 46 percent capacity through 2020.[30]

Within the City of Berkeley there are approximately 400 miles of sanitary sewer mains, which range in size from 6 to 48 inches, with an estimated 28,000 lateral connections. According to Henry Yee, City of Berkeley Wastewater Engineer, the Central Campus sewer sub-basin (17-012) was listed as one of the 49 sub-basins in the city requiring replacement/rehabilitation of 50 percent of the lateral lines.[31]

In 1990 the City of Berkeley agreed to upgrade its sewer system as required to serve development proposed by the Draft 1990 LRDP. UC Berkeley has paid more than $3 million to the city to support these improvements. Additionally, the University currently pays sewer hook up fees on bed spaces developed on blocks adjacent to the campus.

CAMPUS PARK

UC Berkeley owns and maintains its own sanitary sewer infrastructure serving the Campus Park. Sewer lines ranging from 4 to 15 inches in diameter run east to west throughout the Campus Park. The campus system includes a main trunk line for the Campus Park and Adjacent Blocks North, which passes north of Moffitt Undergraduate Library and runs to the west past the Campus Park entrance at West Gate near Oxford Street. UC Berkeley facilities adjacent to the Campus Park either feed into the University-owned system or connect directly to the city's system.[32]

In general, UC Berkeley's system capacity for average dry weather flows (ADWF) is adequate, although regular maintenance and repairs are required. Campus engineering studies have demonstrated that no capacity problems occur under existing or proposed future conditions for ADWF or three-hour peak flows.[33]

UC Berkeley's wastewater collection system has experienced its most significant design capacity problems during wet-weather wastewater flows. However, since 1990 extensive improvement programs have replaced sewer mains, including those between Evans Hall and the West Circle, reducing capacity constraints on campus. Major sanitary sewer trunk lines have been increased in size and relief sewers have been installed, particularly in the west segment of the campus where the lines converge to connect to the City of Berkeley sewer system.[34]

ADJACENT BLOCKS, SOUTHSIDE, AND THE CITY OF BERKELEY

Wastewater treatment for the Adjacent Blocks, Southside and the rest of the City of Berkeley is provided by EBMUD, with wastewater conveyance provided by the City of Berkeley. The sewer mains in the City of Berkeley range in age up to 100 years old. The system is currently undergoing renovation and replacement.[35] Existing ADWF for the City of Berkeley is approximately 75 mgd.[36] The ADWF from UC Berkeley is approximately 8.3 mgd, or about 11 percent of the city's flow.[37]

Stormwater infiltration and inflow (I/I) has created significant overflow problems for the Berkeley sewer system. During intense storms, stormwater can seep into the sewer

system through cracks and cross connections, increasing wet weather sewage flow up to 20 times the amount of dry weather flow due to the infiltration and inflow of storm water.[38] The I/I correction program, initiated by the city in late 1987, includes rehabilitation or replacement of 50 percent of the city's existing system over 30 years, as well as 12 miles of new relief sewer to accommodate overflow conditions by the year 2007.

By 1999, over 25 percent of planned replacement and rehabilitation had been completed and about 10 miles of the proposed 12 miles of new sewer lines had been installed. A 22-mile interceptor line along Adeline Street, completed in 1992, now conveys wet weather flow to EBMUD's storage and treatment facilities.[39]

HILL CAMPUS

UC Berkeley owns and maintains the sanitary sewer infrastructure serving the Hill Campus and connects to the City of Berkeley collection system at points along Stadium Rim Way.[40] Existing lines are sufficient for existing wastewater loads. However, since portions of the sanitary sewer lines in the Hill Campus flow to the Campus Park, capacity deficiencies on the Campus Park and City of Berkeley system could affect the Hill Campus' wastewater capacity.[41]

CITY OF OAKLAND

The City of Oakland collects wastewater from an area of about 39 square miles. This system then feeds into the EBMUD collection system. The majority of the pipes in the Oakland sewer system were put in place before 1938.[42] The city is currently rehabilitating the Adeline and 62nd Street area, upgrading from a 6-inch to an 8-inch line, as part of the city's 25-year public works improvement program.[43]

4.13.2.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on wastewater collection and treatment was determined based on the following standards:

Standard: ***Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitment?***

Standard: ***Would the project require or result in the construction of new or expansion of existing wastewater treatment facilities, the construction of which could cause significant adverse effect?***

Standard: ***Would the project exceed wastewater treatment requirements of the Regional Water Quality Control Board?***

4.13.2.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECT REVIEW

2020 LRDP

Review of individual projects under the 2020 LRDP would influence wastewater generation by guiding the location, scale, form and design of new University projects. Two of the Objectives described in Chapter 3.1 are particularly relevant to wastewater:

- **Provide the space, technology, and infrastructure we require to excel in education, research and public service.**
- **Plan every new project as a model of resource conservation and stewardship.**

The 2020 LRDP also includes more specific policies that would contribute to minimizing new demand for wastewater collection and treatment. Under the 2020 LRDP, UC Berkeley would design future projects to minimize energy and water consumption and wastewater production; design new buildings to a standard equivalent to LEED 2.1 certification and LABS 21 environmental performance criteria; and base capital investment decisions on life cycle costs. This last policy would help minimize wastewater production by ensuring a more balanced consideration of initial and ongoing costs of buildings and infrastructure, and thus encourage investment in conservation technology.

CAMPUS POLICIES AND PROCEDURES

WASTEWATER CAPACITY REVIEW. Whenever UC Berkeley develops a preliminary project design for a new development, the engineering and utilities unit of Facilities Services reviews the project to determine whether existing capacity of the sanitary sewer line at the point of connection is adequate. If the capacity of the sewer line is determined inadequate, the University upgrades the system to provide adequate service to the project site prior to occupation or operation.

Campus water conservation programs outlined in section 4.13.1.6 also influence wastewater collection and treatment by reducing the volume of wastewater generated.

WASTEWATER PERMITS. As described above, UC Berkeley complies with all provisions of its industrial wastewater permits issued with EBMUD's disposal permit. UC Berkeley will continue to obtain and comply with all provisions of wastewater permits required for 2020 LRDP-related development.

