3.12 HAZARDOUS MATERIALS

Introduction

This section provides an analysis of the potential for the SUMC Project to expose persons or the environment to hazardous materials. Potential environmental impacts can be associated with the potential disturbance of contaminated soils or groundwater, if present in or near the SUMC Sites, as well as risk of spills from increased future use, disposal, and transport of hazardous materials and hazardous wastes associated with project construction or operation. Specific topics presented in this section include the types of hazardous materials that would be handled and hazardous wastes that would be generated, known on-site contamination from historic uses, the regulatory setting applicable to such activities, and applicable health and safety policies and procedures. The information in this section was extracted from Phase I and II Environmental Site Assessments (ESAs) prepared for properties within the campus, an Environmental Data Resources, Inc. (EDR) report, application materials provided by the SUMC Project sponsors, and information provided from regulatory agencies.

Issues identified in letters responding to the NOP and in written and oral comments received during the Planning and Transportation Commission and City Council scoping meetings for the SUMC Project were considered in preparing this analysis. Comments relevant to hazardous materials included those from the Department of Toxic Substances Control (DTSC) and the Santa Clara Valley Water District (SCVWD). SCVWD identified several historic fuel leak sites associated with underground storage tanks in the Hoover Pavilion Site and requested that these sites be evaluated. On July 1, 2004, SCVWD transferred the fuel leak Local Oversight Program (LOP) to the Santa Clara County (County) Department of Environmental Health (DEH). The County DEH has been supervising completion of steps toward site closure. A discussion of fuel leak sites is included in the Existing Conditions discussion. DTSC requested that the properties’ historic uses be described, and based upon that information, sampling be conducted to determine whether effects associated with remediation activities will need to be addressed in the EIR. Phase I and Phase II ESAs, which include the results of sampling, monitoring, and testing, have been submitted for certain properties within the SUMC Sites. DTSC also requested that, if remediation would be performed, the EIR include a discussion of potential air and health impacts associated with excavation activities, and risk of upset should there be an accident at the site. These concerns are addressed in this section, and Mitigation Measure HW-3.1 in Section 3.11, Hydrology, addresses risk of upset or exposure to hazardous materials during any remediation. Section 3.5, Air Quality, provides further discussions of air quality issues associated with construction activity on the project sites, and Section 3.11, Hydrology, provides further discussions of water quality issues associated with the potential for groundwater contamination.

1 Santa Clara Valley Water District. Letter Regarding Oversight Program Case Transfer: Stanford University Medical Center, 211 Quarry Road, Unincorporated 94304, SCVWDID-06S3W03H02. January 28, 2005. And Santa Clara County DEH. Letter Regarding Fuel Leak Investigation at Stanford University Medical Center, 211 Quarry Road, Palo A lot, Case No. 11-079, SCVWDID #06S3W03H02f.
Existing Conditions

Public health concerns addressed in this section and associated with the SUMC Project generally fall into four categories:

- **Hazardous Materials.** Hazardous materials include non-radioactive chemicals and products that may be harmful if improperly released to the environment or improperly handled by people. These include a broad spectrum of products, including pesticides, petroleum fuel products, paints and other coatings, and common household materials such as cleansers and other cleaning products. Hazardous materials also include radioactive, biohazardous, and medical materials. A more detailed definition of hazardous materials is provided under Classification of Hazardous Materials, below.

- **Hazardous Waste.** Hazardous wastes are produced when hazardous materials are used or discarded, and may be produced by manufacturing or other processes. A more detailed definition of hazardous waste is provided under Classification of Hazardous Materials below.

- **Contaminated Soil and Groundwater.** Contaminated soil and groundwater usually results from land uses that previously released hazardous materials or hazardous wastes into the soil, groundwater, or sewer systems. Leaking underground storage tanks (USTs) and sumps are common causes of such contaminated conditions, as are historic industrial activities that routinely spilled or disposed of hazardous materials or hazardous wastes into the soil or groundwater. Current and historical sources of soil and groundwater contamination in the SUMC Sites are described later in this section.

- **Hazardous Building Components.** The SUMC Project would involve building demolition and handling of hazardous building components. Examples of hazardous building components include asbestos-containing materials (ACMs), asbestos-containing building materials (ACBMs), electric transformers containing polychlorinated biphenyls (PCBs), USTs and aboveground storage tanks (ASTs), and lead-based paint. Applicable federal, State, and local legal requirements exist that relate to the safe maintenance and removal of these materials and are discussed later in this section.

**Classification of Hazardous Materials.** The term “hazardous material” is defined in different ways for different regulatory programs. For purposes of this EIR, the definition of “hazardous material” is the same as that in California Health and Safety Code Section 25501:

...any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.
Hazardous materials can be categorized as hazardous, non-radioactive chemical materials, radioactive materials, and biohazardous materials. For hazardous, non-radioactive chemical materials, the above definition is typically adequate. Radioactive and biohazardous materials are further defined as follows:

- **Radioactive materials** contain atoms with unstable nuclei that spontaneously emit ionizing radiation to increase their stability.
- **Biohazardous materials** include materials containing certain infectious agents (microorganisms, bacteria, molds, parasites, viruses) that normally cause or significantly contribute to increased human mortality or organisms capable of being communicated by invading and multiplying in body tissues.

Types of hazardous materials found in medical facilities include chemotherapy reagents and other pharmaceuticals; chemicals used to sterilize equipment; formaldehyde for specimen preservation; and solvents, oxidizers, corrosives, and stains used in clinical laboratories. Radioactive materials generally contain radioactive atoms; however, x-ray equipment (which does not involve any radioactive substances) is also regulated as radioactive material. Facilities maintenance activities, which occur at the SUMC Sites, require various common hazardous materials, including cleaners (which may include solvents and corrosives, in addition to soaps and detergents); paints; pesticides and herbicides; fuels (e.g., diesel); and oils and lubricants.

“Hazardous waste” is a subset of hazardous materials. For the purposes of this EIR, the definition of hazardous waste is essentially the same as that in California Health and Safety Code Section 25117, and in California Code of Regulations (CCR), Title 22 Section 66261.3. Hazardous wastes are wastes that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may either cause, or significantly contribute to, an increase in mortality or an increase in serious illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Hazardous wastes can generally be grouped into three categories, including hazardous chemical waste, radioactive waste, and medical waste. These three categories are further defined below:

- **Hazardous chemical wastes** are generally residuals of hazardous chemicals applied to various uses. Hazardous chemical waste can include residuals from mercury, photography liquids, photography solids, flammable liquids, aerosols, and laboratory solvents and chemicals.
- **Radioactive wastes** are radioactive materials that are discarded (including wastes in storage) or abandoned.
- **Medical waste** includes both biohazardous wastes (byproducts of biohazardous materials) and sharps (devices capable of cutting or piercing, such as hypodermic needles, razor blades, and broken glass) resulting from the diagnosis, treatment, or immunization of human beings, or research pertaining to these activities.
Surrounding Areas

Historic Uses and Storage of Hazardous Materials. Phase I and Phase II ESAs were performed on several portions of the SUMC Sites, and an EDR database search was conducted to further understand site conditions as they relate to historic hazardous materials use and storage. All Phase I ESAs were conducted in general accordance with the processes described in the American Society for Testing and Materials (ASTM) E1527-00 standard, entitled *Standards Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (ASTM guidelines).

Several facilities located in the SUMC Sites and surrounding area were listed as generators of hazardous materials. There are potential leakages of petroleum from former supply lines; potential for chemical contamination in soil and/or groundwater near, beneath, and around historical site features; potential for mercury and lead to leak into the soil and groundwater; and asbestos-containing materials. In addition, there are six USTs within the SUMC Sites and surrounding area (four within the Hoover Pavilion Site, and two just outside both SUMC Sites). The two USTs outside the Hoover Pavilion Site are at the former the Mobil Gas Station and Chevron Gas Station sites on Arboretum Drive and Quarry Road and are closed cases. At the Hoover Pavilion Site, two of the four USTs are still open cases with the County DEH. The remaining two had Palo Alto Fire Department (PAFD) oversight for closure, but the regulatory closure status is not known.

Fuel Leak Sites. USTs are known to have been used in a variety of settings for the purpose of storing petroleum hydrocarbons and waste oils within and just outside the SUMC Sites. Pursuant to SCVWD Ordinance 83-2, Section 6.1, the SCVWD implements its statutory role in protecting the water supply by prohibiting the pollution of its water supplies, whether in surface streams, reservoirs, or conduits of any kind, or of groundwater, by any direct or indirect means.

The County DEH addresses the protection of water resources through the Local Oversight Program (LOP). The LOP addresses the protection of the County’s water resources, specifically groundwater basins (i.e., Leaking Underground Storage Tank [LUST] cleanup program). Formerly managed by the SCVWD, the LOP was transferred to the County DEH in July 2004. For the purposes of this CEQA review and in response to the NOP comments received from the SCVWD, additional data maintained by the County DEH were reviewed to further assess the status of reported fuel leaks in the vicinity of the SUMC Sites. These LUSTs are identified and described in more detail below in the SUMC Sites discussion and in the Applicable Plans and Regulations subsection.

SUMC Sites

Existing Use and Storage of Hazardous Materials. Slight amounts of commercial hazardous materials are used for daily operations throughout the SUMC Sites, including the use of paints, solvents, metals, fuels, oils, and pesticides. In most circumstances, the potential risks posed by

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hazardous materials use and storage are primarily local and, therefore, limited to the immediate vicinity of such use. However, there are several buildings located within the SUMC Sites that were constructed before 1953 and thus may contain asbestos.

Hazardous materials in larger quantities have been and are currently handled and stored at the SUMC Sites. These materials include flammable gas and liquids, non-flammable and non-toxic gas, oxidizers, and corrosive and toxic materials. If handled and stored incorrectly, these chemicals, radioactive materials, and biohazardous materials can pose both physical and health risks. The potential hazards due to the existing use and storage of hazardous materials at the SUMC Sites are discussed in further detail below.

The SUMC has a Hazardous Material Business plan on file with the PAFD, and the plan would meet applicable regulations prior to demolition and redevelopment of relevant facilities. The current types and amounts of hazardous chemicals existing at the Main SUMC Site are shown in Table 3.12-1. This table provides a summary of the listing of on-site hazardous chemicals from the SUMC Project application. As shown in the table, facilities at the Main SUMC Site currently handle hazardous materials including flammable gas and liquids, non-flammable and non-toxic gas, oxidizers, and corrosive and toxic materials. In addition to the materials described in the table, facilities maintenance activities require various common hazardous materials, including cleaners (which may include solvents and corrosives, in addition to soaps and detergents); paints; pesticides and herbicides; fuels (e.g., diesel); and oils and lubricants.

The hazards posed by chemicals, radioactive materials, and biohazardous materials vary. Some chemicals can pose physical hazards (e.g., chemical burns) or health hazards (e.g., poisoning), including potential acute or chronic illnesses. Acute illness is known as an illness with an abrupt onset and short course, whereas a chronic illness is a long standing illness. The properties and health effects of different chemicals are unique to each chemical and depend on the extent to which an individual is exposed. Exposure to biohazardous materials can cause a range of illnesses, depending on the infectious agent encountered. Some infections can result in short-term discomfort (e.g., mild symptoms that can easily be treated or go away by themselves), while others can result in serious effects (e.g., dangerous disruptions of life functions). Some chronic diseases may or may not be curable or treatable. Some diseases may be communicable. In all of the above cases, the risks posed by the hazardous materials depend on the potential for exposure.

