L. UTILITIES AND SERVICE SYSTEMS

INTRODUCTION

This section addresses the need for utility services and energy resources that include water, sanitary sewer, solid waste disposal (including recycling), energy, and communications services. As determined in the Initial Study, the project's effects on utilities and service systems would be potentially significant. This section identifies potential project impacts and appropriate mitigation measures. The water and sewer impact evaluation in this section relies upon a technical document prepared specifically for the proposed project, the *Abbott Laboratories Site Investigation*, prepared for the applicant by BKF Engineers and approved by the City of Redwood City Engineering and Construction Department on March 04, 2003. Impacts related to storm water drainage are discussed in Section IV.C, *Hydrology and Water Quality*.

SETTING

WATER

Senate Bill 610

Senate Bill 610 (Stats. 2001, c. 643) amended Section 21151.9 of the Public Resources Code (relating to CEQA), Sections 10631 and 10656 of the Water Code (relating to Urban Water Management Plans), and Sections 10910, 10911, 10912, and 10915 of the Water Code (relating to preparation of water supply assessments). The purpose and legislative intent of Senate Bill 610 (SB 610) was to further integrate land use and water supply planning, and to ensure that long-term water supplies were available to support new land uses. The laws took effect on January 1, 2002.

SB 610 requires the preparation of a Water Supply Assessment (WSA) for large-scale development projects. The WSA report evaluates the water supply available for new development based on the anticipated demand. For the broad range of projects which are subject to this law, the statutory WSA must be requested by the lead agency from the local water provider at the time the lead agency determines whether an EIR is required for the project under CEQA. The water agency must then provide the assessment within 90 days (but may request a time extension under certain circumstances). The water supply assessment must include specific information including an identification of existing water supply entitlements and contracts. The governing board of the water agency must approve the assessment at a public meeting.

The SB 610 requirement for a WSA applies to the proposed Abbott Laboratories project. The Abbott WSA has been prepared by the Redwood City Public Works Department, and is included as Appendix D in this EIR.

Urban Water Management Plan

The City has adopted a City of Redwood City Urban Water Management Plan, which was last amended and forwarded to the State of California Department of Water Resources in July 2002. The plan describes: (1) the City's water service area; (2) existing and planned sources of water; (3) water supply reliability; (4) opportunities for water transfers; (5) past and current water use; (6) water demand management measures (e.g., conservation, retrofits, rebate and information programs) in place or scheduled for implementation; and (7) the anticipated effectiveness of each identified water demand management measure.

Supply and Transmission

Redwood City receives all of its domestic water supply from the San Francisco Hetch Hetchy Regional water system through the San Francisco Public Utilities Commission (SFPUC) and currently has a contractual water supply assurance limit of approximately 12,240 acre-feet/year (AFY), but currently consumes approximately 1,000 AFY more than its allocation from the SFPUC (City of Redwood City, 2003). A total demand of 15,520 AFY has been forecasted to meet the City's needs in 2020.[1]

According to the City, the Hetch Hetchy system is antiquated and vulnerable to earthquake damage. Within the next few years the Hetch Hetchy system will undergo repairs and upgrades intended to ensure continued service. Due to the condition of the existing Hetch Hetchy system, and the planned repairs and upgrades, Redwood City has become increasingly concerned about the reliability of its water source for domestic use and fire protection.

According to Redwood City Engineering and Construction Department standards, the proposed project would require a stored volume of emergency water equal to three days of average demand to protect against an unforeseen breakdown of the Hetch Hetchy water main or local water lines crossing U.S. 101. The City emergency water supply closest to the project site is located approximately three miles away. Existing distribution and transmission systems are not capable of delivering water at sufficient pressures and flows to suppress a fire in an emergency services condition from such a great distance from the water source.[2]

The project site is located inside the area known as the Seaport Center. The Seaport Center water system is a network of loops distributing water to the existing office and commercial buildings. Two 12" Polyvinyl Chlorine Pipes (PVC) link the water system to a 16" Steel Pipe (SP) along Seaport Boulevard. The 12" lines supplying water to the Seaport Center are located in Chesapeake Drive and further east along Seaport Boulevard. The main loop is a 12" line encircling Chesapeake Drive, Saginaw Drive, Penobscot Drive, and Galveston Drive. This main loop distributes water to the adjacent infrastructure and to a peripheral 10" loop along Cardinal Way serving the Seaport Plaza project.

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1 Public Works Service Department, *Urban Water Management Plan 2000*, as cited in the *Marina Shores Village DEIR*, March 2002.

2 An "emergency services condition" is defined as the ability to provide water service at maximum daily flows plus fire flows, or peak-hour demand during an interruption of water supply from the Hetch Hetchy system due to extensive system maintenance, water quality issues, and/or damages caused by nature.

The 16" line in Seaport Boulevard also provides water to the new Pacific Shores Center, the Redwood City Harbor and other projects located along Seaport Boulevard. Two 12" Asbestos Concrete Pipes (ACP) and one 8" ACP supply the 16" main at the intersection of Seaport Boulevard and Bloomquist Street.

Redwood City Recycled Water Project

The Redwood City Recycled Water Project (RCRWP) is a result of the "First Step Project," which is a pilot recycled water program that has been undertaken by Redwood City and the South Bayside System Authority (SBSA). This pilot program stems from the requirement for Redwood City to comply with the Hetch Hetchy Supply Assurance Limit.[3] The First Step Project is currently in operation and consists of temporary treatment facilities and permanent underground pipelines that deliver recycled water to landscape customers at the eastern end of the Redwood Shores peninsula near the SBSA treatment plant. The RCRWP proposes to expand the First Step Water Recycling Project city-wide to both private and public landscape areas, medians, schools, and parks. The recycled water may also be used for dust control, toilet flushing, fire fighting, decorative fountains, cooling towers, and other industrial and construction uses. The project has recently been approved by the Redwood City City Council and is scheduled to be complete by 2010.[4] At completion, the recycled water distribution system would extend to the greater Bayfront and Central Redwood City areas. In addition, off-site recycled water storage reservoirs and pump stations would be constructed in the greater Bayfront area and Central Redwood City areas (CH2M Hill, 2002).[5]

In January 2002, the Redwood City City Council accepted the *Final Report for the Water Recycling Feasibility Study* for the Redwood Shores area. The study provides a detailed plan for implementing the recycled water system in the Redwood Shores area, and has since been followed up by a more in-depth evaluation of potential recycled water customers in the greater Bayfront and Central Redwood City areas of the City. The study indicates that improved water management practices, combined with the development of a recycled water system, would reduce the City's water demand on the Hetch Hetchy system by about 1,150 acre-feet per year (AFY) (CH2M Hill, 2002).