4.13.2.7 2020 LRDP IMPACTS

This section describes the potential wastewater collection and treatment impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact USS-2.1-a: Implementation of the 2020 LRDP may result in increased demand for wastewater treatment, but this increase is not anticipated to result in a significant impact on treatment capacity, nor result in construction of new or altered facilities.

LRDP Impact USS-2.1-b: Implementation of the 2020 LRDP may result in increased demand on wastewater collection systems and the construction of new or altered facilities, but these are not anticipated to have significant environmental impacts.

EBMUD's SD-1 plant, which receives effluent transported from its own collection lines as well as the Berkeley and Oakland collection systems, presently has 54 percent surplus treatment capacity. EBMUD estimates this surplus capacity will remain the same until

TABLE 4.13-2 PROJECTED WASTEWATER GENERATION	Projected Water Demand (gpd)	Wastewater Factor	Projected Wastewater (gpd)
Academic & Support: Labs (gsf)	224,000	90%	201,600
Academic & Support: Other (gsf)	45,000	80%	36,000
Residential: Student (beds)	125,000	95%	118,800
Residential: Faculty/Staff (units)	30,600	95%	29,100
Total Addl Wastewater Generation (gpd)			**385,500**
Total Addl Wastewater Generation (gpd) Minus Housing			**237,600**

2020.[44] Implementation of the 2020 LRDP will increase wastewater generation by 385,500 gpd, as shown in Table 4.13-2.[45] This increase represents just 0.2 percent of the total daily permitted wastewater flow of the SD-1 plant. The portion of wastewater generation attributable to the 2020 LRDP would result in a *less than significant* impact.

As described in the discussion of water supply and distribution, above, with anticipated 2020 LRDP development, water usage and wastewater generation will remain lower than volumes experienced in the 1980s. The wastewater generation due to the 2020 LRDP would represent an increase of under 5 percent in the current existing UC Berkeley flow of roughly 8.3 mgd, well within the 20 percent increase in capacity for each sub-basin projected in the Berkeley General Plan EIR.[46]

However, depending on where it is located, it is possible localized clusters of new development may exceed the capacity of individual sub-basins. The following Continuing Best Practices would continue to be implemented by UC Berkeley, to minimize possible collection capacity impacts:

> **Continuing Best Practice USS-2.1-a:** UC Berkeley will promote and expand the central energy management system (EMS), to tie building water meters into the system for flow monitoring.
>
> **Continuing Best Practice USS-2.1-b:** UC Berkeley will analyze water and sewer systems on a project-by-project basis to determine specific capacity considerations in the planning of any project proposed under the 2020 LRDP.
>
> **Continuing Best Practice USS-2.1-c:** UC Berkeley will continue and expand programs retrofitting plumbing in high-occupancy buildings, and seek funding for these programs from EBMUD or other outside agencies as appropriate.
>
> **Continuing Best Practice USS-2.1-d:** UC Berkeley will continue to incorporate specific water conservation measures into project design to reduce water consumption and wastewater generation. This could include the use of special air-flow aerators, water-saving shower heads, flush cycle reducers, low-volume toilets, drip irrigation systems, and the use of drought resistant plantings in landscaped areas.

Continuing Best Practice USS-2.1-e: The current agreement under which UC Berkeley makes payments to the City of Berkeley to help fund sewer improvements terminates at the conclusion of academic year 2005-2006 or upon approval of the 2020 LRDP.[47] Any future payments to service providers to help fund wastewater treatment or collection facilities would conform to Section 54999 of the California Government Code, including but not limited to the following provisions:

- Fees would be limited to the cost of capital construction or expansion.
- Fees would be imposed only after an agreement has been negotiated by the University and the service provider.
- The service provider must demonstrate the fee is nondiscriminatory: i.e. the fee must not exceed an amount determined on the basis of the same objective criteria and methodology applied to comparable non-public users, and is not in excess of the proportionate share of the cost of the facilities of benefit to the entity property being charged, based upon the proportionate share of use of those facilities.
- The service provider must demonstrate the amount of the fee does not exceed the amount necessary to provide capital facilities for which the fee is charged.

To the extent Continuing Best Practice USS-2.1e results in the construction of new or enlarged facilities, such construction may have the potential to cause environmental impacts. However, each such project would be reviewed and, as necessary, mitigated by the service provider in its role as CEQA lead agency. In general, any such impacts would be limited to the temporary impacts of construction. Given the already intensively developed character of the Campus Park and City Environs, these new wastewater facilities are not anticipated to significantly alter land use patterns or have other permanent environmental impacts.

4.13.2.8 TIEN CENTER IMPACTS

The wastewater generated by the Tien Center would fall within the total wastewater generated by the 2020 LRDP, which is described above. Thus no additional impact on wastewater conveyance would occur beyond that already foreseen for the 2020 LRDP.

4.13.3 STORMWATER

4.13.3.1 ANALYTICAL METHODS

Potential impacts of the 2020 LRDP and Tien Center were assessed by determining utility demand factors appropriate for the proposed project and comparing anticipated utility requirements with existing and future planned capacity, considering any upgrading of systems that may be approved or in progress.

4.13.3.2 REGULATORY FRAMEWORK

The regulatory framework regarding NPDES stormwater permits presented in Chapter 4.7 is applicable to stormwater utilities.

4.13.3.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local land use regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policies of the Cities of Berkeley and Oakland related to utilities and service systems.