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4 Stanford University Medical Center, Stanford University Medical Center Facilities Renewal and Replacement Project Application, August 2007, as amended; Tab 7, Table 7-1.

### Table 3.12-1

<table>
<thead>
<tr>
<th>Type of Material</th>
<th>Examples</th>
<th>Existing Amount On-site</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Solids (pounds)</td>
</tr>
<tr>
<td>Explosive, Mass Explosion</td>
<td>Spray paint and other aerosols, acetylene, propane, some refrigerant gases</td>
<td>0.28</td>
</tr>
<tr>
<td>Explosive, Minor Blast</td>
<td>Spray paint and other aerosols, acetylene, propane, some refrigerant gases</td>
<td>0.02</td>
</tr>
<tr>
<td>Flammable Gas</td>
<td>Spray paint and other aerosols, acetylene, propane</td>
<td>102</td>
</tr>
<tr>
<td>Non-Flammable, Non-Toxic Gas and Oxidizers</td>
<td>Aerosols, carbon dioxide (CO₂), most refrigerant gases, nitrous oxide, oxygen, liquid oxygen</td>
<td>3,058</td>
</tr>
<tr>
<td>Flammable Liquids</td>
<td>Gasoline, fuel oil isopropanol, acetone, ether, other solvents</td>
<td>0.00</td>
</tr>
<tr>
<td>Flammable Solid</td>
<td>Lead acid batteries, cycloexylamine - formula 48, chloromethyisothiazolin, magnesium, nitrocellulose</td>
<td>269</td>
</tr>
<tr>
<td>Spontaneously Combustible</td>
<td>Zep formula 300, Freon 12 and 22, glutaraldehyde, phosphorus</td>
<td>5.57</td>
</tr>
<tr>
<td>Water Reactive Flammable</td>
<td>Aluminum powder, calcium carbide, calcium, lithium, magnesium powder, sodium hydride</td>
<td>3.74</td>
</tr>
<tr>
<td>Oxidizer</td>
<td>chlorate, permanganate, inorganic peroxide, or a nitrate</td>
<td>147</td>
</tr>
<tr>
<td>Organic Peroxide</td>
<td>Benzyl peroxide, hydrogen peroxide, acetyl acetone peroxide</td>
<td>1.07</td>
</tr>
<tr>
<td>Radioactive</td>
<td>Isotopes, uranium hexafluoride</td>
<td>0.87</td>
</tr>
<tr>
<td>Corrosive Materials</td>
<td>Lead acid batteries, cycloexylamine - formula 48, chloromethyisothiazolin</td>
<td>375</td>
</tr>
<tr>
<td>Toxic Materials (solid or liquid)</td>
<td>Zep formula 300, Freon 12 and 22, glutaraldehyde, mercury, lead</td>
<td>726</td>
</tr>
<tr>
<td>Other Miscellaneous Hazards</td>
<td>Dry ice, asbestos, PCBs, polymeric beads, wheel chairs/electric vehicles</td>
<td>5,176</td>
</tr>
<tr>
<td>Moderately Toxic</td>
<td>Phenol, ammonia</td>
<td>0.00</td>
</tr>
<tr>
<td>Slightly Toxic</td>
<td>Cleaning solvents, ethyl acetate, ethanol</td>
<td>0.00</td>
</tr>
<tr>
<td>Flammable</td>
<td>Solvents, varnish, ammonia</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Table 3.12-1<sup>a,b,c</sup>
Existing Amounts of Hazardous Chemicals at the Main SUMC Site

<table>
<thead>
<tr>
<th>Type of Material</th>
<th>Examples</th>
<th>Existing Amount On-site</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Solids (pounds)</td>
</tr>
<tr>
<td>Combustible</td>
<td>Aerosols, oxidizers</td>
<td>136</td>
</tr>
<tr>
<td>Suspect Carcinogen/Mutagen</td>
<td>Acephate, benomyl, carbaryl</td>
<td>0.00</td>
</tr>
<tr>
<td>Halogenated Solvent</td>
<td>Trichloroethylene, perchloroethylene, methylene chloride, carbon tetrachloride, methyl chloroform, methyl iodide, ethylene dibromide</td>
<td>0.00</td>
</tr>
<tr>
<td>Skin Irritant</td>
<td>Strong acids (hydrochloric, sulfuric, and nitric acids), solvents (paint remover, alcohol), and caustics (sodium hydroxide, potassium hydroxide)</td>
<td>0.00</td>
</tr>
<tr>
<td>Hepatotoxin</td>
<td>Carbon tetrachloride, dimethylformamide, pesticides, solvents</td>
<td>0.00</td>
</tr>
<tr>
<td>Nephrotoxin</td>
<td>Heavy metals, carbon tetrachloride</td>
<td>0.00</td>
</tr>
<tr>
<td>Neurotoxin</td>
<td>Venoms, nerve agents</td>
<td>0.00</td>
</tr>
<tr>
<td>Lung Irritant</td>
<td>Ozone, smoke, chemical fumes, dust, other air pollution</td>
<td>0.00</td>
</tr>
<tr>
<td>Eye Irritant</td>
<td>Ozone, nitrogen dioxide, formaldehyde, smoke, dust, volatile organic compounds (VOCs)</td>
<td>0.00</td>
</tr>
<tr>
<td>California Prop. 65 Carcinogen</td>
<td>Chloroform, carbon tetrachloride, beryllium compounds, benzene, endrine, ethyl bromide, formaldehyde, lithium citrate, lovastatin, mercury compounds</td>
<td>0.00</td>
</tr>
</tbody>
</table>


Notes:

a. Some chemicals fall into more than one category; therefore, the columns presented here cannot be added to derive actual totals.

b. This table provides a reasonable rough estimate of the materials that would be located at the SUMC; however, due to the continuing advancements in technology, the list of needed chemicals and quantities may change in the time between this estimate and the opening of the SUMC Project.

c. This table provides a summarized version of that provided in the listing of on-site hazardous materials from the SUMC project application.
During the course of patient care and facility maintenance operations at the SUMC Sites, the SUMC applicants use various materials, some of which pose potential hazards. For example, clinical laboratories use potentially hazardous chemicals to analyze patient blood and urine samples. Radioactive materials are used to treat certain kinds of cancer. Various patient diagnosis and treatment activities involve potentially biohazardous materials (infectious agents). Hazardous materials use often results in byproducts that must be handled and disposed of as hazardous wastes.

The hospitals and clinics at the SUMC Sites also administer radiopharmaceutical materials (radioactive material) to patients for both diagnostics and therapeutic purposes.\(^6\) Table 3.12-2 through Table 3.12-4 list the existing radioactive material at the SUMC Sites. Most materials listed in Table 3.12-2 are administered in the Nuclear Medicine Department at the Main SUMC Site and patients are free to leave the facility after they have been given the treatment. Certain therapy procedures require that a patient be housed on-site for a few days before being allowed to leave either hospital facility (SHC or LPCH). In all cases, the half-lives\(^7\) of the radiopharmaceuticals are relatively short. No radioactive waste from Table 3.12-2 sources is generated since the radiopharmaceutical materials are allowed to decay for ten half-lives and then disposed as non-radioactive. Table 3.12-3 lists the longer half-life radioactive materials used by the School of Medicine. Additionally, six isotopes are used in the Nuclear Medicine Department to calibrate instruments (Table 3.12-4). All radioactive material use at the SUMC Sites, including disposal practices, is governed by Stanford University’s Radioactive Material License with the State.

### Table 3.12-2

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Monthly Average (mCi)(^a)</th>
<th>Half Life (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-18</td>
<td>4,704.0</td>
<td>1.83</td>
</tr>
<tr>
<td>1-123</td>
<td>111.9</td>
<td>13.2</td>
</tr>
<tr>
<td>Tc99m</td>
<td>21,058.0</td>
<td>6</td>
</tr>
<tr>
<td>In-III</td>
<td>68.7</td>
<td>67.37</td>
</tr>
<tr>
<td>Tl-201</td>
<td>15.3</td>
<td>73.1</td>
</tr>
<tr>
<td>1-131</td>
<td>438.8</td>
<td>192.96</td>
</tr>
<tr>
<td>Ga-67</td>
<td>0.3</td>
<td>78.26</td>
</tr>
<tr>
<td>P-32</td>
<td>0.2</td>
<td>342.77</td>
</tr>
<tr>
<td>Y-90</td>
<td>16.0</td>
<td>3.19</td>
</tr>
</tbody>
</table>

*Source: SUMC, 2010.*

*Note:

a. Millicurie (mCi): A unit of radioactivity equivalent to 0.001 curies.

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\(^6\) Stanford University Medical Center, Stanford University Medical Center Facilities Renewal and Replacement Project Application, August 2007, as amended; Tab 7.

\(^7\) The radioactive half-life for a given radioisotope is the time for half the radioactive nuclei in any sample to undergo radioactive decay. After two half-lives, there would be one fourth the original sample, after three half-lives one eighth the original sample, and so forth.
Table 3.12-3
Existing Radioactive Material Use by the School of Medicine at SUMC Sites

<table>
<thead>
<tr>
<th>Isotope</th>
<th>Approved Level (mCi)a</th>
<th>Current Annual Usage (mCi)a</th>
<th>Half-life</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-14</td>
<td>40.00</td>
<td>0.33</td>
<td>5,730 years</td>
</tr>
<tr>
<td>H-3</td>
<td>722.00</td>
<td>17.54</td>
<td>12.3 years</td>
</tr>
<tr>
<td>I-125</td>
<td>36.00</td>
<td>29.53</td>
<td>60.1 days</td>
</tr>
<tr>
<td>P-32</td>
<td>189.00</td>
<td>115.32</td>
<td>14.3 days</td>
</tr>
<tr>
<td>S-35</td>
<td>378.00</td>
<td>16.38</td>
<td>87.4 days</td>
</tr>
<tr>
<td>U-238</td>
<td>0.30</td>
<td>0.01</td>
<td>4.5x 10^9 years</td>
</tr>
<tr>
<td>Cr-51</td>
<td>10.00</td>
<td>0.00</td>
<td>27.7 days</td>
</tr>
<tr>
<td>I-131</td>
<td>0.01</td>
<td>0.00</td>
<td>8.01 days</td>
</tr>
<tr>
<td>P-33</td>
<td>18.00</td>
<td>0.00</td>
<td>25.4 days</td>
</tr>
<tr>
<td>Tc99m</td>
<td>1.00</td>
<td>0.00</td>
<td>6 hours</td>
</tr>
</tbody>
</table>


Note:
a. Millicurie (mCi): A unit of radioactivity equivalent to 0.001 curies.

Table 3.12-4
Existing Radioactive Material Sealed Sources at SUMC Sites

<table>
<thead>
<tr>
<th>Isotope</th>
<th>mCi on Hand (mCi)a</th>
<th>Typical Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gd-153</td>
<td>less than 200</td>
<td>PET Scanner attenuation sources</td>
</tr>
<tr>
<td>Ge-68</td>
<td>less than 200</td>
<td>PET Scanner attenuation sources</td>
</tr>
<tr>
<td>Co-57</td>
<td>less than 100</td>
<td>Dose Calibrator Check Sources and SPECT Camera Flood Sources</td>
</tr>
<tr>
<td>Cs-137</td>
<td>less than 1</td>
<td>Dose Calibrator Check Sources</td>
</tr>
<tr>
<td>Eu-152</td>
<td>less than 1</td>
<td>Dose Calibrator Check Sources</td>
</tr>
<tr>
<td>Ba-133</td>
<td>less than 1</td>
<td>Dose Calibrator Check Sources</td>
</tr>
</tbody>
</table>


Note:
a. Millicurie (mCi): A unit of radioactivity equivalent to 0.001 curies.
In addition to radioactive material used at the hospitals and clinics at the SUMC Sites, an irradiator is located in the existing School of Medicine buildings. It contains 2,000 curies of Cs-137 that is in the form of an encapsulated, sealed source. It is anticipated that this irradiator would be replaced within the new FIMs buildings.