Water Conservation Policy and Guidelines

The City of Redwood City has established a set of water conservation policies and guidelines to promote efficient water use through proper landscape design and management. The *Landscape Guidelines* are applicable to all new or rehabilitated landscaping for industrial, commercial, institutional multi-family residential uses, common areas, model homes, and service stations.[6] The guidelines set forth regulations regarding plant selection, turf selection and limitation, soil conditioning and mulching, decorative uses of water, and irrigation.

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3 The Hetch Hetchy Limits are a series of measures (including recycling) a city can take in order to reduce its water demand.
4 Resolution 14545, July 28, 2003.
5 Specific locations have not yet been identified.
6 For the purposes of these guidelines, "common areas," are defined as those areas in a residential development which are maintained by either a developer or a homeowners' association.

California Urban Water Conservation Council

Redwood City has been a member of the California Urban Water Conservation Council (CUWCC) since 1992. The CUWCC is an association of water agencies, public advocacy, and special interest groups concerned with water supply and conservation of natural resources in California. It is responsible for developing Best Management Practices (BMPs) for water conservation. Over the last two years, Redwood City has gradually increased implementation of BMPs for water conservation and plans to be in full compliance by 2003 – 2004 (City of Redwood City, 2003). Relevant BMPs include the following:

- **BMP 4:** Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections;
- **BMP 5:** Large Landscape Conservation Programs and Incentives;
- **BMP 9:** Conservation Programs for Commercial, Industrial, and Institutional Accounts; and,
- **BMP 13:** Water Waste Prohibition.

According to the CUWCC, requiring meters for all new connections and billing by volume of use (BMP 4) would result in a 20% reduction in demand by retrofitted accounts. Dedicated irrigation meters, climate-appropriate landscape design, efficient irrigation equipment and management, and landscape surveys (BMP 5) are estimated to result in a 15% reduction in demand for landscape uses by surveyed accounts. Industrial water reduction results from Best Management Practices, waste discharge fees, new technology, water surveys, plumbing codes and other factors (BMP 9) are estimated to reduce the overall water use per employee. Prohibiting gutter flooding, single pass cooling systems, and non-recycling decorative water fountains (BMP 13) is also estimated to reduce water demand; however, specific amounts have not yet been quantified (CUWCC, 2003).

Plans and Policies

The Redwood City Strategic General Plan does not contain objectives or policies pertaining directly to water service. However, Section 64562 if the California Health and Safety Code requires all public water systems to have sufficient water available from their water resources and distribution reservoirs to supply adequately, dependably, and safely the total requirements of all users under maximum demand conditions before agreement is made to permit additional service connections to the system.

The Uniform Fire Code (UFC) contains regulations relating to construction and maintenance of buildings as well as the configuration and use of premises where they are located. Topics addressed in the code include fire equipment access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazards safety, hazardous materials storage and use, protection and assistance for first responders, industrial processes, and other general and special fire-safety requirements. The UFC requires 40 pounds per square inch (psi) of residual fire flow pressures for buildings over 75 feet as part of the high-rise safety requirement. Additionally, the

City of Redwood City Engineering and Construction Department has established Hydraulic Design Criteria. These criterion set standards for the design, alignment, distribution, infrastructure performance, and maintenance requirements for water supply, sewage, and other utility systems within the City.

SANITARY SEWER

Treatment and Transmission

Sanitary sewer service in Redwood City is provided by the South Bayside System Authority (SBSA). The SBSA transmission system conveys the sewer flows of the Redwood City area from the SBSA pump station in Maple Street to the SBSA treatment plant in Redwood Shores. This SBSA transmission system also serves the cities of San Carlos, Belmont, and the West Bay Sanitary District which serves Menlo Park, Atherton and Portola Valley, and a few residents in several other cities. The SBSA transmission system for all of these cities includes one force main, numerous pump stations, and a lift station at the treatment plant. The SBSA operates a sewage treatment plant located on Radio Road in Redwood City.

The sewage capacity available for any particular project is not determined exclusively by the SBSA treatment plant. Available capacity is also based on the *capacity rights* allocated to each member of the Joint Powers Agreement; each member is allocated a portion of the design capacity of the SBSA system. The allocation is made in terms of the following parameters: peak wet weather flow (PWWF), average daily dry weather flow (ADDWF), biochemical oxygen demand (BOD) and suspended solids. SBSA capacity allocations to its members are made for two basic sewer service elements: *treatment capacity* and *transmission capacity.*

The average daily dry weather flow (ADDWF) represents the actual volume of sewage generated by the city or development from domestic and industrial uses. The peak wet weather flow (PWWF) represents the ADDWF multiplied by a peaking factor plus inflow and infiltration (I/I) during the winter season. "Infiltration" generally occurs during the winter when precipitation raises the ground water table to a level where the water infiltrates defective sewer lines (i.e., infiltration). "Inflow" represents discharge into the sewer system such as surface runoff into manholes, illicit roof connections, and other drainage connections. Both infiltration and inflow contribute to peak wet weather flow (PWWF) and result in an increase in total sewer flow that reduces the overall available capacity of the sewer system.

Redwood City has ADDWF capacity rights for 11.4 million gallons per day (mgd) of the available treatment capacity of the original SBSA treatment plant, know as the Stage 1 project. Redwood City currently uses all of this available (allocated) capacity, but possesses an option to purchase an additional 2.1 mgd of ADDWF capacity from a planned Stage 2 treatment system expansion program, for which the SBSA has received all permits and approvals.[7]

[7] Jim Bewley, Manager, South Bayside System Authority, personal communication, cited in the *Abbott Laboratories Site Investigation,* March 2002.