BERKELEY GENERAL PLAN

Berkeley General Plan policies related to stormwater management include EM-23, to improve water quality in San Francisco Bay by minimizing storm sewer pollution of the Bay, by maintaining an effective street sweeping and cleaning program, and by identifying and eliminating sanitary and storm sewer cross connections; and EM-28, to restore a fresh water supply to creeks and the bay by eliminating conditions that pollute rainwater, by reducing impervious surfaces, and by encouraging swales, cisterns and other devices that increase infiltration and replenish underground water supplies that nourish creeks.[48]

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The Berkeley General Plan EIR found that construction of new medium and high density housing and additional student housing at UC Berkeley could result in localized flooding problems by increasing impervious surfaces. As described in the EIR, "when storm water runoff volumes and velocities are increased, existing storm drainage components that are at or near capacity may be inadequate to convey the additional runoff during peak events, causing localized ponding and flooding." The EIR concludes that existing programs to review project design, and the fact that most building would occur on previously developed sites, would make this impact less than significant.[49]

OAKLAND GENERAL PLAN

The Oakland General Plan contain policies that require individual developments to mitigate the stormwater impacts they create.[50]

4.13.3.4 EXISTING SETTING

CAMPUS PARK

UC Berkeley operates and maintains the stormwater utilities on the Campus Park. Most of the campus stormwater runoff is drained into Strawberry Creek. Strawberry Creek drains into a culvert owned by the City of Berkeley. Stormwater pipes on the Campus Park range in age from 10 years to 100 years old.

ADJACENT BLOCKS, SOUTHSIDE AND CITY OF BERKELEY

The City of Berkeley is responsible for stormwater conveyance on the Adjacent Blocks, Southside and the portion of the LRDP Housing Zone located in Berkeley. Currently, stormwater from the Adjacent Blocks flows to Strawberry Creek (as described in Chapter 4.7), except for the Southside area that flows to the storm drain on Bowditch Street.[51]

A capital improvement program managed by the City of Berkeley maps the entire storm drain system, and schedules needed improvements, such as pipe replacements and enlargements. Ongoing maintenance programs include catch basin cleaning, street/sidewalk sweeping, site inspection, testing and monitoring, runoff control from

new development, and public information and participation such as catch basin stenciling. Maintenance and improvements of the system are paid for by the General Fund and through hook-up fees paid by new development.[52]

HILL CAMPUS

UC Berkeley is responsible for stormwater utilities on the Hill Campus. The system currently has adequate capacity to handle existing loads. For any growth, the stormwater drainage has to be evaluated including that of LBNL. Some stormwater drainage from the Hill Campus goes through LBNL then to the city.[53]

CITY OF OAKLAND

The City of Oakland is responsible for the storm drainage in the portion of the LRDP Housing Zone located in Oakland. Drainage improvements and maintenance are performed on a case-by-case basis at this time because the city is constrained by a lack of funding.[54] Projects are usually completed in response to erosion or localized flooding problems.[55]

4.13.3.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on stormwater was determined based on the following standard:

Standard: ***Would the project require or result in the construction of new or expansion of existing stormwater drainage facilities, the construction of which could cause significant adverse effects?***

4.13.3.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECT REVIEW

This section describes how UC Berkeley would conduct project-specific review regarding stormwater impacts for projects to be approved under the 2020 LRDP.

2020 LRDP

Review of individual projects under the 2020 LRDP would influence stormwater management by guiding the location, scale, form and design of new University projects. Three of the Objectives described in Chapter 3.1 are particularly relevant to stormwater:

- **Provide the space, technology, and infrastructure we require to excel in education, research and public service.**
- **Plan every new project as a model of resource conservation and stewardship.**
- **Maintain the Hill Campus as a natural resource for research, education and recreation, with focused development on suitable sites.**

The 2020 LRDP also includes more specific policies that would contribute to minimizing new demand for stormwater facilities. Under the 2020 LRDP, UC Berkeley would: accommodate new programs primarily through more intensive use of university owned land on and adjacent to the Campus Park, and design new buildings to a standard equivalent to LEED 2.1 certification and LABS 21 environmental performance criteria. These Objectives and policies would minimize the increase in impervious surfaces and thus in runoff, by directing nearly all new development under the 2020 LRDP to sites in already urbanized areas.

The Campus Park Framework and Guidelines in the 2020 LRDP also contain policies that protect significant natural areas and open spaces, including the riparian zones along Strawberry Creek, from further intrusion, and recommend paving materials that maximize the amount of pervious surfaces to minimize runoff.

CAMPUS POLICIES AND PROCEDURES

STORMWATER CONVEYANCE CAPACITY REVIEW. Whenever UC Berkeley develops preliminary project designs for a new development, the Physical Plant/Campus Services Engineering and Utilities Department reviews the project to determine whether existing storm drainage system is adequate at the point of connection. If the storm drainage system is determined inadequate, UC Berkeley upgrades the system to provide adequate storm water drainage and/or detention as part of construction of the project.

4.13.3.7 2020 LRDP IMPACTS

This section describes the potential stormwater impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact USS-3.1: At all sites outside the Hill Campus, implementation of the 2020 LRDP could alter drainage patterns in the project area and increase impervious surfaces, but would not exceed the capacity of stormwater drainage systems.

As described in detail in Chapter 4.7, almost all development under the 2020 LRDP would occur in urbanized areas where runoff is already relatively great due to existing levels of paving and construction. Thus new development under the 2020 LRDP would not increase runoff or require improvements to the overall stormwater system. The only exception to this situation is the Hill Campus, where limited new construction may occur on currently undeveloped sites that drain into Strawberry Creek.

> **Continuing Best Practice USS-3.1:** UC Berkeley shall continue to manage runoff into storm drain systems such that the aggregate effect of projects implementing the 2020 LRDP is no net increase in runoff over existing conditions.[56]

SIGNIFICANT IMPACTS AND MITIGATION MEASURES

LRDP Impact USS-3.2: Projects implemented in the Hill Campus under the 2020 LRDP could alter drainage patterns and increase impervious surfaces, which could exceed the capacity of stormwater drainage systems, but the mitigation described below would ensure this impact is *less than significant.*

Given the steeper slopes and upstream position, projects in the Hill Campus that are substantial enough to alter drainage patterns would have an impact on the amount of runoff contributed to the storm drain system. For this reason, projects with potential to alter drainage patterns in the Hill Campus would be accompanied by a hydrologic modification analysis, and would implement a plan to prevent increases of flow from the newly developed site.