**701 Welch Road.** On June 7, 2006, a Phase I ESA was prepared by Aquifer Sciences, Inc. for the 701 Welch Road site to determine current environmental conditions at that site. Based on aerial photographs reviewed for that report, as of 1939, the site appeared to be part of a large farm or pasture lands. This condition remained unchanged until 1957-61, when the existing buildings were constructed. The existing buildings consist of three office buildings (Building A, B, and C) and a small storage building (Building D). The office buildings, which have been used primarily as medical offices, were constructed in the late 1950s and early 1960s. The buildings have been renovated several times since their original construction, including the addition of an elevator tower in 2001. The buildings are surrounded by asphalt-paved parking, landscaping, and related improvements. Access to Building B to perform the Phase 1 investigation was not permitted.

The Phase I ESA for 701 Welch Road made the following recommendations:

- Inspection of Building B, the Addiction Research Foundation, should be performed to better understand the small-quantity generator status of this facility. A small quantity generator is any facility that generates less than 100 kilograms of hazardous waste per month.

- Based on the age of the buildings, it is possible that asbestos-containing materials could be present. Prior to demolition, an asbestos survey should be conducted.

An addendum Report to the Phase I ESA was completed by Aquifer Sciences, Inc. on August 14, 2006 to further document current environmental conditions at 701 Welch Road. At the time of the inspection on June 28, 2006, access was allowed to perform environmental inspection at Building B.

The Addendum Report concluded that there were several environmental concerns regarding the use, handling, and disposal of chemicals at Building B. The Addendum Report also recommended that a Phase II ESA be performed, which could possibly include sampling and analysis of soil, groundwater, wastewater, and residues on surfaces such as laboratory countertops, fume hoods, sinks, sumps, floors, and drain lines.

**703 Welch Road.** On June 1, 2006, a Phase I ESA was performed by Aquifer Sciences, Inc. for the 703 Welch Road site to determine current environmental conditions at that site. The Phase I ESA

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8 Aquifer Sciences, Inc., *Phase I Environmental Assessment*, 701 Welch Road, Palo Alto, California, June 7, 2006.

9 Based on further research conducted by Annette Walton, Stanford Environmental Manager, an elevator tower was installed in 2001 to meet ADA requirements and that no elevator existed prior to this.


11 Aquifer Sciences, Inc., *Phase I Environmental Assessment*, 703 Welch Road, Palo Alto, California, June 1, 2006.
included a review of aerial photographs which revealed that, as of 1939, the site appeared to be part of a large farm or pasture lands. A 1965 aerial photograph showed the current building that occupies the site.

The site currently contains an office building, constructed in 1958 that has been used primarily over the years as dental offices. The building has been renovated several times since the original construction, including a second-floor addition built in 1963. In 1993, a new hydraulic-lift elevator and equipment room were installed. The building is surrounded by asphalt-paved parking areas, landscaping, and related improvements.

Dentists typically use metals in the preparation of amalgam. To prevent these chemicals from being discharged into wastewater, amalgam separators are required. The building contains four amalgam separators in four basement areas to filter out the metals from the dentists’ offices. Wastewater from each separator is conveyed to a sump that, in turn, discharges the wastewater onto either the landscaping or pavement at four locations outside the building.

The Phase I ESA made the following recommendations:

- A more thorough inspection should be made of each of the four amalgam separators.
- Water samples should be taken from each of the four sumps and analyzed for amalgam constituents: mercury, silver, tin, copper, and zinc.
- Based on the age of the building, it is possible that asbestos containing materials are present at the site. Prior to any demolition activities an asbestos survey should be prepared.
- Prior to building demolition, the sink piping (P-traps) and other surfaces should be tested for the presence of metals and other chemicals. If chemicals are detected, proper cleaning and/or disposal of piping, equipment, and other materials may be necessary.
- When the building is demolished, the soil beneath the elevator shaft should be inspected. If there is any sign of a hydraulic fluid release, a soil sample should be collected for laboratory analysis. The soil sample should be analyzed for PCBs. If PCBs or hydraulic fluid is present in the soil sample, the extent of the release should be defined. Soil containing PCBs or hydraulic fluid should be excavated and transported to a regulated landfill for disposal.

A Phase II Soil and Wastewater Quality Evaluation was published for the 703 Welch Road site (also completed by Aquifer Sciences, Inc.) on July 19, 2006. The Phase II was conducted on June 2, 2006 and a comprehensive investigation completed on June 24, 2006. The objective of this assessment was to evaluate the sediment and soil quality in the vicinity of four basement areas where wastewater from amalgam separator systems has been discharged outside the buildings and onto the lawns, the landscaping, or pavement, and to collect wastewater from each separator to determine water quality.

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On June 2, 2006, shallow soil and sediment samples were collected at four discharge points outside the building in proximity to the amalgam separator discharge points and one sample from an unaffected area to represent background conditions. Four wastewater samples were also analyzed.

The surface samples were identified as S1 and S4 and collected at grade; the soil samples were designated S2 and S3 and collected at 1 foot below ground surface (bgs). The background sample was designated as S5. The water samples were collected from the separator system and identified as VW1 through VW4. All the soil and sediment samples were analyzed for amalgam constituents: copper, mercury, silver, tin, and zinc by EPA method 6020A. The four wastewater samples were also analyzed for the amalgam constituents by EPA Method E200.8.

Soil samples were also compared to residential and commercial Environmental Screening Levels (ESLs) established by the San Francisco Bay Regional Water Quality Control Board (RWQCB) for soils. In addition, the soil samples were compared to the Total Threshold Limit Concentration (TTLC) values and Soluble Threshold Limit Concentration (STLC) values established by the State to provide concentration limits for the classification of hazardous substances. As a rule-of-thumb, samples that contain metals at concentrations exceeding the numerical value of 10 times the STLC should be analyzed for soluble concentrations. The results of the initial investigation are provided below:

- Copper concentrations in the soil samples ranged from 44 milligrams per kilogram (mg/kg) to 350 mg/kg; only one sample (S3) exceeded the commercial/industrial ESL for copper (230 mg/kg). None of the samples contained copper at concentrations exceeding the TTLC value of 2,500 mg/kg, but sample S3 did exceed 10 times the STLC value of 250 milligrams per liter (mg/L).

- Mercury concentrations in the soil samples ranged from 18 mg/kg to 1,500 mg/kg; all samples exceeded the commercial/industrial ESL for mercury (10 mg/kg). The background sample (S5) contained mercury at 18 mg/kg and sample S2 contained mercury at 19 mg/kg; the remaining samples were elevated compared to the background concentration. Samples S1, S3, and S4 contained mercury at concentrations exceeding the TTLC value of 20 mg/kg, and all samples exceeded 10 times the STLC value of 2.0 mg/L.

- Silver concentrations in the soil samples ranged from 4.7 mg/kg to 1,100 mg/kg; three samples (S1, S2 and S4) exceeded the commercial/industrial ESL for silver (40 mg/kg). The background sample (S5) contained silver at 4.7 mg/kg and sample S2 contained mercury at 14 mg/kg; the remaining samples were elevated compared to the background concentration. Sample S1 contained silver at a concentration exceeding the TTLC value of 500 mg/kg, and three samples (S1, S3, and S4) exceeded 10 times the STLC value of 50 mg/L.

- Tin concentrations in the soil samples ranged from 4.7 mg/kg to 370 mg/kg. There is no commercial/industrial ESL for tin. The background sample (S5) contained tin at 4.7 mg/kg and tin was not detected in sample S2; the remaining samples were elevated compared to the background concentration. No TTLC or STLC values have been established for tin.

- Zinc concentrations in the soil samples ranged from 160 mg/kg to 810 mg/kg; three samples (S1, S3 and S4) exceeded the commercial/industrial ESL for zinc (600 mg/kg). The
background sample (S5) contained zinc at 160 mg/kg and sample S2 contained zinc at 250 mg/kg; the remaining samples were elevated compared to the background concentration. None of the samples contained zinc at concentrations exceeding the TTLC value of 5,000 mg/kg or the STLC value of 2,500 mg/L.

Wastewater samples were also compared to ESLs established by the San Francisco Bay RWQCB for groundwater. The results of the initial investigation are provided below:

- Copper concentrations in the wastewater samples ranged from 450 micrograms per liter (µg/L) to 2,500 µg/L; all samples exceeded the ESL for copper in groundwater (3.1 µg/L).
- Mercury concentrations in the wastewater samples ranged from 14 µg/L to 1,400 µg/L; all samples exceeded the ESL for mercury in groundwater (0.012 µg/L).
- Silver concentrations in the wastewater samples ranged from 12 µg/L to 1,100 µg/L; all samples exceeded the ESL for silver in groundwater (0.19 µg/L).
- Tin concentrations in the wastewater samples ranged from 23 µg/L to 1,200 µg/L. There is no ESL for tin in groundwater.
- Zinc concentrations in the wastewater samples ranged from 390 µg/L to 3,000 µg/L; all samples exceeded the ESL for zinc in groundwater (81 µg/L).

On June 24, 2006, Aquifer Sciences, Inc. performed a comprehensive sampling program to investigate the lateral and vertical extent of the metals found in shallow soil in the vicinity of the four basement areas on June 2, 2006. A total of 22 boring locations were selected and drilled to a depth ranging from 9 to 20 feet bgs. In all, 73 soil samples were collected for laboratory analysis. Groundwater was not encountered in any of the borings. The samples were analyzed for mercury, silver, and pH levels.

This follow-up investigation revealed that while elevated concentrations of metals were detected in shallow soil and sediment samples collected in the immediate vicinity of the wastewater discharge points, the area impacted was limited in lateral and vertical extent. Based on the analytical data, the areas impacted were limited in lateral extent to those areas immediately to the hose ends (a 4- to 9-square-foot area around each waste water discharge point). The analytical results show that the vertical impact to soil from each wastewater discharge point is limited in depth of the upper 2 feet outside the four basement areas. No significant metals concentrations were detected in soil samples collected adjacent to the floor sumps, with the exception of one sample (VS2-5), collected at a depth of 5 feet below the basement. It contained mercury at a concentration of 14 mg/kg, which exceeds the commercial/industrial ESL of 10 mg/kg.

The Phase II Soil and Wastewater Quality Evaluation made the following recommendations:

- Discontinue the practice of discharging wastewater from the amalgam separators to the landscaping or pavement.
- Reroute any water collecting in the floor sumps into the sanitary sewer system.
• If the building is demolished, inspect the sanitary sewer line for signs of leakage at joints and bends. If the sanitary sewer line is in poor condition or leakage has occurred, collect samples of the surrounding soil. Analyze the samples for mercury, silver, and pH levels to evaluate whether disposal of wastewater from the dental offices has impacted soil quality.