The available sewer transmission capacity is evaluated using PWWF. Redwood City has PWWF capacity rights for 30.5 mgd (4.6 mgd for Redwood Shores and 25.9 mgd for the remainder of the city). Since 1994-95, the City has exceeded its allocated PWWF capacity nine times during the winter, due primarily to I/I factors.[8]

Collection

The project site is served by the Seaport Center Sewer System. The collection system includes a series of gravity lines, force mains, and pump stations that serve the Seaport Center and Seaport Plaza projects. The last pump station in this collection system is located on Galveston Street and discharges sewage collected from Seaport Center and Seaport Plaza through an 8" PVC force main to a 6" asbestos cement pipe (ACP) force main along Seaport Boulevard. From there, sewage flows north to the Redwood City Marina and the Marina Pump Station.

The existing collection system that conveys sewage to the Marina pump station includes the project site, Seaport Plaza, Seaport Center, and the Redwood City Marina and Harbor.

From the Marina pump station, flows are conveyed through a 10" ACP line up to Blomquist Street where they are transferred to a 14" line. Currently, the Marina pump station utilizes segments of a 10" and a 14" force main. The 14" PVC line then conveys the flows to the 33" South Bayside System Authority (SBSA) force main that discharges into the SBSA pump station at Maple Street near U.S. 101.

Storm water collection and disposal are discussed in Section IV.C, *Hydrology and Water Quality*.

SOLID WASTE

Solid waste collection services in the vicinity of the project site are provided by Browning Ferris Industries (BFI). Non-hazardous solid waste is transported to the South Bayside Transfer Station located at 225 Shoreway Road in San Carlos. The solid waste is then hauled to the Ox Mountain Sanitary Landfill located three miles east of Half Moon Bay, off of Highway 92. Total annual waste disposal for Redwood City is approximately 125,000 tons per year (includes 47 percent diversion rate). The Ox Mountain Sanitary Landfill's remaining permitted capacity in 2000, was estimated to be about 45 million cubic yards, and the landfill was not expected to reach its capacity until 2020 (CIWMB, 2002).

Assembly Bill 939 (AB 939), enacted in 1989, requires the Source Reduction and Recycling Element of each City and County to include an implementation schedule to meet diversion goals of 25 percent by 1995 and 50 percent by the year 2000 through source reduction, recycling, and composting activities. Redwood City's overall waste diversion rate was approximately

[8] ibid.

47 percent in 2000.[9] Total annual waste disposal for Redwood City is estimated to be approximately 125,000 tons per year.[10]

The County of San Mateo Health Services Department is certified by the California Integrated Waste Management Board as the Local Enforcement Agency (LEA) for solid waste in San Mateo County. The LEA has the primary responsibility for ensuring the correct operation and closure of solid waste facilities in the state. It also has responsibility for guaranteeing the proper storage and transportation of solid wastes. See Section IV.I, Hazards and Hazardous Materials, for information regarding hazardous, biohazardous, and radioactive waste disposal.

ENERGY

Electricity and gas service to Redwood City, including the project site and vicinity, is provided by Pacific Gas and Electric (PG&E). PG&E's expansion plans are on an as-needed basis and require the user to fund extensions of service. PG&E maintains an existing easement on the southern perimeter of the project site.

TELECOMMUNICATIONS SERVICES

Telecommunications services include telephone and data connections. SBC provides local telephone service and AT&T provides cable service to the Redwood City area.

IMPACTS AND MITIGATION MEASURES

APPROACH TO ANALYSIS

Physical impacts to utilities and service systems are usually associated with population and employment increases, which in turn, lead to the need for expanded new facilities. An increase in population or employment in any given area may result in the need to develop new, or alter existing, public facilities in order to accommodate demand.[11] The project would directly introduce approximately 1,036 new jobs to the area.[12]

SIGNIFICANCE CRITERIA

According to Appendix F and Appendix G of the *CEQA Guidelines*, a project may be considered to have a significant impact on the environment if it would:

- exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board;

9 California Integrated Waste Management Board, www.ciwmb.ca.gov, accessed April 2, 2003.
10 Includes Redwood City's 47 percent diversion rate.
11 Impacts related to storm water drainage are discussed in Section IV.C, *Hydrology and Water Quality*.
12 Perclose employs 495 employees at its current location. The proposed project is estimated to employ a total of 1,531 at buildout, a net increase of 1,036 employees.

- require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- have insufficient water supplies available to serve the project from existing entitlements and resources;
- result in a determination by the wastewater treatment provider which serves or may serve the project site that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
- be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs;
- fail to comply with federal, state, and local statutes and regulations related to solid waste;
- result in the wasteful, inefficient, or unnecessary consumption of energy; and
- require the construction of additional infrastructure facilities.

WATER

Supply, Distribution and Emergency Storage

Impact L.1: The proposed project would increase demand for water in Redwood City. (Potentially Significant)

The proposed project would construct approximately 541,000 square feet of new manufacturing, research and development, and administrative facilities and an approximate 10,000-sf onsite replacement facility for the Marine Science Institute that would increase the demand for domestic water use in Redwood City. The proposed project's projected water use is approximately 122,550 gallons per day (gpd) (or 137.3 acre feet per year) at full buildout (BKF, 2003).[13] Table IV.L-1 summarizes the projected water demands for the proposed project based on Redwood City standards. Redwood City determines the water demand for a project by increasing the average sewage generation by a factor of 40 percent (BKF, 2003). This factor represents water used for irrigation, drinking, and other uses not returning to the sewer system.

The proposed project meets the definition of a "Project" subject to the new provisions of the California Water Code required by Senate Bill 610.[14] The project applicant submitted its projected water demand estimates based on City requirements for the Water Supply Assessment

[13] This number was derived from Redwood City Engineering Design Standard Criteria and the Revenue Program Guidelines for Wastewater Agencies, published in April 1983 by the State Water Resources Control Board, and the 1997 Uniform Building Code.

[14] Under the new provisions of the Water Code, a "Project" includes any project that would demand an amount of water equivalent to, or greater than, the amount of water required by residential projects of more than 500 units, and specified commercial and industrial projects.

report in February 2003. The Water Supply Assessment for the proposed project was certified on September 8, 2003 and is included in Appendix D in this EIR.