LRDP Mitigation Measure USS-3.2: In addition to Best Practice USS-3.1, projects proposed with potential to alter drainage patterns in the Hill Campus would be accompanied by a hydrologic modification analysis, and would incorporate a plan to prevent increases of flow from the project site, preventing downstream flooding and substantial siltation and erosion.

4.13.3.8 TIEN CENTER IMPACTS

The stormwater volume generated by the Tien Center would fall within the total stormwater volume generated by the 2020 LRDP on the Campus Park, as described above. Thus no additional impact on stormwater conveyance would occur beyond that already foreseen for the 2020 LRDP.

4.13.4 STEAM HEATING

4.13.4.1 ANALYTICAL METHODS

Potential impacts of the 2020 LRDP and Tien Center were assessed by determining utility demand factors appropriate for the proposed projects and comparing anticipated utility requirements with existing and future planned capacity, considering any upgrading of systems that may be approved or in progress.

4.13.4.2 REGULATORY FRAMEWORK

There are no federal or State regulations that apply to steam heating.

4.13.4.3 LOCAL PLANS AND POLICIES

There are no local plans or policies that apply to steam heating.

4.13.4.4 EXISTING SETTING

CAMPUS PARK

UC Berkeley owns and operates a steam heating distribution system for all buildings and facilities at UC Berkeley. Steam is generated from a co-generation plant, fueled by natural gas, located behind the Evans Memorial Stadium. Steam is distributed from the central heating plant via a piping system to individual buildings.[57] The cogeneration plant is owned and maintained privately. Peak demand for steam is currently 249,000 pounds per hour and the plant's capacity is 353,000 pounds per hour.[58] In 2002, UC Berkeley used 749 million pounds of steam.[59]

The 1990 LRDP EIR noted a number of deficiencies in the steam heat distribution system. These deficiencies have been addressed as part of various projects since 1990, including improvements to Hearst Mining Building and Stanley Hall. Additionally, steam feeds to Stern Hall have been recently replaced.[60]

The University recently completed a study to identify maintenance and expansion needs of the steam distribution system. There are still existing deficiencies in the UC Berkeley system as noted in the steam study, but there is no separate project dedicated to solely addressing all the recommendations in the study due to budget constraints. Upgrades to various deficient areas are typically completed as part of the construction of new projects.[61]

ADJACENT BLOCKS AND SOUTHSIDE

Generally, the steam system does not extend beyond the Campus Park with the exception of a few university buildings located in the Adjacent Blocks and Southside, including:[62]

- West side of Oxford Street from the UC Printing Plant to the Oxford Tract.
- Buildings in the Adjacent Blocks North and South east of Gayley Road, including Stern Hall, Greek Theater, Bowles Hall, International House and Memorial Stadium.

UC Berkeley facilities located in the Adjacent Blocks and Southside that are not connected to the campus steam heating system have their own electric or natural gas boilers.[63]

HILL CAMPUS AND LRDP HOUSING ZONE

No portions of the Hill Campus or LRDP Housing Zone have steam heating facilities.

4.13.4.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on steam heating was determined based on the following standard:

Standard: ***Would the project require or result in the construction of new or expansion of existing steam facilities, the construction of which could cause significant adverse effects?***

4.13.4.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECT REVIEW

This section describes how UC Berkeley would conduct project-specific review regarding steam heating impacts for projects to be approved under the 2020 LRDP.

2020 LRDP

Review of individual projects under the 2020 LRDP would influence steam heat demand by guiding the location, scale, form and design of new University projects. Two of the Objectives described in Chapter 3.1 are particularly relevant to steam heat

- **Provide the space, technology, and infrastructure we require to excel in education, research and public service.**
- **Plan every new project as a model of resource conservation and stewardship.**

The 2020 LRDP also includes more specific policies that would contribute to minimizing new demand for steam heat. Under the 2020 LRDP, UC Berkeley would: design new buildings to a standard equivalent to LEED 2.1 certification and LABS 21 environmental performance criteria; design new buildings to outperform the required provisions of Title 24 by at least 20 percent; design future projects to minimize energy and water consumption and wastewater production; and base capital investment decisions on life cycle costs. This last policy would help minimize energy consumption by ensuring a more balanced consideration of initial and ongoing costs of buildings and infrastructure, and thus encourage investment in conservation technology.

CAMPUS POLICIES AND PROCEDURES

STEAM HEATING CAPACITY REVIEW. Whenever UC Berkeley develops a preliminary project design for a new development, the Physical Plant/Campus Services Engineering and Utilities Department reviews the project to determine whether existing capacity of the steam system at the point of connection is adequate. If the capacity of the steam system is determined inadequate, the University upgrades the system to provide adequate service to the project site before or as part of the project. In the event there is not enough capacity in the steam system, the campus would use natural gas or electricity for building heating and cooling.

4.13.4.7 2020 LRDP IMPACTS

This section describes the potential steam heating impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact USS-4.1: Implementation of the 2020 LRDP would increase demand for steam, but is not anticipated to result in a need for new or altered facilities.

Implementation of the 2020 LRDP could increase UC Berkeley's steam demand by up to 22,200 pounds per hour, a 9 percent increase over current peak demand.[64] The additional steam use increase attributable to 2020 LRDP development is well within the existing capacity of 353,000 pounds per hour.

4.13.4.8 TIEN CENTER IMPACTS

The steam used by the Tien Center would fall within the total steam demand under the 2020 LRDP, which is described above. Thus no additional impact on steam heating capacity would occur beyond that already foreseen for the 2020 LRDP.

4.13.5 SOLID WASTE

4.13.5.1 ANALYTICAL METHODS

Potential impacts of the 2020 LRDP and Tien Center were assessed by determining utility demand factors appropriate for the proposed project and comparing anticipated utility requirements with existing and future planned capacity, considering any upgrading of systems that may be approved or in progress.

4.13.5.2 REGULATORY FRAMEWORK

The California Integrated Waste Management Act of 1989 (Assembly Bill 939) established the Integrated Waste Management Board, required the implementation of integrated waste management plans and mandated that local jurisdictions divert at least 50 percent of all solid waste generated, starting January 1, 2000.