A Lead Survey and Evaluation was conducted for 703 Welch Road in June 2005. The purpose of this screening survey was to detect the presence of lead-based paint (LBP) or lead-containing paint (LCP) on major building components throughout the site. One sample tested positive for LBP found on the exterior railing components. Nine samples tested positive for LCP. The report authors recommended more comprehensive lead inspection prior to significant disturbance of painted surfaces.

A Limited Asbestos Survey and Evaluation was conducted for 703 Welch Road by ProTech Consulting and Engineering in May 2006 to locate ACM and ACBM within the building. ACMs were discovered in wall and ceiling sheetrock, joint tape and compound, acoustical ceiling plaster and spray, sheetrock surfacing texture, and duct tape. The report recommended that any ACM that could be impacted during repairs, renovation, or demolition be removed prior to those destructive activities.

1101 Welch Road. A Phase I ESA was conducted by Geomatrix for 1101 Welch Road in February 1996. Stanford University has owned the property at 1101 Welch Road since 1885. The property was leased to Medical Plaza, Inc. from 1957 to 1982, and Medical Plaza, Inc. built the medical buildings in the late 1950s. In 1982 the lease was reassigned to Medical Plaza Associates, and has subsequently been reassigned to SHC. The property contains three single-story buildings: Building A, Building B, and Building C. The area around the buildings is paved with asphalt and the landscaping is mature. The general uses of the buildings along with hazardous contents are described as follows:

• Building A: Contains a blood laboratory; no x-ray rooms or chemicals were present.
• Building B: Contains two blood laboratories, an x-ray room, and a dark room, as well as supporting offices. Offices contained paint, grout, wall finish, and paint-related chemicals. The dark room contained x-ray developing chemicals, photo processing chemicals, and silver repositories. A “Visible Laser Radiation Machine” was located in one office as well as liquid nitrogen, a cylinder of oxygen, and dermatology medication.
• Building C: Contains several offices with x-ray rooms and darkrooms. The dark rooms contained photo processing chemicals and byproducts containing silver. This building also contains a pharmacy.

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14 Lead-based paint (LBP) contains a concentration of 1 milligram of lead per square centimeter (mg/cm²) or greater.
15 Lead-containing paint (LCP) contains a concentration of less than 1 milligram per square centimeter (mg/cm²) of lead.
17 Geomatrix Consultants, *Phase I Environmental Site Assessment*, 1101 Welch Road, Palo Alto, California, February 1996.
The 1101 Welch Road site also contains a transformer vault area including a heating equipment room, a cooling equipment room, and a power switch room. The vault area includes a locked biohazardous waste storage locker and the power switchboard room. The cooling system area includes a chemical storage area without secondary containment. It was noted in the Phase I ESA that the storm drain in this area should be sealed in order to prevent release of chemicals into the storm or sanitary sewer.

Several of the current and former x-ray rooms and dark rooms in the offices of the buildings were tested for the presence of lead in the walls and paint. Lead was detected in all of the areas tested, probably due to LBP. However, it is also possible that the walls are lead lined. No asbestos surveys or tests were conducted.

The Phase I ESA recommended the following:

- If painted walls are to be disturbed through construction renovation or maintenance activities, the Occupational Safety and Health Administration (OSHA) and Cal/OSHA worker safety protocol should be followed.
- All chemical waste stored on the property should be disposed of off-site.
- The chemicals stored in the cooling areas of Building C should be stored in a secondary containment area.
- The floor drain in the cooling equipment area of Building C should be sealed.
- Given that no hazardous waste spills or accidents have been reported and no underground storage tanks exist, a Phase II analysis is not recommended for this site.

**Hoover Pavilion Site.** On September 2007, a limited Phase I ESA was conducted by Geomatrix for the Hoover Pavilion Site, located at 211 and 215 Quarry Road.\(^\text{18}\) The Phase I ESA\(^\text{19}\) included a site reconnaissance, review of historical photographs and topographic maps, selected agency file review, review of regulatory databases, interviews of local government officials regarding the current regulatory status of the site, and interviews of personnel currently associated with the site.

According to the Phase I ESA, the aerial photographs and topographic maps indicate that the site appears to have been undeveloped, agricultural land until the late 1930s; on-site buildings first appear in photographs and maps in 1939. The surrounding land uses appear to have been commercial and residential since the 1940s, with the exception of Stanford University, which appears in photographs and maps as early as 1899. Buildings constructed prior to 1981 could have been built with hazardous materials such as asbestos, PCBs, lead, and mercury.

\(^{18}\) Geomatrix, Phase I Environmental Site Assessment, Hoover Pavilion, September 2007.

\(^{19}\) The SUMC Project sponsors elected to not conduct the ESA according to ASTM E1527-05, which is updated relative to ASTM E1527-00 to include provisions of U.S.EPA All Appropriate Inquires (AAI) Final Rule (40 CFR 312), which took effect November 1, 2006. AAI is the prevailing standard for providing liability protection as an innocent landowner, a bona fide prospective purchaser, or a contiguous property owner under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA).
Historical uses and operations of the Hoover Pavilion Site include medical services, welding, spray-painting, printing/mimeography, and automobile body repairs and maintenance. The welding shop ceased operations and was dismantled in 1995 in accordance with PAFD procedures; the printing/mimeography operations ceased in the mid-1980s; and spray painting of miscellaneous items still occurs on an intermittent basis. As a result of these historical uses, the Phase I ESA identified certain site features that could impact environmental conditions at the site: two 2,200-gallon USTs (diesel); one 750-gallon UST (primarily diesel); one 350-gallon UST (waste oil); a boiler room with sump; and three oil-filtered transformers. The two 2,200-gallon USTs were emptied and closed in-place with neat cement slurry under a permit with the PAFD. The 750-gallon UST (which was installed in the 1960s under a permit with the PAFD) was removed in 1996, and the 350-gallon waste oil UST was emptied and closed in-place in 1987. According to interviews conducted as part of the Phase I ESA report, the boiler room and sump were closed in 2000, and the three oil-filled transformers were removed and replaced with dry type transformers in the mid-1990s.

Underground Storage Tanks. In 1940, two 2,200-gallon USTs were installed adjacent to what is now the south wing of the Hoover Pavilion (please refer to Figure 3.12-1). The tanks were known to contain both diesel fuel and fuel oil from the time of installation. In 1986, petroleum hydrocarbons were detected in the soil during a subsurface investigation conducted to ascertain closure options for the two 2,200-gallon diesel tanks. Hydrocarbon migration was identified from the tanks into the surrounding soil and groundwater, revealing a hydrocarbon plume consisting of degraded diesel and some type of heavier fuel oil. The tanks were emptied in 1987 and closed in place (for structural reasons) under a permit with the PAFD in 1996. Product supply and return lines associated with the tanks, which extended from the USTs to a nearby boiler room and to a power substation to the west, were flushed and filled in place or capped in 1996.

Soon after the tanks were emptied, Stanford Health Services began conducting quarterly hydrocarbon monitoring. The May 1995 Hydrocarbon Investigation for the Hoover Pavilion Site recommended “natural attenuation” to control the migration of hydrocarbons. The First Quarter 2001 Groundwater Monitoring Report confirmed that the plume of dissolved-phase hydrocarbons was relatively stable. Groundwater was analyzed for concentrations of total petroleum hydrocarbons as diesel (TPH-D), volatile organic compounds (VOCs), and oxygenates. Samples detected TPH-D at 432 μg/L from the source well (MW-6), which is explained as a result of its location next to the source (the UST) and natural seasonal fluctuations of water levels. Water levels were recorded to range between 41 and 53 feet bgs. VOCs were also detected as trichlorofluoromethane (Freon-11); however, these concentrations were well below the State Maximum Contaminants Levels (MCL) for Freon-11 in drinking water, and did not represent a threat to groundwater quality. No oxygenates were detected in any of the wells.

FIGURE 3.12-1
Location of Underground Storage Tanks in Project Vicinity


D41357.00
Stanford University Medical Center Facilities Renewal and Replacement Project

1. Hoover Pavilion USTs
2. 703 Welch Rd. Phase 1 ESA (potential contamination from waste water discharge)
3. Chevron Station
4. Mobil Station - 375 Arboretum Road


Stanford University Medical Center Facilities Renewal and Replacement Project


D41357.00
Stanford University Medical Center Facilities Renewal and Replacement Project
A 750-gallon steel UST was installed in the 1960s on the Hoover Pavilion Site (see Figure 3.12-1), and was located adjacent to the loading dock behind the Hoover Pavilion Site. The tank was used as a diesel fuel storage tank for the emergency generator and the boiler room sump. The tank remained in use as diesel fuel storage until 1996 when it, as well as most of its associated piping, was emptied and removed under a permit with the PAFD. Soil sampling was conducted after the tank was removed for TPH-D, benzene, toluene, ethyl benzene, and xylenes (collectively known as BTEX). TPH-D was detected (at concentrations ranging from 180 to 1,400 parts per million [ppm]); BTEX were not detected. The Phase I ESA states that it is likely that residual TPH-D remains in shallow soil beneath the old supply lines, which ran from the tank to the boiler sump and underneath the loading dock. No additional sampling was performed beneath the supply lines. The removal of this tank was overseen by the PAFD, and any further action regarding clean up with this tank would be done under the oversight of the County.

A 350-gallon waste oil tank was installed on the southwest corner of the property at the Hoover Pavilion Site near what is now a storage shed. This tank was associated with a former auto repair shop. Soil sampling conducted in 1986 identified petroleum hydrocarbons at 100 ppm. The tank was emptied and closed in place in 1987. Further analysis was conducted in 1994 to assess the soil condition under the UST, and results indicated minimal residual concentrations of tetrachloroethene, THP-D, chromium, nickel, and zinc. Case closure was requested for this tank in 1994; however, there is no record at SCVWD of the closure letter.

Conclusions and Findings for the Limited Hoover Pavilion Phase I ESA. Based on the data reviewed, the Phase I ESA made the following conclusions:

- For the two 2,200-gallon USTs closed in place and leaking associated residual petroleum hydrocarbons remaining in subsurface media (soil and/or groundwater):
  - petroleum-impacted soils remain below ground surface in the vicinity of tanks;
  - free product likely is present in on-site monitoring wells;
  - while previous investigations have shown that impacts to subsurface media from these USTs is limited to within the Hoover Pavilion Site boundaries, the presence of free product in site wells leaves the site open from a regulatory perspective; and
  - besides passive free product removal, no other remedial actions have been implemented at the site.

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24 Personal communication between Carolina Morgan, of PBS&J and Mamerto Jorvina of Santa Clara County Department of Health and Services regarding case ID 06S3W03H02f – Stanford University Medical Center at Hoover Pavilion (211 Quarry Road, Palo Alto, CA), February 15, 2008.
• The adequacy and completeness of the regulatory closure for the 750-gallon diesel UST and the 350-gallon UST is not known.

- While it is known that the 750-gallon diesel tank was removed under permit by the PAFD, no documentation was found in any agency files to indicate a “No Further Action” certificate was submitted for this tank.

- Case closure was recommended by a previous consultant for the closed-in-place 350-gallon UST; however, based on files available at the PAFD, it is not known whether a closure request was submitted and approved. This tank should be removed during future redevelopment activities with PAFD oversight.

- It is known that polynuclear aromatic hydrocarbons are commonly associated with waste oil; however, these have not been tested in the vicinity of the 350-gallon waste UST.

• Potential leakage of petroleum from the former supply lines has not been investigated.