TABLE IV.L-1
PROJECTED PROJECT WATER DEMAND (Gallons per Day)[a]

Use	Phase 1	Phase 2	Phase 3	Total
R&D, Administrative, and Amenities	30,450	34,876	34,650	99,976
Manufacturing	6,125			6,125
Storage Facilities	2,333			2,333
Cafeteria seating area		11,667[b]		11,667
Cafeteria kitchen		350[b]		350
Marine Science Institute	2,100			2,100
Total Projected Domestic Water Use	41,008	46,893	34,650	122,551

[a] Project water use is based on 140% of average sewage generation. Redwood City Water System Planning and Design Criteria (includes irrigation water demand) (BKF, 2003).
[b] Assumes cafeteria of 10,000 sf with 5,000 sf of seating area. Based on preliminary design and may be subject to change.

SOURCES: BKF, ESA, 2003.

During times of water shortage, Redwood City may expect cutbacks from the SFPUC with or without the proposed project. A potential solution to the existing and projected deficiencies in water supply is the use of recycled water, which is available from the South Bayside System Authority (SBSA) treatment plant in Redwood Shores, for irrigation and industrial uses (BKF, 2003). The City of Redwood City has identified the Seaport Boulevard area as a potential candidate area for recycled water. The following mitigation measure would reduce the significance of this impact.

Mitigation Measure L.1a: The proposed project shall obtain non-potable water supply from the City's tentative recycled water program, if approved by the City. Assuming the program is adopted by the City, the project applicant shall contribute its fair share to the cost of implementation of the recycled water program. (Identified by this EIR)

The City's Water Supply Assessment (WSA) indicates that the City has tentative plans to provide high quality recycled water to existing and future water users for landscape irrigation and various industrial uses. If implemented, this system would provide a means of meeting water demands that would otherwise have to be met from potable water sources. The program would, at full utilization, deliver up to 1,995 AF/Y, which would thereby reduce existing and future demands on the City's water supply. The project sponsor shall contribute its fair share to the cost of implementation of the recycled water system, and shall also be required to comply with all

applicable current and future City of Redwood City water demand performance standards, including standards in the *Redwood City Urban Water Management Plan*, the City's recycled water project, and the City's water conservation program. If the recycled water program is not implemented, the applicant shall be responsible for obtaining an alternative water supply in cooperation with the City.

Mitigation Measure L.1b: The proposed project shall implement Redwood City's *Landscape Guidelines*, which set forth regulations regarding plant selection, turf selection and limitation, soil conditioning and mulching, decorative uses of water, and irrigation. (Identified by this EIR)

Mitigation Measure L.1c: The proposed project shall implement the following measures as described in the California Urban Water Conservation Council's BMPs. (Identified by this EIR):

- **All new water connections shall be billed by volume of use (BMP 4).**
- **The project shall install dedicated irrigation meters and efficient irrigation equipment, provide climate-appropriate landscaping, and participate in a landscape survey (BMP 5).**
- **The project shall install the latest water conservation technology (including water-efficient toilets), participate in available water surveys, and comply with applicable plumbing codes (BMP 9).**
- **The project shall ensure the prohibition of gutter flooding, single pass cooling systems, and non-recycling decorative water fountains (BMP 13).**

According to a Water Use Forecast completed for Redwood City in June 2002, water demand will increase by approximately 1,950 AFY to approximately 14,540 AFY by 2010 from 13,170 AFY in 2000 (Whitcomb, 2002).[15] Redwood City's water supply allocation will remain unchanged until at least July 2009 when the existing Master Water Sales Contract and the Bay Area Water Users Association (BAWUA) / SFPUC Interim Shortage Allocation Plan expire and are renegotiated (Whitcomb, 2002). While implementation of Mitigation Measure L.1 would reduce the significance of this impact in the long-term, short-term effects related to water supply would be significant and unavoidable.

Mitigation Measure L.1d: The project sponsor shall retain an independent civil engineering or water specialist to monitor actual water consumption subsequent to buildout of each of the proposed project's three phases. Water consumption data shall be submitted to the Redwood City Engineering and Construction Services Department to ensure that the estimated water demand is consistent with actual water use.

[15] This forecast assumes passive conservation resulting from natural replacement of toilets and clothes washers with more efficient models. The forecast does not include active conservation or water substitution resulting from using recycled water for irrigation.

Significance after Mitigation: Significant and Unavoidable.

Impact L.2: The provision of water service to the project site would require modifications to the water delivery system in the project vicinity. (Less than Significant)

The proposed project proposes several local water system modifications to achieve compliance with the Redwood City Hydraulic Design Criteria. The proposed project proposes to install 1,850 linear feet of 12" water main crossing the project site. The line would connect to the 12" main in Saginaw Drive and would follow Cardinal Way to the project's entrance. The water main would cross the project along the main access way, turn west at the north shoreline and would connect to the existing 10" main in Cardinal Way. The proposed water system would also include a 12" inner loop along the east shoreline that would connect to the existing 8" stub line in Chesapeake Drive.

Water demand calculations also require consideration of adequate flow for existing and proposed fire hydrants. The existing water system has been studied and modeled by BKF Engineers and Redwood City Engineering and Construction Services Department. The model simulates the water system east of U.S. 101 supplying the Seaport Boulevard area, and the project's proposed water system was added to the Redwood City water model and tested using the City's Hydraulic Design Criteria. The criterion requires the proposed water system be evaluated with the Peak-Hour Flow and the Maximum Day plus Fire Flow.[16] The project proposes to install five additional fire hydrants throughout the project site. The anticipated available fire flows for each of the five proposed hydrants onsite are presented in Table IV.L-2.

TABLE IV.L-2
ANTICIPATED AVAILABLE FIRE FLOWS

Fire Hydrant	Fire Flow at 20 psi
FHAL - 1	2,827 gpm
FHAL - 2	2,868 gpm
FHAL - 3	2,893 gpm
FHAL - 4	2,887 gpm
FHAL - 5	2,882 gpm

SOURCES: BKF, ESA, 2002.

[16] The Peak-Hour Flow equals the average demand multiplied by a factor of four, and the Maximum Day equals the average demand multiplied by a factor of two.

Existing and proposed water system under Maximum Day + Fire Flow water demand service conditions are shown in Table IV.L-3 (Du, 2003).