4.13.5.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local land use regulations when using its property in furtherance of its educational purposes, it is University policy to

evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policies of the Cities of Berkeley and Oakland related to utilities and service systems.

BERKELEY GENERAL PLAN

Berkeley General Plan policies related to solid waste include policies that encourage reduction of solid waste, reuse of buildings and construction waste, increased access to recycling stations, materials recovery, re-manufacturing, and biodegradable materials.[65]

FINDINGS OF THE BERKELEY GENERAL PLAN EIR

The Berkeley General Plan EIR estimated that policies encouraging increased commercial development and residential population in the Downtown, as well as higher-density housing and commercial development in commercial and mixed use districts and along transit corridors could result in increased solid waste generation. New housing units were anticipated to generate approximately 9,802 tons of added waste. Given that the Vasco Road landfill had 18 years of capacity in 1999, and that the city anticipated diversion of approximately 41 percent of its solid waste, the EIR determined that solid waste increases could be accommodated without significant impact.[66]

OAKLAND GENERAL PLAN

The Oakland General Plan does not contain policies regarding solid waste or recycling.

4.13.5.4 EXISTING SETTING

CAMPUS PARK

UC Berkeley's Recycling and Refuse Services unit collects and hauls all non-hazardous solid waste generated on the Campus Park, with the exception of construction waste, which under current practices is managed by the construction contractor. Non-construction debris boxes and compactors are hauled by a private firm supervised by the campus. In 1999-2000, UC Berkeley generated 9,186 tons of solid waste, not including construction waste. Of this amount, 6,006 tons were disposed of and 3,180 tons were recycled.[67]

The Recycling and Refuse Services unit provides refuse and recycling collection for all University-owned properties, including student housing. The campus maintains a fleet of 6 packer style garbage trucks, mostly later model Volvo GMC with Heil bodies and rear compaction capacity: currently, these vehicles use standard diesel fuel, but may be converted to biodiesel fuel pending a pilot program. UC Berkeley is exempt from county requirements to dispose of solid waste in the county, and therefore selects landfill sites based on lowest cost. The campus currently hauls waste to the West Contra Costa County Sanitary Landfill.[68]

While the total amount of waste generated from campus operations (excluding construction) has remained fairly constant over the past four years, the amount of waste diverted from landfill has increased from 16 percent in 1997 to 37 percent in 2002, due to improvements in the campus recycling program[69]. Construction debris, including debris generated by demolition activities, is often transported by demolition contractors to privately owned and operated facilities that specialize in debris recycling and provide for landfilling of materials that cannot be recycled.

ADJACENT BLOCKS, SOUTHSIDE AND CITY OF BERKELEY

The City of Berkeley Refuse Collection Division provides for pickup of solid wastes for the Adjacent Blocks and Southside, as well as the rest of Berkeley. University owned properties, however, are served by the campus' Recycling and Refuse Service unit. The City of Berkeley also provides or contracts for a number of recycling programs for solid waste. This includes a curbside collection program and buy-back center and salvage operation at Second and Gilman Streets. The city initiated a pilot program for commercial recycling, yard debris curb collection and a waste oil storage depository at the transfer station.[70] In 2000, the entire City of Berkeley generated 139,500 tons of waste.[71]

HILL CAMPUS

UC Berkeley's Physical Plant Services, Campus Recycling and Refuse Division, collects and hauls all non-hazardous solid waste generated on the Hill Campus, with the exception of construction debris. In 2001-2002, 288 tons of wastes were collected from the Hill Campus.[72]

CITY OF OAKLAND

The City of Oakland generated 422,484 tons of waste in 2000.[73] Solid waste collection and disposal for the portions of the LRDP Housing Zone located in Oakland is provided by Waste Management of Alameda County, which hauls garbage to the San Leandro Transfer Station. Ultimately, waste is disposed of at the Altamont Landfill is eastern Alameda County. The Altamont Landfill has a peak permitted capacity of 11,500 tons per day and receives on average 5,600 tons per day:[74] it has an expected life of over 20 years.

4.13.5.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on solid waste services was determined based on the following standards:

Standard: ***Would the project violate any applicable federal, State, and local statutes and regulations related to solid waste?***

Standard: ***Would implementation of the project exceed the permitted capacity of a landfill that serves the project's solid waste disposal needs?***

4.13.5.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECT REVIEW

2020 LRDP

Review of individual projects under the 2020 LRDP would influence solid waste management by guiding the location, scale, form and design of new University projects. Two of the Objectives described in Chapter 3.1 are particularly relevant to solid waste

- **Provide the space, technology, and infrastructure we require to excel in education, research and public service.**
- **Plan every new project as a model of resource conservation and stewardship.**

The 2020 LRDP also includes more specific policies that would contribute to solid waste management. Under the 2020 LRDP, UC Berkeley would: design new buildings to a standard equivalent to LEED 2.1 certification and LABS 21 environmental performance criteria, and base capital investment decisions on life cycle costs. This last policy

would contribute to solid waste management by ensuring a more balanced consideration of initial and ongoing costs of buildings and infrastructure, and thus encourage investment in conservation technology.

CAMPUS POLICIES AND PROCEDURES

WASTE REDUCTION AND RECYCLING PROGRAMS. The University promotes many voluntary waste reduction and reuse programs. Grounds maintenance crews chip woody debris and manage lawn cuttings for mulch, reducing wastes by an estimated 28 tons per month, or over 336 tons per year. Campus Refuse and Recycling distributed 5,000 reusable plastic coffee cups with an estimated savings of 3 million disposable cups, or 100 tons, per year. The campus materials exchange program diverts approximately 10 tons of waste per year by facilitating the reuse of office supplies and printed materials through an on-campus drop off and pick up location. The campus' Surplus and Salvage unit handles furniture and other large equipment.

The residential recycling education program employs students both as paid employees and volunteers to promote recycling for batteries, light bulbs, electronic equipment (computers and monitors) mixed paper and bottles in all of the residential housing units operated by the campus. Mixed paper recycling diverts over 2,100 tons of material annually from all quadrants of the campus.