• Potential of chemical contamination in soil and/or groundwater near and beneath and around site features, including:

  - The dry storage shed adjacent to the Paint Shop, located on the southern part of the site has historically functioned has an auto body repair shop. However, the extent of operations at this location is not known.

  - The sump motor associated with the former boiler was fueled with diesel fuel from on-site USTs. It is possible that chemicals are present in soil near and beneath the former boiler sump motor.

  - Regarding the spray-painting operation, it is possible lead-based paints were used at some point, and consequently lead may have been expelled from the fume hood and deposited in the vicinity of the Paint Shop.

On March 12, 2008, the County DEH requested that quarterly monitoring of groundwater quality be reinstated so that the current levels of contamination in groundwater can be assessed. At this time, preliminary data has been submitted to the County DEH on groundwater testing for the two 2,200-gallon USTs located at 211 Quarry Road. As indicated by the County DEH, four groundwater samples were collected on August 18th and 19th, 2008, from four monitoring wells located within and in the immediate vicinity of the two tanks. Groundwater samples from MW-4, MW-5, MW-6 and MW-7 were tested for diesel range organics. The results indicated maximum levels of TPH-D at 180 µg/l
(ppb) in MW-6, which is above the RWQCB water Environmental Screening Level (ESL)\textsuperscript{25} and water quality objective of 100 \( \mu g/l \) for drinking water; however, it was below the ESL of 210 \( \mu g/l \) for non-drinking water groundwater.\textsuperscript{26} All other samples were below 50 \( \mu g/l \). Groundwater analysis also disclosed the presence of naphthalene at a concentration of 1 \( \mu g/l \), well below the corresponding ESL for both drinking water and non-drinking water groundwater (17 \( \mu g/l \) and 24 \( \mu g/l \), respectively).\textsuperscript{27} SHC has completed the well sampling and assessed, insofar as was feasible, the volatility of the diesel compounds and the biodegradation factors. SHC also has conducted further soil vapor sampling. This analysis detected concentrations of VOCs that included styrene, dichloroethene (DCE), trichloroethene (TCA), tetrachloroethene (PCE), and Freon-11, which are not typically found in diesel fuel and likely are unrelated to the USTs. Still, concentrations of PCE were measured at 1.63 \( \mu g/l \) about 60 feet south of the two USTs, a concentration that exceeds the corresponding ESL of 0.41 \( \mu g/l \).\textsuperscript{28}

**Fuel Leak Sites.** USTs are known to have been used in a variety of settings for the purpose of storing petroleum hydrocarbons and waste oils within the SUMC Sites. Pursuant to SCVWD Ordinance 83-2, Section 6.1,\textsuperscript{29} the SCVWD implements its statutory role in protecting the water supply by prohibiting the pollution of its water supplies, whether in surface streams, reservoirs, or conduits of any kind, or of groundwater, by any direct or indirect means. The Hoover Pavilion Site is the only site within the SUMC Sites known to have USTs on-site (as explained above under “Hoover Pavilion Site”). A summary description is below.

*Stanford University Medical Center (Case # 06S3W03H02f - Open).* This site is also known as the Hoover Pavilion Site, located at 211 Quarry Road. Four USTs have been reported in the Hoover

\textsuperscript{25} The Environmental Screening Levels (ESLs) are considered to be conservative. Under most circumstances, and within the limitations described, the presence of a chemical in soil, soil gas or groundwater at concentrations below the corresponding ESL can be assumed to not pose a significant, longterm (chronic) threat to human health and the environment. Additional evaluation will generally be necessary at sites where a chemical is present at concentrations above the corresponding ESL. Active remediation may or may not be required depending on site-specific conditions and considerations. The Tier 1 ESLs presented in this section from the lookup tables are NOT regulatory cleanup standards. The presence of a chemical at concentrations in excess of an ESL does not necessarily indicate that adverse impacts to human health or the environment are occurring; this simply indicates that a potential for adverse risk may exist and that additional evaluation is warranted.

\textsuperscript{26} California Regional Water Quality Control Board San Francisco Bay Region, *Interim Final Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*, Table C. Environmental Screening Levels (ESLs) Deep Soils (>3m bgs) Groundwater is a Current or Potential Source of Drinking Water and Table D. Environmental Screening Levels (ESLs) Deep Soils (>3m bgs) Groundwater is not a Current or Potential Source of Drinking Water, November 2007, Revised May 2008.

\textsuperscript{27} California Regional Water Quality Control Board San Francisco Bay Region, *Interim Final Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*, Table C. Environmental Screening Levels (ESLs) Deep Soils (>3m bgs) Groundwater is a Current or Potential Source of Drinking Water and Table D. Environmental Screening Levels (ESLs) Deep Soils (>3m bgs) Groundwater is not a Current or Potential Source of Drinking Water, November 2007, Revised May 2008.

\textsuperscript{28} California Regional Water Quality Control Board San Francisco Bay Region, *Interim Final Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*, Table E. Environmental Screening Levels (ESLs) Indoor Air and Soil Gas (Vapor Intrusion Concerns), Shallow Soil Gas Screening Levels, Residential Land Use, November 2007, Revised May 2008.

\textsuperscript{29} Santa Clara Valley Water District, NOP Stanford University Medical Center Facilities Renewal and Replacement Project, and Simon Properties-Stanford Shopping Center Expansion, September 28, 2007.
Pavilion Site: two 2,200-gallon USTs (diesel); one 750-gallon UST (primarily diesel); and one 350-gallon UST (waste oil). Please refer to the “Hoover Pavilion Site” section for further description.

**Existing Hazardous Waste.** Hazardous wastes have been and are currently generated by uses at the Main SUMC Sites. The current types and amounts of hazardous waste generated at the Main SUMC Site are shown in Table 3.12-5. This table provides a summary of the listing of on-site hazardous chemicals from the SUMC Project application.²⁰ Types of hazardous waste include flammable materials (e.g., solvents), corrosive materials (e.g., acids, bases), toxic materials (e.g., mercury, lead), reactive materials (e.g., aerosols, oxidizers), other hazardous liquids (e.g., oil and water, latex paints), and other hazardous solids (e.g., batteries, lights, ballast). As shown in the table, facilities at the Main SUMC Site currently generate about 61.4 tons of hazardous waste each year. The majority (94.3 percent) generated by the LPCH and SHC.

<table>
<thead>
<tr>
<th>Table 3.12-5</th>
<th>Non-Biohazard Hazardous Waste Generated at the Main SUMC Site</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Waste</strong></td>
<td><strong>Examples</strong></td>
</tr>
<tr>
<td>Flammable Materials</td>
<td>Solvents</td>
</tr>
<tr>
<td>Corrosive Materials</td>
<td>Acids, bases</td>
</tr>
<tr>
<td>Toxic Materials</td>
<td>Mercury, lead</td>
</tr>
<tr>
<td>Reactive Materials</td>
<td>Aerosols, oxidizers</td>
</tr>
<tr>
<td>Other Hazardous Liquids</td>
<td>Oil and Water, latex paints</td>
</tr>
<tr>
<td>Other Hazardous Solids</td>
<td>Batteries, lights, ballast</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
</tr>
</tbody>
</table>


No radioactive waste is generated from radioactive hazardous materials listed in Table 3.12-2 since it is allowed to decay for ten half-lives and is then disposed as non-radioactive. This disposal method is specified in Stanford’s Radioactive Material License with the State of California. Radioactive materials listed in Table 3.12-4 are normally returned to the manufacturer for recycling or disposal when sources are past their useful life, resulting in a very small quantity as waste. Disposal of all radioactive waste is in accordance with the Hazardous Materials & Waste Management Plan.

A Medical Waste Management Plan is followed by the SHC, the LPCH, and the SoM. This plan includes a comprehensive list of the types of medical waste generated and covers the collection and disposition of medical waste, emergency action plans, and a list of the required training for new employees. About 1,100 tons of biohazardous waste generated by the Main SUMC Site is treated on-site by steam sterilization and about 160 tons are transported to off-site, licensed disposal facilities for incineration (pathological waste, trace chemotherapy waste, pharmaceutical waste).

²⁰ Stanford University Medical Center, Stanford University Medical Center Facilities Renewal and Replacement Project Application, August 2007, as amended; Tab 7.
Hazardous materials handling and hazardous waste management are subject to laws and regulations at all levels of government as summarized below. The County Office of Emergency Services (OES) and the PAFD implement and enforce federal, State, and local laws regarding hazardous materials management and emergency planning. The County DEH is the Certified Unified Program Agency (CUPA) for the County of Santa Clara and the City of Palo Alto. The County DEH administers the Hazardous Waste Generator/Tiered Permitting Program (California Health and Safety Code Chapter 6.5), and the Risk Management Program (California Health and Safety Code Chapter 6.95). The PAFD administers the California Fire Code (with local amendments), the Hazardous Materials Storage Ordinance, and the Toxic Gas Ordinance. As a CUPA Participating Agency, the PAFD also administers the following State programs: the Hazardous Materials Business Plans (California Health and Safety Code Chapter 6.95), the Underground Storage Tank Program (California Health and Safety Code Chapter 6.7), and the Aboveground Petroleum Storage Tank Program (California Health and Safety Code Chapter 6.67).

The County DEH protects the health of the community through the enforcement of environmental standards. The Hazardous Materials Compliance Division regulates the disposal and storage of hazardous materials both above and below ground. The California Office of Statewide Health Planning and Development (OSHPD), the Palo Alto Building Division (PABD), and the PAFD implement and enforce State laws regarding building and fire safety. Cal/OSHA and OSHA implement and enforce State and federal laws regarding worker safety. DTSC implements and enforces federal and State laws regarding hazardous waste handling. The Radiologic Health Branch of the California Department of Health Services (CDHS) implements and enforces State and federal laws regarding radioactive materials management. The CDHS Medical Waste Management Program and County Department of Environmental Protection implement and enforce State laws regarding medical waste handling. The U.S. Department of Transportation (DOT), the U.S. Postal Service (USPS), the U.S. Environmental Protection Agency (EPA), the California Highway Patrol (CHP), the California Department of Transportation (Caltrans), and the DTSC implement and enforce State and federal laws regarding hazardous materials transportation. Bay Area Air Quality Management District (BAAQMD), Cal/OSHA, and DTSC implement and enforce state and federal laws regarding hazardous building components. San Francisco Bay RWQCB oversees the groundwater protection program throughout the County.

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**Hazardous Materials Management and Emergency Planning.** State and federal laws require that hazardous materials be properly handled, used, stored, and disposed of, and, in the event that such materials are accidentally released, that appropriate measures are taken to prevent or to mitigate injury to human health or the environment. California’s Hazardous Materials Release Response Plans and Inventory Law, sometimes called the “Business Plan Act,” aims to minimize the potential for accidents involving hazardous materials and to facilitate an appropriate response to possible hazardous materials emergencies. Businesses, including hospitals, that use hazardous materials in quantities that exceed the state-established threshold quantities of 55 gallons for liquids, 500 pounds for solids, and 200 cubic feet at standard temperature and pressure for compressed gases, are required by law to create a Hazardous Materials Business Plan (HMBP). The HMBP is then submitted to the PAFD.39

In Santa Clara County, any amount of radioactive materials used or handled by a business requires an HMBP.40 The HMBP requires inventories of those materials to be provided to designated emergency response agencies, a diagram illustrating where the materials are stored on-site, an emergency response plan, and annual training for the employees’ safe use of the materials and safety procedures in the event of a release or threatened release of a hazardous material. If the quantity or type of hazardous materials involved exceeds the thresholds for a ‘short form’, a HMBP addendum must also be prepared. A HMBP addendum must include a spill prevention plan, an emergency response plan, a description of equipment type and location, an employee training plan, and a closure plan. HMBPs and addendums available for existing uses in the SUMC Sites are kept on file with the PAFD and the County Hazardous Materials Program. This information must be updated within 30 days of a substantial change in operations.41

The SUMC Project could increase hazardous materials use and hazardous waste generation due to increased site activity and development, and the range and volume of hazardous materials currently on the site would change due to the expansion of the SUMC. The SUMC has a HMBP on file with the PAFD. The requirement to prepare and maintain an HMBP ensures that the SUMC Project’s use of hazardous materials would be within acceptable risk levels and, therefore, that the SUMC Project would not use or produce hazardous materials in a manner that poses substantial hazards to people or to the environment.