TABLE IV.L-3
EXISTING AND PROPOSED WATER SYSTEM CONDITIONS
UNDER PEAK WATER DEMANDS

Design Criteria	Acceptable Condition	Existing Condition	Proposed Condition
Average Water System Velocity	4 -7 fps[a]	1.83 fps	2.02 fps
Maximum Water System Velocity	10 fps	5.85 fps	5.75 fps
Pressure	40 psi for multi-story;[b] 20 psi for residential	36.9 psi	36.5 psi

[a] feet per second
[b] for high-rise buildings over 75 feet

SOURCES: City of Redwood City, ESA, 2003.

The City's Hydraulic Design Criteria also includes a water distribution system characteristic. Based on this criterion, pipe segments, which have the largest velocity and head loss under the proposed condition, have been identified. The pipe segments with the largest flow velocity and head loss under the proposed condition are the 12" ACP segment along Seaport Boulevard and the 12" PVC segment along Chesapeake Drive. Table IV.L-4 shows these proposed conditions for these pipe segments. According to the *Abbott Laboratories Site Investigation*, the proposed water system presents similar flow velocity and head loss results to the existing water system.[17] Therefore, the project would have a minimal effect on the existing water distribution system (BKF, 2003).

The above local water system modifications have been formulated based on the projected water demands for the project as currently proposed. If the water demands change as a result of revisions in the project development program or new Redwood City standards or design criteria, the proposed local water system would be revised accordingly. Moreover, the applicant would be required to pay all applicable City of Redwood City development and connection fees.

[17] In treating incompressible flows, it is customary to define a flow variable called the *total head*.

TABLE IV.L-4
PROPOSED CONDITIONS OF PIPE SEGMENTS WITH LARGEST FLOW VELOCITY AND HEAD LOSS

Pipe Segment	Max Flow Velocity			Max Head Loss		
	Existing	Proposed	Acceptable	Existing	Proposed	Acceptable
12" ACP segment along Seaport Blvd. (P-SPT3)	5.85 fps	5.75 fps	4 – 7 fps	11.23 ft. /1,000 ft.	10.89 ft. /1,000 ft.	1 to 5 ft. /1,000 ft.
12" PVC segment along Chesapeake Dr. (SP-6)	6.11 fps	5.17 fps	4 – 7 fps	17.86 ft. /1,000 ft.	13.08 ft. /1,000 ft.	1 to 5 ft. /1,000 ft.

[a] feet per second

SOURCES: City of Redwood City, ESA, 2003.

Mitigation Measure L.2: The project shall be required to: (1) construct all necessary water system facilities as identified in the *Abbott Laboratories Site Investigation*; and (2) submit all final project water system design specifications and construction modifications for approval by the City of Redwood City Engineering and Construction Department. (Proposed as Part of the Project)

According to the City of Redwood City Engineering Department, additional offsite improvements could be required in addition to the proposed onsite water system. Existing pipe sections (SP6 and 31) and existing pipes (double tapping to both existing 8"and 16" pipes at junctions J-SPT4 and J-SPT5 from pipe sections SP-25 and SP-1) could need improvement as a result of the proposed project (Du, 2003).

Project implementation of these measures and their approval by the City would reduce the project impact on the existing water delivery system to a less-than-significant level.

Significance after Mitigation: Less than Significant.

Impact L.3: The proposed project would require the expansion of existing domestic water supply facilities. (Potentially Significant)

Construction of the new domestic water lines could result in construction impacts. These potential impacts would be reduced to a less than significant level with implementation of Mitigation Measures D.7, E.1, F.1a, F.1b, F.2a, F.2b, and F.2c, which address potential construction impacts to traffic (see Section IV.D), air quality (see Section IV.E), and noise (see Section IV.F) during construction.

Mitigation Measure L.3: During construction of on- and offsite improvements, the contractor shall implement Mitigation Measures D.7, E.1, F.1a, F.1b, F.2a, F.2b, and F.2c as identified in Sections IV.D, IV.E, and IV.F. (Identified by this EIR)

Significance after Mitigation: Less than Significant.

Impact L.4: The proposed project would have insufficient emergency water supply capability to support fire suppression requirements at the proposed project site. (Potentially Significant)

In case of an unforeseen Hetch Hetchy breakdown, the City has indicated that existing emergency water supplies are inadequate to ensure fire protection at the proposed project. The following mitigation will ensure that this impact will be reduced to a less-than-significant level.

Mitigation Measure L.4: The project sponsor shall be responsible for the cost of analysis, design, and construction of a new water storage system in accordance with the Redwood City's Hydraulic Design Criteria to provide an emergency water system with a storage capacity of three times the project's average daily demand (approximately 370,000 gallons) to adequately serve the proposed project. (Identified by this EIR)

Significance after Mitigation: Less than Significant.

SANITARY SEWER

Collection, Transmission and Treatment

Impact L.5: The proposed project would increase sewage generation in the project vicinity. (Potentially Significant)

Redwood City evaluates sewer demand using the average sewage generation ratios described in the Redwood City Engineering Standard Design Criteria. The generation ratio of gallons per square-foot originates from two components: the domestic water consumption by gallons per person and the number of persons per square foot. However, the Standard Design Criteria only lists generation rates for Office/Commercial/Industrial uses and does not include the Manufacturing or Warehouse uses proposed by the project. Therefore, for these other uses, the City calculates the generation ratios with information listed in the *Revenue Program Guidelines for Wastewater Agencies* published in April 1983 by the State Water Resources Control Board and the 1997 Uniform Building Code table.

Based on the above criteria, and as shown in Table IV.L-5, the average daily sewer demand at project buildout is projected to be approximately 88,037 gallons per day (gpd). The sewage volume was determined by the generation rates of each activity within the building.