4.13.5.7 2020 LRDP IMPACTS

This section describes the potential solid waste impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact USS-5.1: Implementation of the 2020 LRDP would not violate any applicable federal, state, and local statutes and regulations related to solid waste.

While the University of California is exempt from AB 939, UC Berkeley waste materials may be counted against the diversion percentages of the city of origin, in this case the City of Berkeley. The campus remains committed through campus policy to continuing and improving waste reduction and minimization efforts. Implementation of the 2020 LRDP would not violate any applicable state or federal statutes and would result in a *less than significant* impact in this regard.

> **Continuing Best Practice USS-5.1:** UC Berkeley would continue to implement a solid waste reduction and recycling program designed to reduce the total quantity of campus solid waste that is disposed of in landfills during implementation of the 2020 LRDP.

LRDP Impact USS-5.2: Implementation of the 2020 LRDP may result in increased generation of solid waste, but is not anticipated to exceed the capacity of permitted sites.

UC Berkeley is exempt from county requirements to dispose of solid waste in the county, and therefore selects landfill sites based on lowest cost. The campus currently hauls waste to the West Contra Costa County Sanitary Landfill.[75] Projects implemented

under the 2020 LRDP are expected to generate up to 2.8 tons of waste per day from maintenance and operational activities.[76]

The West Contra Costa facility is slated to close in the near future, however, at which point a new deposit site would be selected. While the new site is not yet identified, there is adequate capacity at other potential sites to accommodate the increase in solid waster due to the 2020 LRDP. For example, the Altamont Landfill in eastern Alameda County has a permitted peak capacity of 11,500 tons per day and receives on average 5,600 tons per day:[77] it has an expected life of over 20 years. The projected increment of 2.8 tons per day due to implementation of the 2020 LRDP would represent only .02 percent of peak permitted capacity at Altamont.

Demolition and construction debris from 2020 LRDP projects would be disposed of at any available landfill. This is a one-time disposal activity. It would be the responsibility of the demolition contractor to haul and dispose of the debris at appropriate sites.

> **Continuing Best Practice USS-5.2:** In accordance with the Regents-adopted green building policy and the policies of the 2020 LRDP, the University would develop a method to quantify solid waste diversion. Contractors working for the University would be required under their contracts to report their solid waste diversion according to the University's waste management reporting requirements.

4.13.5.8 TIEN CENTER IMPACTS

The solid waste generated by the Tien Center would fall within the total solid waste generated by the 2020 LRDP, as described above. Thus no additional impact on landfill capacity would occur beyond that already foreseen for the 2020 LRDP.

4.13.6 ENERGY

4.13.6.1 ANALYTICAL METHODS

Potential impacts of the 2020 LRDP and Tien Center were assessed by determining utility demand factors appropriate for the proposed project and comparing anticipated utility requirements with existing and future planned capacity, considering any upgrading of systems that may be approved or in progress.

4.13.6.2 REGULATORY FRAMEWORK

CALIFORNIA ADMINISTRATIVE CODE TITLE 24

New buildings in California built after June 30, 1977 must comply with standards set forth in Title 24 of the California Administrative Code. Title 24 requires the inclusion of state-of-the-art energy conservation features in building design and construction including: incorporation of specific energy conserving design features, use of non-depletable energy resources, or a demonstration that the proposed new buildings would comply with a designated energy budget.[78]

EXECUTIVE ORDER D-16-00

Although not mandatory, the Regents of the University of California are encouraged to comply with Executive Order D-16-00, issued August 2, 2000, which establishes the

Governor's sustainable building goal: 'to site, design, deconstruct, construct, renovate, operate, and maintain State buildings that are models of energy, water and materials efficiency; while providing healthy, productive and comfortable indoor environment and long-term benefits to Californians.[79]

4.13.6.3 LOCAL PLANS AND POLICIES

Although the University is constitutionally exempt from local regulations when using its property in furtherance of its educational purposes, it is University policy to evaluate proposed projects for consistency with local plans and policies. Therefore, this section outlines the plans and policies of the Cities of Berkeley and Oakland related to utilities and service systems. Policies from these local plans specific to energy include the following:

- The Berkeley General Plan contains policies which encourage energy efficiency, fossil fuel conservation through building design and construction methods, and development patterns that locate housing close to transportation and commercial/job centers.[80]
- The Oakland General Plan includes policies that encourage the use of energy-efficient construction and building materials; development of site plans which maximize energy efficiency; and maintenance of building codes, regulations and procedures which support energy conservation.[81]

4.13.6.4 EXISTING SETTING

CAMPUS PARK

ELECTRICITY. Electric power to UC Berkeley is provided by two sources: power generated at the campus cogeneration plant, and power furnished to the Hill Area Substation by Pacific Gas & Electric. Campus electricity is currently obtained under a direct access contract with Arizona Public Service, and delivered to the campus through transmission lines owned by PG&E. Electricity is transported via underground wiring to a switching station on the Campus Park and then distributed to various buildings on the Campus Park.

All major elements in the campus high voltage electrical system, including transformers, switches and wire materials have been replaced within the past ten years, except the conduits and the manholes. [82] UC Berkeley has completed several upgrades and maintenance activities during the last twelve months on the high voltage electrical system.[83] Presently, there are no major electricity utility deficiencies in the Campus Park based on current loads. Capacity deficiencies resulting from additional development are typically addressed as part of the scope of each new project.[84]

NATURAL GAS. Both PG&E and the University own and manage limited gas distribution lines on the Campus Park. Gas enters the Campus Park from gas mains located on Bancroft Way, Hearst Avenue, Oxford Street and Channing Way. The natural gas distribution network on the Campus Park is a small utility compared to other utilities. Gas is provided to those buildings that do not have steam service, and when gas is required for lab use or emergency generators.[85]

Natural gas is used on the Campus Park for producing electricity, steam, space heating, heating water for domestic use, cooking, laboratory needs and emergency generators.[86]