**Building and Fire Safety.** OSHPD enforces the 2007 California Building Code, 2003 Life Safety Code, and 2001 California Fire Code. The PABD and PAFD also enforce the California Building Code and California Fire Code, respectively. These laws specify management practices for flammable materials, including packaging and containment requirements. They also set forth appropriate construction standards (e.g., fire separations and fire suppression systems) depending on building occupancy classifications. The OSHPD, PABD, and PAFD also review proposed building design plans to ensure compliance with the Uniform Building Code and California Fire Code requirements. The new construction and expanded operations at the SUMC Sites would be subject to these requirements.

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Worker Safety. Occupational safety standards exist in federal and State laws to minimize worker safety risks from both physical and chemical hazards in the workplace. Cal/OSHA is responsible for developing and enforcing workplace safety standards and assuring worker safety in the handling and use of hazardous materials. Among other requirements, Cal/OSHA obligates many businesses to prepare injury and illness prevention plans and chemical hygiene plans. Cal/OSHA’s Hazard Communication Standard requires that workers be informed of the hazards associated with the materials they handle. For example, manufacturers are to appropriately label containers and employers are to make material safety data sheets available in the workplace and properly train workers in the use of hazardous materials.

OSHA’s Bloodborne Pathogens Standard mandates the use of universal precautions in the handling of human blood and certain body fluids in the workplace. Each employer with employees who have potential occupational exposure to bloodborne pathogens must annually review and update their Exposure Control Plan. The Exposure Control Plan must implement precautions including providing hand washing facilities; forbidding bending, recapping, or removing contaminated needles or sharps; providing regulation of sharps disposal containers; forbidding the storage or consumption of food/drink, the application of cosmetics, or smoking in work areas where there is a likelihood of occupational exposure; prohibiting mouth suctioning of blood; transporting biohazardous materials according to regulation; provision of personal protective equipment at no cost to employees, including gloves, masks, eye protection, gowns, aprons, and other protective equipment; clean and sanitary maintenance of facilities; provision of the hepatitis B vaccine to employees with risk of occupational exposure; labeling of all containers holding regulated waste; and ensuring all employees participate in occupational exposure training. All of these safety standards and practices regarding workplace safety are contained in and implemented by individual businesses through their HMBPs and Addenda, as described above.

Hazardous Waste Handling. DTSC is authorized to enforce hazardous waste laws and regulations in California. Requirements place responsibility for proper hazardous waste disposal on hazardous waste generators for the lifetime of the hazardous waste, commonly referred to as cradle-to-grave.

All hazardous waste generators must certify that, at a minimum, they make a good faith effort to minimize their waste and use the waste management methods required by law. Hazardous waste laws and regulations are enforced locally by the County DEH.

Radioactive Materials Management. The Radiologic Health Branch of the CDHS administers the federal and State radiation control laws and regulations that govern the storage, use, and transportation of radioactive materials and the disposal of radioactive wastes. The Radiologic Health Branch licenses institutions that use radioactive materials and radiation-producing equipment, such as x-ray equipment. In order to maintain their licenses, institutions such as the facilities at the SUMC must meet training and radiation safety requirements and be subject to routine inspections.

Medical Waste Handling. The CDHS Medical Waste Management Program enforces the California Medical Waste Management Act and related regulations. Medical facilities that generate 200 or more pounds per month of medical waste in any month of a 12-month period are required to implement a
Medical Waste Management Plan, which acts as the Medical Waste Facility Permit application. A Medical Waste Management Plan must be filed with the County DEH, the enforcement and permitting agency, on forms provided by the County DEH, containing but not limited to the name, address, and type of business of the waste generator; the type and estimated monthly quantity of medical waste generated; the type and capacity of medical waste treatment facilities used on-site; the name and address of the registered hazardous waste hauling service; the name and address of the offsite medical waste treatment facility; an emergency action plan complying with CDHS regulations; and a statement certifying that the information provided is complete and accurate. The Medical Waste Management Plan is enforced through an annual certification completed by the medical waste generator and through annual inspections by the PAFD and/or the County DEH.

Medical waste and its disposal are generally regulated in the same manner as hazardous waste, except that special provisions apply to storage, disinfection, containment, and transportation. Medical waste must be stored in closed red bags marked “biohazard” and, when transported for disposal, placed inside hard-walled containers with lids. The law imposes a cradle-to-grave tracking system and a calibration and monitoring system for on-site treatment. Facilities that treat medical waste on-site must obtain a medical waste facility On-site Treatment Facility permit from the County DEH, which is subject to annual audits, and submit a Generator Registration Application (form DHS 8550). The medical waste facility On-site Treatment Facility permit application must contain, but is not limited to, the permit application form (DHS 8667); the capacity and time per operational cycle; the operations schedule; the amount of medical waste expected to be handled during the permit period; the process to be used to treat medical waste; the type of waste to be treated; measures which would prevent unauthorized waste from being treated at the facility; a description of radiation detection devices; a facility site plan depicting medical waste treatment locations; a map of the vicinity; a disclosure statement; a description of security procedures; the general operation plan; the emergency action plan; the training plan; the closure plan; and a description of the monitoring equipment and schedule. The permit is valid for five years, at which point it can be renewed. The County DEH would issue a medical waste facility On-site Treatment Facility permit upon evaluation, inspection, or records review of the application. The permit is issued within 180 days if the application is in substantial compliance with the California Medical Waste Management Act. The permit may condition the handling or treatment of medical waste to protect public health and safety.

The current SUMC Medical Waste Management Plan was revised in March 2007 and includes a comprehensive list of the types of medical waste generated, as well as information on the collection and disposal of medical waste, emergency action plans, and a list of required training regiments for all new employees. With implementation of the SUMC Project, the SUMC Project sponsors would continue to comply with and be subject to the plan.  

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42 Stanford University Medical Center, Stanford University Medical Center Facilities Renewal and Replacement Project Application, August 2007, as amended; Tab 7.
Hazardous Materials Transportation. The United States DOT has developed regulations pertaining to the transport of hazardous materials and hazardous wastes by all modes of transportation. Typical hospital operations could include hazardous materials transport by mail; USPS has developed additional regulations for the transport of hazardous materials by mail; DOT regulations specify packaging requirements for different types of materials; and the EPA has also promulgated regulations for the transport of hazardous wastes. These more stringent requirements include tracking shipments with manifests to ensure that wastes are delivered to their intended destinations. In California, CHP, Caltrans, and DTSC enforce federal hazardous materials transportation requirements. All transportation of hazardous materials to and from the SUMC Sites would be subject to these requirements.

Hazardous Building Components. Structural building components sometimes contain hazardous materials such as asbestos, PCBs, lead, and mercury. Demolition of buildings within the SUMC Sites that contain such materials could disturb these materials and thus expose workers, the public, and the environment to hazardous materials. These materials are subject to regulatory oversight, as described below.

Asbestos. Asbestos is regulated as a hazardous air pollutant and as a potential worker safety hazard. BAAQMD’s Regulation 11 and Cal/OSHA regulations restrict asbestos emissions from demolition and renovation activities and specify safe work practices to minimize the potential for release of asbestos fibers. These regulations prohibit emissions of asbestos from asbestos-related manufacturing, demolition, or construction activities; require medical examinations and monitoring of employees engaged in activities that could disturb asbestos; specify precautions and safe work practices that must be followed to minimize the potential for release of asbestos fibers; and require notice to federal and local government agencies prior to beginning renovation or demolition that could disturb asbestos. California requires licensing and certification through Cal/OSHA of contractors who conduct asbestos abatement activities.

PCBs. DTSC has classified PCBs as a hazardous waste when concentrations exceed 5 parts per million (ppm) in liquids or 50 ppm in non-liquids. Fluorescent light ballasts may contain PCBs, and if so, they are regulated as hazardous waste and must be transported and disposed of or incinerated as hazardous waste. Ballasts manufactured after January 1, 1978 should not contain PCBs and are required to have a label clearly stating that PCBs are not present.

Lead. Cal/OSHA standards establish a maximum safe exposure level for types of construction work where lead exposure may occur, including demolition of structures where materials containing lead are present; removal or encapsulation of materials containing lead; and new construction, alteration, repair, or renovation of structures with materials containing lead. Inspection, testing, and removal of lead-containing building materials must be performed by State-certified contractors who are required to comply with applicable health and safety and hazardous materials regulations. Typically, building materials with only lead-based paint attached are not considered hazardous waste unless the paint is chemically or physically removed from the building debris.
Mercury. Spent fluorescent light tubes, thermostats, and other electrical equipment contain heavy metals that, if disposed of in landfills, can leach into soil or groundwater. Lighting tubes typically contain concentrations of mercury that may exceed regulatory thresholds for hazardous waste and, as such, must be managed in accordance with hazardous waste regulations. Elemental mercury also can be found in many electrical switches, which also must be managed in accordance with hazardous waste regulations.

Emergency Response and Evacuation. Emergency response and evacuation in the City is directed by the Palo Alto Emergency Operations Plan (EOP), which identifies the City’s emergency planning, organization, and response policies and procedures. The plan addresses how the City will respond to disaster emergencies, from preparation through recovery. The EOP establishes the policies and structure for City government management of emergencies and disasters and prescribes four phases of emergencies and disasters: Preparedness, Response, Recovery, and Mitigation/Prevention. It assigns responsibilities for actions and tasks that the City will take to help protect the safety of its citizens against natural, technological, and national security emergencies and disasters. In addition, the EOP provides Evacuation Routes maps from the City’s Comprehensive Plan.43

Impacts and Mitigation Measures

Standards of Significance

Based on significance thresholds determined by the City of Palo Alto, the SUMC Project would result in a significant hazardous materials impact if it would:

- Create a significant hazard to the public or the environment as a result of the routine transport, use, or disposal of hazardous materials;
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- Construct a school on a property that is subject to hazards from hazardous materials contamination, emissions, or accidental release;
- Create a significant hazard to the public or the environment from existing hazardous materials contamination by exposing future occupants or users of the site to contamination either in excess of soil and groundwater cleanup goals developed for the site or from location on listed hazardous materials sites compiled pursuant to Government Code Section 65962.5;
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires;

• Result in a safety hazard from a public airport for people residing or working within the project area; or
• Impair implementation of or physically interfere with an adopted emergency response or evacuation plan.

Methodology for Analysis

To assess the potential for the SUMC Project to involve the use, production, or disposal of materials in a manner that poses substantial hazards to people, the following analysis considers the pathways through which exposure to hazards could potentially occur, and evaluates the controls that would be placed on each of these pathways. Exposure pathways that would be controlled sufficiently to pose no substantial hazards are considered less-than-significant health and safety issues. This evaluation includes the review of previous ESAs, agency files, and hazardous materials reports that deal directly with facilities located within the SUMC Sites.