TABLE IV.L-5
PROJECTED PROJECT SEWER DEMAND

Use	Ratio gpd/sf	Phase 1 Quantity sf	Phase 1 Demand gpd	Phase 2 Quantity sf	Phase 2 Demand gpd	Phase 3 Quantity sf	Phase 3 Demand gpd
R&D, Admin, Amenities	0.150[a]	145,000	21,750	166,077	24,912	165,000	24,750
Manufacturing	0.125[b]	35,000	4,375				
Storage Facilities	0.083[b]	20,000	1,667				
Cafeteria seating area	1.667[c]			5,000[d]	8,333		
Cafeteria kitchen	0.050[c]			5,000[d]	250		
Marine Science Institute	0.150[a]	10,000	1,500				
Average Daily Sewer Demand		210,000	29,292	176,077	33,495	165,000	24,750
Inflow and Infiltration (Included approximately 1/2 mile of 10" PVC)							500
Average Daily						gpd	**88,037**
						ac-ft/year	**98.6**

[a] Average sewer generation 15 gallons per 100 square feet (Section C of Redwood City Engineering Standards).
[b] Gallons per person from Revenue Program Guidelines for Wastewater Agencies, April 1983, State Water Resources Control Board, Division of Water Quality. Floor area per person based on building usage, 1997 Uniform Building Code. (Manufacturing: 25 gpd per 200 sf per person, Storage: 25 gpd per 300 sf per person).
[c] Gallons based on usage from Revenue Program Guidelines for Wastewater Agencies, April 1983, State Water Resources Control Board, Division of Water Quality. Floor area based on building usage, 1997 Uniform Building Code. (Restaurant Dining (Large): 25 gpd per 15 sf per seat, Kitchen: 10 gpd per 200 sf per person).
[d] Based on preliminary design; may be subject to change.

SOURCES: BKF, ESA, 2002.

The Redwood City Engineering Standards Design Criteria Section Part VI requires a generation rate of 15 gallons per 100 square feet for office/commercial/industrial space. The project's cafeteria would consist of 10,000 square feet of which 5,000 square feet would be allocated to a seating area. Therefore, the square footage allocated to the cafeteria would provide approximately 333 seats. The design criteria calculate a sewer demand for large restaurants at 25 gallons per day per seat. The peak hourly flow for the project represents the daily maximum sewer flow produced by the project and is estimated to be approximately 305 gallons per minute (gpm) at buildout of the project. Table IV.L-5 shows the projected sewer demands for each of the project's three phases.

These design criteria list only generation rates for office/commercial/industrial and does not include the manufacturing or storage facilities uses proposed by the project. Therefore, for these other uses, the City calculates the generation ratios with information listed in the *Revenue Program Guidelines for Wastewater Agencies* published in April 1983 by the State Water

Resources Control Board and the 1997 Uniform Building Code (BKF, 2003). Therefore, the resulting ratio for the manufacturing area is 0.125 gallons per day per square foot, which originates from the average consumption of 25 gallons per person per day divided by 200 square feet of floor area per person and the resulting ratio for storage facilities of 0.083 gallons per day per square foot originates from an average consumption of 25 gallons per person per day divided by 300 square feet of floor area per person. The projected sewage volume for the project's proposed cafeteria was projected based on a common value used to estimate the number of seats in a restaurant of 15 square feet per seat.

The sewage treatment capacity required to accommodate the proposed project would be the computed average daily dry weather flow (ADDWF) adjusted for biochemical oxygen demand (BOD) and suspended solids (SS). The projected project ADDWF total of 88,037 gpd, as listed in Table IV.L-5, has not been adjusted for BOD and SS. The proposed project's ultimate treatment capacity requirement would be calculated later in the development permitting stage, when the project design has been finalized, but is expected to be in the same general magnitude as shown in Table IV.L-5.

In recent years, sewage flow into the SBSA sewage collection system from Redwood City has occasionally exceeded the current peak wet weather flow capacity right (exclusive of Redwood Shores) of 25.9 mgd. Since 1994-95, the City has exceeded its allocated capacity nine times during the winter. Provision of sewer service to the site would require modifications to the existing sewer system from the project site to the SBSA treatment plant in order to avoid any further contribution to this existing condition.

As identified by the City of Redwood City Engineering and Construction Department, *"The main issue of concern is the limited delivery capacity of [the] regional transmission system itself (i.e., pump stations and large force mains delivering member agencies' sewer flows to the treatment plan)…. According to the SBSA, the City has reached its 25.9 mgd peak wet weather flow (PWWF) capacity rights for the main area of Redwood City.*[18]

Redwood City currently uses all of its available (allocated) capacity, but possesses an option to purchase an additional 2.1 mgd of average dry weather capacity at the SBSA treatment plant from a planned Stage 2 expansion program, for which the SBSA has received all permits and approvals.

Mitigation Measure L.5: Prior to issuance of the Building Permit, the City of Redwood City shall purchase from the SBSA the dry weather treatment capacity necessary to accommodate the projected increase in sewage generated by the proposed project. The project's ultimate treatment capacity requirement shall be calculated in the final permitting stage. The project applicant shall reimburse the City for all costs associated with the purchase of this treatment capacity (i.e., the capacity option itself and associated

18 Phong Du, Senior Civil Engineer, City of Redwood City Engineering and Construction Department, written correspondence to Charles J. Humpel, Project Manager, BKF Engineers, October 4, 2002, as summarized from the Marina Shores Village Project EIR, March 5, 2003.

administrative costs), the procedural details of which shall be included in a development agreement for the project. (Identified by this EIR)

In order to mitigate the limited transmission capacity from the project site to the SBSA treatment plant, the project applicant will be required to upgrade the influent lifting station (ILS) at the treatment plant and upgrade the treatment plant itself as necessary, *as well as* implement one of the following design solutions stated in Mitigation Measure L.6 subject to approval by the City of Redwood City Engineering and Construction Department.

Significance after Mitigation: Less than Significant.

Impact L.6: Due to the current limited capacity of the sewage collection system, implementation of the proposed project would require modifications to the existing sewage system. (Potentially Significant)

Mitigation Measure L.6: The project sponsor shall fund one of the three sanitary sewer improvement alternatives identified in the BKF Abbott Laboratories Site Investigation, 2003. These mitigation alternatives, proposed as part of the project, are described below:

> **Alternative 1: Construct an onsite pump station and a 10-inch PVC force main from the site to Seaport Boulevard in Chesapeake Drive. This force main will connect to the existing 10-inch ACP force main at the intersection of Chesapeake Drive and Seaport Boulevard. The City's Engineering Department has indicated that the Marina pump station flow transfer could be performed through the link prior to Chesapeake Drive, thus allowing the existing 10-inch ACP force to be used only by the Abbott Laboratories' project from Chesapeake Drive to the SBSA pump station; or,**
>
> **Alternative 2: Construct a sewer system identical to Alternative 1, above. However, this Alternative would utilize the existing 10-inch ACP in Seaport Boulevard up to Bloomquist Street. At the intersection of Bloomquist Street the 10-inch ACP line would be connected to the SBSA 33-inch main near the intersection of Bloomquist Street next to the 14-inch connection point; or,**
>
> **Alternative 3: Utilize the pump station and 10-inch PVC line in Chesapeake Drive described in Alternative 1. However, this alternative would connect the 10-inch PVC in Chesapeake to a new sanitary sewer line constructed in Seaport Boulevard. The new line would be approximately 2,300 linear feet long and would run parallel to the 14-inch line constructed by the Pacific Shores project. The new line would connect to the SBSA 33-inch main near the intersection of Bloomquist Street next to the 14-inch connection point.**

Construction of the new sewer lines could result in construction impacts. These potential impacts would be reduced to a less than significant level with implementation of Mitigation Measures D.7, E.1, F.1a, F.1b, F.2a, F.2b, and F.2c which address potential construction impacts to traffic (see Section IV.D), air quality (see Section IV.E), and noise (see Section IV.F) during construction.

A detailed discussion of the design alternatives and potential design solutions is included in the *Abbott Laboratories Site Investigation (March 2003)*, available for review at the City of Redwood City Community Development Services Department, City Hall, 1017 Middlefield Road.

Significance after Mitigation: Less than Significant.

SOLID WASTE

Impact L.7: The proposed project would generate solid waste. (Potentially Significant)

BFI Peninsula would transport non-hazardous solid waste from the project site to the South Bayside Transfer Station located at 225 Shoreway Road in San Carlos. The solid waste would then be hauled to the Ox Mountain Sanitary Landfill located three miles east of Half Moon Bay, off Highway 92. The Ox Mountain Sanitary Landfill's remaining permitted capacity in 2000 was estimated to be approximately 45 million cubic yards and the landfill was not expected to reach its capacity until 2020 (CIWMB, 2002).

It is estimated that the proposed project would generate approximately 574 tons per year of non-hazardous solid waste. In addition, approximately 41,750 gallons and 48 tons per year would consist of hazardous and biohazardous wastes (see Section I, *Hazards and Hazardous Materials*). In addition, it is estimated that the project would generate approximately 1,900 cubic feet per year of radioactive waste. Project construction would also generate an estimated 3,600 cubic yards of construction waste. Table IV.L-6 shows the proposed project's estimated solid waste generation.

Whenever feasible, solid waste would be recycled. Waste material that could be recycled include office paper, newspaper, glass, aluminum cans, cardboard, miscellaneous plastics, rejected plastic devices and components, Styrofoam, spent toner cartridges, and transparency film. Hazardous and radioactive wastes would be disposed of in compliance with all applicable laws and requirements as described in Section IV.I, *Hazards and Hazardous Materials*.

Without recycling, the proposed project could have an impact on the City's diversion rate, which would conflict with the City's state-mandated Source Reduction and Recycling Element/Integrated Waste Management Plan. This impact would be less than significant with the incorporation of the following mitigation measures.

Mitigation Measure L.7a: The project shall provide suitable storage locations and containers for recyclable materials. The containers shall be designed and constructed to protect soils, water resources, biological resources, and all other aspects of the environment. (Identified by this EIR)

Mitigation Measure L.7b: The project sponsor shall prepare and implement a recycling program to achieve at least a 50 percent reduction in waste generated from project operations through the use of recycling (i.e. paper, bottles, and cans). Additionally, if and

when BFI Peninsula implements a food scrap composting program, the project sponsor shall participate to further reduce waste generated by the cafeteria component of the proposed project. (Identified by this EIR)

TABLE IV.L-6
PROJECTED SOLID WASTE GENERATION

	Type of Waste	Amount[a]	Method of Disposal
Perclose Building	Hazardous Waste	30,000-40,000 gallons/year	Off-site disposal
	Biohazardous Waste	6,750 gallons/year	Off-site disposal
	Non-Hazardous Waste	880,000 lbs/year	Off-site disposal and recycling[b]
Research and Development Buildings	Hazardous Waste	45,650 lbs/year	Off-site disposal
	Biohazardous Waste	50,400 lbs/year	Off-site disposal
	Non-Hazardous Waste	268,500 lbs/year	Initially, minimal recycling
	Radioactive Waste	1,900 cubic feet/year	In accordance with applicable license and regulatory requirements
All Construction	Construction Waste	3,600 cubic yards[c]	Goal of recycling 15 – 20% of all solid waste during construction

[a] Amounts are approximate
[b] Office paper recycled off-site; Production waste: 75% off-site disposal and 25% recycled off-site; Plastic and cafeteria waste off-site disposal; Non-paper trash recycled and/or disposed of off-site
[c] Phase 1: 1,400 cubic yards; Phase 2: 1,200 cubic yards; Phase 3: 1,000 cubic yards (based on 100 cubic yards per month average).

SOURCE: Abbott Laboratories, 2002.

Mitigation Measure L.7c: Before construction begins, the project applicant shall prepare and submit a reduction and recycling plan for all construction and demolition debris during the construction phase to the City Public Works Department for approval. (Identified by this EIR)

Significance after Mitigation: Less than Significant.

ENERGY

Impact L.8: The proposed project would increase energy usage and would require the relocation and expansion of some PG&E distribution and transmission lines and related facilities. (Potentially Significant)

The development proposed as part of the project would require electrical and gas service, and would therefore require expansion of the existing utility infrastructure to serve the site. Total natural gas and electricity estimates for the project are shown in Table IV.L-7.

TABLE IV.L-7
PROJECTED ENERGY USE[a]

	Construction	Operations
Natural Gas	---	64,000 therms[b]/year
Electricity	250 KW[c] per hour max	19,200 mwh[d]/year
Diesel	150 gallons[e]	---

[a] Amounts are approximate.
[b] A unit used to measure quantity of heat.
[c] Kilowatts
[d] Megawatt hours
[e] For diesel generator during Phase 1

SOURCE: Abbott Laboratories, 2002.

The project sponsor proposes to use solar energy to the degree possible and maximize the use of natural light and operable windows for ventilation as part of the project. However, the following mitigation measure would further reduce impacts to energy resources.