There are no major gas utility deficiencies in the Campus Park based on current loads. Capacity deficiencies resulting from additional development are typically addressed as part of the scope of each new project.[87]

The age of the University-owned natural gas lines is not known; the age of the pipes may reflect the age of the building they serve. PG&E follows maintenance guidelines set up by the California Public Utilities Commission (PUC) for their gas lines. The gas main from Oxford Street up to the Heating Plant was replaced in 1997 by PG&E.[88] Other replacements are completed, as necessary, as part of the University's Annual Main Gas Line Leak Survey.[89]

HILL CAMPUS

Both PG&E and the University own and manage some gas distribution lines on the Hill Campus. Gas enters the Hill Campus from gas mains located on Bancroft Way, Hearst Avenue, Oxford Street and Channing Way. The University-owned natural gas lines are of an unknown age, while PG&E-owned gas lines follow maintenance guidelines set up by the California PUC.[90] There are no major capacity problems on gas and electric in the Hill Campus based on current loads.[91]

ADJACENT BLOCKS, SOUTHSIDE AND THE LRDP HOUSING ZONE

Natural gas and electricity are provided to the Adjacent Blocks, Southside and LRDP Housing Zone by PG&E. Gas is provided through underground transmission lines located in the public right-of-way and electricity is provided through above ground and below ground lines. Currently, there is sufficient capacity in the distribution lines.[92]

4.13.6.5 STANDARDS OF SIGNIFICANCE

The significance of the potential impacts of the 2020 LRDP and Tien Center on electricity service systems was determined based on the following standards:

Standard: ***Would the project require or result in the construction of new or expansion of existing energy production and/or transmission facilities, the construction of which could cause significant adverse effects?***

Standard: ***Would the project encourage the wasteful or inefficient use of energy?***

4.13.6.6 POLICIES AND PROCEDURES GUIDING FUTURE PROJECT REVIEW

2020 LRDP

Review of individual projects under the 2020 LRDP would influence energy demand by guiding the location, scale, form and design of new University projects. Two of the Objectives described in Chapter 3.1 are particularly relevant to energy:

- **Provide the space, technology, and infrastructure we require to excel in education, research and public service.**
- **Plan every new project as a model of resource conservation and stewardship.**

The 2020 LRDP also includes more specific policies that would contribute to minimizing new demand for energy. Under the 2020 LRDP, UC Berkeley would: design new buildings to a standard equivalent to LEED 2.1 certification and LABS 21 environ-

mental performance criteria; design new buildings to outperform the required provisions of Title 24 by at least 20 percent; design future projects to minimize energy and water consumption and wastewater production; and base capital investment decisions on life cycle costs. This last policy would help minimize energy consumption by ensuring a more balanced consideration of initial and ongoing costs of buildings and infrastructure, and thus encourage investment in conservation technology.

The Campus Park Design Guidelines also include several provisions related to building orientation, exposure, and roof and façade design, to both minimize energy consumption and facilitate the use of renewable sources of energy.

CAMPUS POLICIES AND PROCEDURES

CHANCELLOR'S POLICY ON CAMPUS POWER CURTAILMENT. [93] The UC Berkeley Chancellor has directed the campus to comply with specific measures regarding campus power curtailment and energy conservation. Measures applicable to the 2020 LRDP include:

- Compliance with Executive Order D-16-00 so that all new campus buildings are designed based on life-cycle cost analyses.
- Design new buildings to outperform the required provisions of Title 24 by at least 20 percent.

ENERGY CAPACITY REVIEW. Whenever UC Berkeley develops a preliminary project design for a new development, the Physical Plant/Campus Services Engineering and Utilities Department reviews the project to determine whether existing capacity of the gas and electric system at the point of connection is adequate. If the capacity of the gas and/or electric system is determined inadequate, the campus upgrades the system to provide adequate service to the project site before or as part of the project.

4.13.6.7 2020 LRDP IMPACTS

This section describes the potential energy impacts of the 2020 LRDP based on the Standards of Significance, whether they are significant or less than significant, and whether any significant impacts can be mitigated to less than significant levels.

LESS THAN SIGNIFICANT IMPACTS

LRDP Impact USS-6.1: Implementation of the 2020 LRDP would result in increased use of energy, but is not anticipated to result in the need for new or altered production and/or transmission facilities.

Implementation of the 2020 LRDP would increase the use of both electricity and natural gas. As shown in Tables 4.13-3 and 4.13-4, electricity use would increase by up to 57,202 mWh per year, while natural gas use would increase by up to 163,200 mmBtu per year. The additional electricity use increase attributable to 2020 LRDP development is minimal compared to the 273 million mWh of electricity generated for California in 2002.[94] The additional natural gas use increase attributable to 2020 LRDP development is minimal relative to the 1.3 billion mmBtu of natural gas generated for California in 2000.[95]

LRDP buildout would probably require some upgrades to gas and electricity lines in order to provide adequate levels of service.[96] However, these upgrades would occur in

TABLE 4.13-3 PROJECTED ELECTRICITY USE	2020 LRDP Max Net Addl	Demand Factor (kWh)	Projected Addl Demand (mWh)
Academic & Support: Labs (gsf)	700,000	45.2	31,640
Academic & Support: Other (gsf)	1,500,000	12.1	18,150
Residential: student (beds)	2,500	2,615	6,538
Residential: faculty/staff (units)	200	4,371	874
Total Addl Electricity Use/Year (mWh)			**57,202**

TABLE 4.13-4 PROJECTED NATURAL GAS USE	2020 LRDP Max Net Addl	Demand Factor (kBtu)	Projected Addl Use(mmBtu)
Academic & Support: Labs (gsf)	700,000	137	95,900
Academic & Support: Other (gsf)	1,500,000	23.8	35,700
Residential: student (beds)	2,500	9,600	24,000
Residential: faculty/staff (units)	200	38,300	7,660
Total Addl Natural Gas Use/Year (mmBtu)			**163,200**

already urbanized portions of the East Bay, so no environmental impacts from construction are expected. Thus, the impact would be *less than significant*.