Exposure pathways are the means by which hazardous substances move through the environment from a source to a point of contact with people. A complete exposure pathway must have four parts: (1) a source of contamination, (2) a mechanism for transport of a substance from the source to the air, surface water, groundwater, or soil, (3) a point where people come in contact with contaminated air, surface water, groundwater, or soil, and (4) a route of entry into the body. Routes of entry can be eating or drinking contaminated materials, breathing contaminated air, or absorbing contaminants through the skin. Risks can be assessed when an exposure pathway is complete. If any part of an exposure pathway is absent, the pathway is said to be incomplete and no exposure or risk is possible. In some cases, although a pathway is complete, the likelihood that exposure will occur is very small.

Exposure pathways can exist under many different circumstances. Toxic substances can be released from a facility or source of contamination during normal, everyday operations or through leaks, spills, fires, or other accidents. Once released, contaminants can move or be transported through the environment by various means, including surface and groundwater flows.

Environmental Analysis

HM-1. Exposure from Hazardous Materials Use, Handling, and Disposal. The SUMC Project would not substantially increase exposure from hazardous materials use, handling, and disposal during operation. (LTS)

Impacts on Workers and Other Individuals On-Site. The existing and projected amounts of hazardous materials at the SUMC Sites are shown in Table 3.12-6. In addition to the materials described in the table, facilities maintenance activities require various common hazardous materials, including cleaners (which may include solvents and corrosives, in addition to soaps and detergents); paints; pesticides and herbicides; fuels (e.g., diesel); and oils and lubricants.

As shown in Table 3.12-6, the post-construction amounts of hazardous materials at the SUMC Sites would exceed the existing amounts of chemicals and hazardous materials currently
<table>
<thead>
<tr>
<th>Type of Material</th>
<th>Existing Amounts On-site</th>
<th>Projected Amount On-site</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Solids (pounds)</td>
<td>Liquids (gallons)</td>
</tr>
<tr>
<td>Explosive, Mass Explosion</td>
<td>0.28</td>
<td>0.00</td>
</tr>
<tr>
<td>Explosive, Minor blast</td>
<td>0.02</td>
<td>0.00</td>
</tr>
<tr>
<td>Flammable Gas</td>
<td>102</td>
<td>0.00</td>
</tr>
<tr>
<td>Non-Flammable, Non-Toxic Gas</td>
<td>3,058</td>
<td>1,535</td>
</tr>
<tr>
<td>Flammable Liquids</td>
<td>0.00</td>
<td>2,879</td>
</tr>
<tr>
<td>Flammable Solid</td>
<td>269</td>
<td>0.06</td>
</tr>
<tr>
<td>Spontaneously Combustible</td>
<td>5.57</td>
<td>0.03</td>
</tr>
<tr>
<td>Water Reactive Flammable</td>
<td>3.74</td>
<td>0.05</td>
</tr>
<tr>
<td>Oxidizers</td>
<td>147</td>
<td>164</td>
</tr>
<tr>
<td>Organic Peroxide</td>
<td>1.07</td>
<td>30.2</td>
</tr>
<tr>
<td>Radioactive</td>
<td>0.87</td>
<td>0.00</td>
</tr>
<tr>
<td>Corrosive Materials</td>
<td>375</td>
<td>749</td>
</tr>
<tr>
<td>Toxic Materials (solid or liquid)</td>
<td>726</td>
<td>442</td>
</tr>
<tr>
<td>Miscellaneous Hazards</td>
<td>5,176</td>
<td>527</td>
</tr>
<tr>
<td>Moderately Toxic</td>
<td>0.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Slightly Toxic</td>
<td>0.00</td>
<td>31</td>
</tr>
<tr>
<td>Flammable</td>
<td>0.00</td>
<td>31</td>
</tr>
<tr>
<td>Combustible</td>
<td>136</td>
<td>218</td>
</tr>
<tr>
<td>Suspect Carcinogen/Mutagen</td>
<td>0.00</td>
<td>33</td>
</tr>
<tr>
<td>Halogenated Solvent</td>
<td>0.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Skin Irritant</td>
<td>0.00</td>
<td>121</td>
</tr>
<tr>
<td>Hepotoxin</td>
<td>0.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Nephrotoxin</td>
<td>0.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Neurotoxin</td>
<td>0.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Lung Irritant</td>
<td>0.00</td>
<td>121</td>
</tr>
<tr>
<td>Eye Irritant</td>
<td>0.00</td>
<td>121</td>
</tr>
<tr>
<td>California Prop. 65 Carcinogen</td>
<td>0.00</td>
<td>2.00</td>
</tr>
</tbody>
</table>


Notes:

a. Some chemicals fall into more than one category; therefore, the columns presented here cannot be added to derive actual totals.

b. This table provides a reasonable estimate of the materials that will be located at SUMC facilities; however, because of the continuing advancements in technology, the list of needed chemicals and quantities may change in the time between this estimate and the opening and ongoing operation of SUMC Project facilities.
on-site. The amount of hazardous materials, as measured by weight, would increase by about 18 percent; the amount of hazardous materials measured by liquid volume would increase by about 19 percent; and the amount of hazardous material measured by gaseous volume would increase by about 9 percent. Overall, there would be a 12 to 30 percent increase in most hazardous materials used and stored on-site.

The risks posed by chemicals used at the SUMC Sites vary depending upon the particular chemical/biohazard. The properties and health effects of different chemicals are unique to each chemical and depend on the extent to which an individual is exposed and how that exposure occurs. As is currently the case, following occupation of the new buildings at the SUMC Sites, exposure to hazardous and biohazardous materials by physicians, staff, patients, and visitors could occur through activities associated with hazardous materials use, handling, storage, and accidental release.

Although the SUMC Project would increase the amount of these materials used or stored at the Main SUMC Site, their transport, storage, and use would be controlled in the same manner as under current conditions. The routes through which SUMC facility employees or others in the immediate vicinity could be exposed include inhalation, ingestion, contact, injection, and other accidents. Control measures to reduce or prevent exposure to hazardous chemical materials and radioactive materials currently exist explicitly in federal and State laws to minimize worker safety risks. Control measures to reduce or prevent exposure to biohazardous materials are incorporated in California law by reference in Sections 25115, 25117, and 25316 of the California Health and Safety Code. Examples of control measures to reduce the risk of exposure of on-site workers and other individuals are presented in Table 3.12-7. These control measures are consistent with occupational safety standards and standard industry practices. They respond to the materials and wastes handling regulations enforced by county, State, and federal agencies through required reporting procedures and site inspections (see Applicable Plans and Regulations, above). The SUMC Project sponsors are, and would continue to be, required by law to comply with the control measures established in the approved HMBPs, license to handle radiological materials, and Medical Waste Facility Permit.

The standard industry practices are established by guidelines from agencies such as the National Research Council and the U.S. Department of Health and Human Services, National Institutes of Health, and Centers for Disease Control. The guidelines are often indirectly required by laws and regulations that incorporate them by reference. The protective equipment and training required by law to be provided to SUMC facilities staff would further reduce potential exposure. The occupational exposure training and personal protective equipment required by OSHA’s Bloodborne Pathogens Standard, the training required by the California Medical Waste Management Act, and the training required by California’s Hazardous Materials Release Response Plans and Inventory Law all limit the exposure pathway for individuals on or near the SUMC Sites. Compliance with the regulations and industry standards would protect workers and other individuals on-site from exposure to hazardous materials.
### Table 3.12-7
Exposure Pathways and Controls – Workers and Other Individuals On-site

<table>
<thead>
<tr>
<th>Exposure Pathway</th>
<th>Examples of Control Measures</th>
</tr>
</thead>
</table>
| **Inhalation** (breathing a hazardous substance) | • Working with volatile materials in fume hoods<sup>a</sup>  
• Working with potentially aerosol-suspended biohazardous materials in biosafety cabinets<sup>b</sup>  
• Keeping containers closed when not in use  
• Wearing face masks or respirators, as necessary |
| **Ingestion** (swallowing a hazardous substance) | • Not eating or drinking near hazardous materials  
• Not storing food in refrigerators used for hazardous materials  
• Not smoking near hazardous materials  
• Washing hands and work areas |
| **Contact** (absorbing a hazardous substance through the skin or eyes) | • Wearing protective clothing and shoes, as necessary  
• Wearing eye protection (glasses or goggles), as necessary  
• Wearing gloves, as necessary  
• Washing hands and work areas  
• Working with radioactive materials behind shields |
| **Injection** (puncturing or cutting the skin with a contaminated object) | • Participating in awareness training  
• Keeping sharps (e.g. needles, knives, scissors) in puncture-resistant containers |
| **Other Accidents** | • Participating in emergency response training<sup>c</sup>  
• Maintaining emergency equipment (e.g., safety showers, emergency eye washes, first aid kits)  
• Providing appropriate lips on shelves where hazardous materials are stored and other restraints where necessary<sup>d</sup>  
• Segregating incompatible hazardous materials and storing flammable materials in fire-rated cabinets  
• Providing secondary containment for hazardous materials that are not in use  
• Calling the Palo Alto Fire Department and its Hazardous Materials Emergency Response Team, if necessary |

**Source:** PBS&J, 2008.

**Notes:**

a. Fume hoods are cabinets with front-opening (usually sliding) glass doors connected to overhead exhaust fans that draw air from the room through the cabinet and expel it into the atmosphere through rooftop stacks.

b. Biosafety cabinets look similar to fume hoods. They filter aerosols and remove particles from the air, but do not necessarily exhaust the filtered air to the outdoors.

c. Training content and methods as required and described by California’s Hazardous Materials Release Response Plans and Inventory Law, Cal/OSHA’s Communication Standard, OSHA’s Bloodborne Pathogens Standard, the licensing requirements of the Radiological Health Branch of the CDHS, the Medical Waste Management Act, and any other applicable laws or regulations.

d. All containers shall be stored using restraining wire or cord, or restraining edges, when open shelving is used.
The County OES regulates the management of hazardous materials, including its storage and use. The County OES inspects hazardous material sites and performs oversight functions pursuant to Division 20 of the State Health and Safety Code. The State Health and Safety Code defines hazardous materials, establishes threshold quantities for regulation, and lists businesses that are exempt from State requirements. All businesses, including hospitals, that use or store quantities that exceed the State’s thresholds are required to file a HMBP with the County OES and the PAFD. Also, in Santa Clara County, an HMBP is required for sites that involve the use or handling of any quantity of radioactive material. The SUMC has an HMBP on file with the PAFD. Compliance with the Business Plan Act would ensure that project-related use of hazardous materials would be within acceptable risk levels because of the inventory, reporting, training, and emergency response plan requirements associated with the HMBP and oversight by the County OES. Therefore, project-related activities would not use or produce hazardous materials in a manner that poses substantial hazards to workers and other individuals on-site. As such, impacts from exposure to hazardous materials use, handling, and disposal on the community and the environment on-site would be less than significant.