Mitigation Measure L.8: The project sponsor shall implement energy conservation, including the following:

- **Ensure exterior doors and windows are closed while HVAC system is running.[19] Install ENERGY STAR ®-labeled programmable thermostats with locking covers to prevent tampering with temperature settings.**
- **Use ENERGY STAR® compact fluorescent lighting instead of incandescent lighting, where feasible.**
- **Install occupancy sensors to turn off lights when rooms are not in use.**
- **Install ENERGY STAR®- labeled roofing material.**

[19] Heating, Ventilation, and Air Conditioning

- **Turn off lighting in unoccupied areas when not in use or where windows provide sufficient daylighting. Make sure lighting controllers (time clocks and photocells) are working and properly set. Ensure that exterior lighting is off in the daytime. (Identified by this EIR)**

All modifications and improvements to the existing electrical and gas infrastructure required to accommodate the project would be determined in consultation with PG&E and would be subject to current installation charges. As the project sponsor would be responsible for all costs associated with extending electrical and gas service to the project site, including the under-grounding of utilities as required, the project would have a less than significant impact on the provision of these services. In addition, any construction impacts associated with the installation of utility lines would be reduced to a less than significant level by Mitigation Measures E.1, F.1a, F.1b, F.1c, F.1d, and D.6, which address potential construction impacts to air quality (see Section IV.E), noise (see Section IV.F), and traffic (see Section IV.D).

Significance after Mitigation: Less than Significant.

TELECOMMUNICATIONS

Impact L.9: The proposed project would require the extension of cable television and other data transmission lines to serve the site. This would be a less than significant impact.

Although no cable TV service infrastructure presently exists on site, existing lines near the site would be extended to provide service to the proposed project. All modifications and improvements to the existing infrastructure required to accommodate the project would be determined in consultation with the City and AT&T, and would be subject to current installation charges. As the project sponsor would be responsible for all costs associated with extending cable TV service to the project site, including the under-grounding of utilities as required, the project would have a less than significant impact on the provision of these services.

Mitigation: None required.

CUMULATIVE IMPACTS

Impact L.10: The proposed project would contribute to cumulative impacts on the availability of domestic water supply. (Potentially Significant)

As described earlier in this section, Redwood City is already using more than its allocation of water from the SFPUC by approximately 1,000 acre-feet annually, and is predicted to exceed its allocation by approximately 2,700 acre-feet annually by 2009. As required by SB 610, the Redwood City Council approved the WSA for the proposed project on September 8, 2003. That approval pertained to the adequacy and reliability of the WSA itself and was not an approval or

disapproval of the proposed project. The WSA for the proposed project has determined that the City of Redwood City does not currently have sufficient water supply to meet the projected water demands of the proposed project together with those of its existing customers and the demands of other planned development. Therefore, the anticipated cumulative demands for water service would represent a potentially significant cumulative impact to which the project would contribute.

Mitigation Measure L.10: The project sponsor shall implement Mitigation Measures L.1a through L.1c. (Identified by this EIR)

Implementation of Mitigation Measures L.1 through L.4 would help reduce the increase in cumulative water demand attributable to the project. However, because the city already exceeds its water supply allocation from the Hetch Hetchy system, the additional water demand that would be generated by the project would be considered considerable and, therefore, significant and unavoidable.

Significance after Mitigation: Significant and Unavoidable, due to uncertainty in proposed mitigation measures.

Impact L.11: The proposed project, together with other existing and probable future development, could reduce the excess capacity of the sewer system. (Potentially Significant)

Sewer treatment and transmission capacities available for all existing and reasonably foreseeable projects are not exclusively determined by the physical capacity of the sewer system. They are also based on the capacity rights allocated to each of the agencies that discharge to the treatment plant by the governing Joint Powers Agreement. Participants in the Joint Powers Agreement include Redwood City, Belmont, San Carlos and the West Bay Sanitary District, which covers Menlo Park, portions of Atherton and Portola Valley, and a few residences in several other cities. Each participating member is allocated a portion of the design capacity of the SBSA system for the parameters of peak wet weather flow (PWWF), average daily dry weather flow (ADDWF), biochemical oxygen demand, and suspended solids.

ADDWF represents the actual volume of sewage generated by domestic and industrial uses. The available sewer treatment capacity is evaluated using the ADDWF. Redwood City has ADDWF capacity rights for 11.4 million gallons per day (mgd) of the available treatment capacity of the original plant. Redwood City currently utilizes all of this available treatment capacity (BKF, 2003). The City also possesses an option to purchase an additional 2.1 mgd of dry weather treatment capacity.

The available sewer transmission capacity is evaluated using the PWWF. Redwood City has PWWF capacity rights for 30.5 mgd. The City has exceeded its capacity nine times during the winter season since 1994 (BKF, 2003).

Two possible approaches to mitigate the PWWF issue are to reduce inflow and infiltration into the system, or to increase the hydraulic capacity of the conveyance system. Redwood City has undertaken efforts to reduce its inflow and infiltration. The SBSA Wet Weather report, covering the wet weather season of 1994-1995 through 2002-2003, indicates that the effort has been successful. However, the City does not believe that this approach would be a timely or cost-effective method of mitigating the impacts of the proposed project and other future projects (BKF, 2003).

The City and the SBSA have identified two potential system improvements to increase the hydraulic capacity of the conveyance system from the SBSA pump station at Maple Street to the SBSA treatment plant. The preferred improvements are the upgrade of the SBSA Influent Lifting Station (ILS) adjacent to the treatment plant with minor modification inside the treatment plant in Redwood Shores and modifications to the SBSA pump station in Maple Street. The details of the specific improvements/upgrades at these locations have not been finalized (BKF, 2003).

Any improvements to the existing system to serve the proposed project and other cumulative projects would be determined in consultation with the City's Public Works Agency prior to construction and operation, and would be funded by the respective project applicants.

Mitigation Measure L.11: The project sponsor shall contribute its fair share to the funding of potential sanitary sewer system improvements to increase the hydraulic capacity of the conveyance system from the SBSA pump station at Maple Street to the SBSA treatment plant, as determined by the City of Redwood City.

Significance after Mitigation: Less than Significant.

REFERENCES – Utilities and Service Systems

(*The references cited below are available at the Redwood City Community Development Services Department, 1017 Middlefield Road, Redwood City, California, unless specified otherwise below.*)

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