LRDP Impact USS-6.2: Implementation of the 2020 LRDP would not encourage the wasteful or inefficient use of energy.

UC Berkeley would continue to meet or exceed Title 24 energy conservation requirements for new buildings, and it would continue to incorporate energy efficient design elements outlined in the Chancellor's Policy on Campus Power Curtailment and in the policies of the 2020 LRDP, which includes the policy to outperform the Title 24 requirements by 20%. Thus, the impact would be *less than significant*.

4.13.6.8 TIEN CENTER IMPACTS

The energy used by the Tien Center would fall within the energy usage under the 2020 LRDP, which are described above. Thus no additional impact on energy supply and distribution would occur beyond that already foreseen for the 2020 LRDP.

4.13.7 CUMULATIVE IMPACTS

This section evaluates whether the 2020 LRDP, in combination with other University and non-University projects which are reasonably foreseeable, would result in significant cumulative impacts on utilities and service systems.

This analysis considers cumulative growth as represented by the implementation of municipal general plans, implementation of the proposed Lawrence Berkeley National Laboratory 2004 LRDP, the proposed redevelopment of University Village Albany, and implementation of the 2020 LRDP, as described in 4.0.5. The analysis also includes growth anticipated by the City of Berkeley General Plan EIR and by previously certified UC Berkeley EIRs, including the Northeast Quadrant Science and Safety Projects (SCH 2001022038), Seismic Replacement Building 1 (SCH 99122065), and the Underhill Area Projects (SCH 99042051).

The Standard of Significance for cumulative utilities and service systems impacts, described below, are defined in terms of whether or not new development would exceed the capacities of existing systems. The relevant scope of this analysis, therefore, is the area served by those systems that might be significantly affected by cumulative development.

As explained in section 4.10.9, the 2020 LRDP, in combination with the other reasonably foreseeable projects referenced in Chapter 4.0, would represent an increase of less than one percent of the population growth anticipated in ABAG Projections 2003. This includes both the direct and indirect impacts of population growth generated by new jobs (and, at UC Berkeley, by new students).

While this magnitude of growth is not anticipated to have significant impacts on utilities and service systems as a whole, the referenced cumulative projects may cause potential localized impacts on those systems or subsystems serving the areas of most intensive development: namely, the cities of Berkeley, Oakland, and Albany, in which the referenced cumulative projects are located.

However, the potential impacts of the planned expansion of University facilities at University Village Albany and other cumulative projects are addressed in a Draft EIR published in January 2004. The UVA Draft EIR found the potential impacts of this planned expansion would have no significant impacts on utilities or service systems within the City of Albany.[97]

The geographic context for this analysis of cumulative utilities and service systems impacts, therefore, includes the City of Berkeley and the areas of the City of Oakland within the scope of the 2020 LRDP, and the systems serving these areas.

The significance of potential utilities and service systems impacts was determined based on the following standard:

Standard: ***Would the project require or result in a need for new or altered facilities for water, wastewater, stormwater, solid waste, or steam, electricity or natural gas, the construction of which could cause significant environmental impacts?***

The question posed in this section is twofold:

- Is the potential *cumulative* impact of the 2020 LRDP *and* other reasonably foreseeable projects under these standards significant?
- Is the contribution of the 2020 LRDP to these impacts cumulatively considerable?

Cumulative Impact USS-1: The 2020 LRDP, in combination with other reasonably foreseeable projects, would increase the demand for water, for wastewater treatment, for solid waste disposal, and for steam, electricity, and natural gas, but these are not anticipated to result in the need for new or altered facilities.

Cumulative Impact USS-2: The 2020 LRDP, in combination with other reasonably foreseeable projects, would increase the demand for wastewater and stormwater conveyance, and may result in the construction of new or altered facilities, but these are not anticipated to have significant environmental impacts.

The Notice of Preparation for the Lawrence Berkeley National Laboratory 2004 LRDP anticipates an increase in on-site population of up to 1,200 by 2025, and an increase in building space of up to 800,000 gsf. The magnitude of these increments is roughly 40 percent of the 2020 LRDP projections for campus headcount and academic and support space, respectively.

To the extent cumulative service demands require the construction of new wastewater or stormwater conveyance facilities, such construction may have the potential to cause environmental impacts. However, each such project would be reviewed and, as necessary, mitigated by the service provider in its role as CEQA lead agency. In general, any such impacts would be limited to the temporary impacts of construction: given the already urbanized character of the geographic context, these new conveyance facilities are not anticipated to significantly alter land use patterns or have other permanent environmental impacts, such as inducement of new growth in previously undeveloped areas.

As discussed in Chapter 4.7, it is possible that, given an increase in impervious surfaces in the Hill Campus due to development under the 2020 LRDP, combined with development under the LBNL 2004 LRDP, stormwater flows may exceed the capacity of stormwater drainage systems serving the Strawberry Creek watershed. However, continuing Best Practice HYD-4-e would ensure that there is no net increase in stormwater runoff resulting from implementation of the 2020 LRDP; therefore, the contribution of the 2020 LRDP to cumulative stormwater impacts under Cumulative Impact USS-2 would not be cumulatively considerable.

Growth due to projects other than the 2020 LRDP and the Lawrence Berkeley National Laboratory 2004 LRDP are assumed to follow the patterns described in current city and county general plans and other adopted land use plans and policies. Any such projects would be subject to review by the relevant CEQA lead agency, to ensure they are adequately served by utilities and service systems.

The capacities of existing water, wastewater treatment, and solid waste systems are expected to be adequate to serve cumulative growth within the geographic context through 2020, particularly given the effects of conservation measures in new construction, which result in demand factors significantly lower than in older buildings. However, despite similar conservation measures with respect to energy consumption, there may be a need for additional energy capacity. New generation facilities 50 mW and larger proposed in California would be reviewed under CEQA, and impacts mitigated as necessary, by the California Energy Commission. Smaller energy facility projects would also undergo CEQA review under the auspices of the relevant lead agency.

4.13.8 REFERENCES

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