**Impacts on the Surrounding Community and Environment.** The health and safety procedures that protect workers and other individuals in the immediate vicinity of hazardous materials would also protect the more distant community and environment. The pathways through which the community or the environment (e.g., local air quality and biota) could be exposed to hazardous materials include air emissions, transport of hazardous materials to or from the site, waste disposal, human contact, and accidents. Table 3.12-8 lists all of the primary means the SUMC Project sponsors would use to protect the community and the environment from exposure to hazardous materials, as required by law, such as California’s Hazardous Materials Release Response Plans and Inventory Law, the 2007 California Building Code, the 2003 Life Safety Code, the 2001 California Fire Code, the San Francisco Bay RWQCB’s groundwater protection program, Cal/OSHA’s Hazard Communication Standard, OSHA’s Bloodborne Pathogen Standard, hazardous waste laws and regulations, radiation control laws and regulations, the California Medical Waste Management Act, the DOT hazardous materials transportation regulations, the USPS hazardous materials transportation regulations, the EPA hazardous materials transportation regulations, and the BAAQMD and Cal/OSHA regulations restricting asbestos emissions and specifying safe work practices, as described in the Applicable Plans and Regulations section, above.
<table>
<thead>
<tr>
<th>Exposure Pathway</th>
<th>Examples of Control Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Emissions</td>
<td>• Using fume hood ventilation or alternative exhaust systems to dilute and subsequently disperse outgoing emissions&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>
| Transport to and from the Site | • Following packaging requirements specified by the DOT, USPS, and the CDHS Radiologic Health Branch and Medical Waste Program  
• Identifying container contents with appropriate labels  
• Using licensed hazardous waste haulers  
• Documenting hazardous waste shipments  |
| Waste Disposal        | • Training workers<sup>b</sup>  
• Segregating wastes  
• Collecting hazardous waste for appropriate disposal  
• Diluting and treating wastewater from the site  
• Labeling trash cans  
• Following federal and State hazardous waste disposal regulations and procedures, including those for hazardous waste manifest documentation |
| Human Contact         | • Identifying container contents with appropriate labels  
• Training workers<sup>b</sup>  
• Implementing standard hygiene practices (e.g., wearing protective clothing and gloves when necessary, leaving protective clothing at work, and washing hands and work areas)<sup>c</sup>  
• Implementing medical surveillance programs to monitor the health of those who work with certain biohazardous materials<sup>d</sup>  
• Monitoring the exposure of those who work with radioactive materials<sup>c</sup> |
| Accidents             | • Providing emergency response training<sup>b</sup>  
• Maintaining emergency equipment (e.g., safety showers, emergency eye washes, first aid kits)  
• Calling the Palo Alto Fire Department and its Hazardous Materials Emergency Response Team, if necessary  
• Plugging floor drains or providing sumps in areas where relatively large quantities of hazardous waste may be handled<sup>d</sup>  
• Conducting facility inspections and preventative maintenance |


Notes:

a. Fume hoods are cabinets with front-opening (usually sliding) glass doors connected to overhead exhaust fans that draw air from the cabinet and expel it into the atmosphere through rooftop stacks.

b. Training content and methods as required and described by California’s Hazardous Materials Release Response Plans and Inventory Law, Cal/OSHA’s Communication Standard, OSHA’s Bloodborne Pathogens Standard, the licensing requirements of the Radiological Health Branch of the CDHS, the Medical Waste Management Act, and any other applicable laws or regulations.

c. These measures would prevent employees from transmitting hazardous materials to the community or into the environment.

d. Floor drains in generator rooms shall be equipped with removable plugs to prevent spills from entering the wastewater sewer. A sump located at the loading dock would minimize the potential for a hazardous materials release to the storm sewers.
The SUMC Project would increase hazardous materials usage and storage on the SUMC Sites. Increased usage and storage would increase risks of human and environmental exposure to hazardous materials. Table 3.12-6 provides the SUMC Project sponsors’ estimates of the quantities of hazardous materials that would be stored at the SUMC Sites. In addition to the materials described in the table, facilities maintenance activities require various common hazardous materials, including cleaners (which may include solvents and corrosives, in addition to soaps and detergents); paints; pesticides and herbicides; fuels (e.g., diesel); and oils and lubricants. It is expected that storage of gases and liquids would generally be in small; individual containers of about 5 gallons or less except for diesel fuel storage tanks and compressed gas cylinders. As a result, the quantities anticipated at the SUMC Sites would be sufficiently small that they would fall well below the federal and California Accidental Release Prevention Program (CalARP) regulated State threshold quantities that would trigger the requirements for a Risk Management Plan. The SUMC Project would not be expected to increase the use of these materials to the point that would exceed the threshold quantities identified in Section 112(r)(5) of the federal Clean Air Act (40 CFR section 68.130). Aside from accidents possibly occurring on-site, accidents during waste transport to and from the SUMC Sites could expose the community and the environment to risks at some distance from the SUMC Sites. As projected by the SUMC Project sponsors, medical waste is expected to increase by 38 tons per year, or 24 percent. As currently, the on-site functions transport an estimated 160 tons of waste per year. The amount of non-medical hazardous waste generated would increase by about 16.6 tons, or 27 percent. As noted above, handling and transportation of hazardous materials and waste is highly regulated.

Hazardous waste transporters are subject to both U.S. Department of Transportation (DOT) and USEPA enforcement of the regulations. Consequently, the DOT and USEPA coordinate their efforts, especially at the regional level, to obtain compliance with both the RCRA and Hazardous Materials Transportation Act (HMTA) regulations. Under the authority of Resource Conservation and Recovery Act (RCRA), the USEPA regulates the transportation of hazardous wastes. The USEPA coordinates its transportation ordinances with the requirements of the HMTA and any statutes promulgated by the DOT pursuant to HMTA. The USEPA has set forth these standards applicable to transporters of hazardous wastes in 40 CFR 263. These USEPA standards incorporate and require compliance with the DOT provisions on labeling, marking, placarding, using proper containers, and reporting discharges. The USEPA’s adoption of these DOT standards ensures consistency among the requirements and avoids establishing conflicting rules. The DOT’s regulations are documented in 49 CFR 171-180 and implemented by the Research and Special Programs Administration (RSPA) within the DOT. In summary, the USEPA is directed by RCRA to establish certain standards for transporters of hazardous materials and to coordinate regulatory activities with the DOT.

44 Stanford University Medical Center, Stanford University Medical Center Facilities Renewal and Replacement Project Application, August 2007, as amended; Tab 7.
45 Stanford University Medical Center, Stanford University Medical Center Facilities Renewal and Replacement Project Application, August 2007, as amended; Tab 7.
In accordance with USEPA regulations, a transporter must:

- Comply with the manifest system (a system that ensures the integrity of the shipment from the point of origin to its destination).
- Maintain the appropriate records (signed manifests) for three years.
- Take immediate action to protect human health and the environment (e.g., notify local authorities or initiate interim measures) in the case of a discharge.
- In the event of a hazardous waste discharge, notify the National Response Center and submit a report to the DOT Office of Hazardous Materials Regulations.
- Clean up any discharges to the environment and take any actions required by the appropriate government officials for mitigating the discharge effects on human health and environment.

Transporters of hazardous wastes must also adhere to all of the Federal Motor Carrier Safety Regulations which DOT has adopted under the Motor Carrier Safety Act of 1984. This Act specifies more requisites that apply to the transport vehicle and the driver. Among them are concise specifications for vehicle parts and accessories, such as lighting devices, brakes, glazing and windows, fuel systems, tires, and horns. Additional requirements concerning inspection, repair, and maintenance are enumerated. Special driving and parking rules which relate to hazardous materials transportation are also indicated. Standards for drivers identify minimum qualifications, including physical qualifications, background and character profiles, and pertinent examinations. Also included among these rules are testing requirements for alcohol and controlled substances such as marijuana, cocaine, opiates, amphetamines, and phencyclidine (PCP). Other regulations pertaining to drivers include standards for the driving of vehicles, stopping, fueling, the use of lamps, the reporting of accidents, and the monitoring of a driver's hours of service.

These existing regulations would ensure that the increase in hazardous waste materials would not substantially increase exposure to the community and surrounding environment. Furthermore, in the event of an accident or spill, the SUMC Project would implement its required emergency response plan (as part of the HMBP) in coordination with the PAFD (see Section 3.14, Public Service, for an analysis of SUMC Project impacts on PAFD services).

**Hazardous Materials Use and Storage Summary.** The SUMC Project would increase the on-site use and handling, disposal, and transport of hazardous materials relative to existing conditions. Regulations such as California’s Hazardous Materials Release Response Plans and Inventory Law; the 2007 California Building Code, the 2003 Life Safety Code, the 2001 California Fire Code; the San Francisco Bay RWQCB’s groundwater protection program; Cal/OSHA’s Hazard Communication Standard; OSHA’s Bloodborne Pathogen Standard; hazardous waste laws and regulations; radiation control laws and regulations; the California Medical Waste Management Act; the DOT hazardous materials transportation regulations; the USPS hazardous materials transportation regulations; the EPA hazardous materials
transportation regulations; and the BAAQMD and Cal/OSHA regulations restricting emissions and specifying safe work practices would require implementation of the controls summarized in Table 3.12-7 and Table 3.12-8. These mechanisms would minimize the potential for exposure to adverse health or safety effects. Therefore, the SUMC Project would not involve the use, disposal, or transport of materials in a manner that poses substantial hazards to people, animal, or plant populations. Furthermore, the SUMC Project would implement its required emergency response plan (as part of the HMBP) in coordination with the PAFD (see Section 3.14, Public Service, for an analysis of SUMC Project impacts on PAFD services). For these reasons, the SUMC Project would not result in a significant environmental impact related to the increased use, transport, handling, and disposal of hazardous materials.


The SUMC Project would require demolition of about 1.2 million square feet of existing buildings, some of which date back to 1953. Because it was common building practice to use materials containing asbestos, PCBs, lead, and mercury in structures built prior to 1981, demolition of the existing buildings (which were built prior to 1981) could disturb these hazardous building materials and, without control measures, the hazardous materials could cause adverse health or safety effects to construction workers, the public, and/or the environment.

If hazardous materials were found upon inspection at levels that require special handling (i.e., any building material containing 0.1 percent asbestos, paint that contains more than 5,000 parts per million of lead, or any building materials known or suspected to contain any amount of PCBs or mercury), the SUMC Project sponsors must manage these materials as required by law and according to federal and State regulations and guidelines, including those of DTSC, BAAQMD, Cal/OSHA, Santa Clara County OES, and any other agency with jurisdiction over these hazardous materials, as described below.

Asbestos poses health hazards only when inhaled; therefore, friable (easily crumbled) asbestos is potentially hazardous if not encapsulated. Non-friable asbestos or encapsulated asbestos does not pose substantial health risks. During building demolition, asbestos fibers (if any are present) could be disturbed, released into the air, and inhaled by construction workers or the public unless proper precautions are taken. There could be asbestos containing materials in these buildings, and though currently those materials are inert, they could be released to the air during demolition activities, subsequently exposing site workers.

BAAQMD’s Regulation 11 – Hazardous Pollutants, Rule 2 – Asbestos Demolition, Renovation, and Manufacturing establishes an allowable asbestos emissions threshold from asbestos-related demolition or construction activities, and specifies precautions and safe work practices to be followed in order to minimize the potential release of asbestos fibers. A detailed written plan or notification of demolition must be submitted to the Air Pollution Control Officer (APCO) at least 10 business days before the commencement of demolition. This plan must include contact
information for the person who conducted the asbestos survey, including the surveyor's applicable Cal/OSHA certification number; a description of demolition methods, work practices, and engineering controls; the amount of regulated-asbestos containing material to be removed; certification that at least one person trained as required by the BAAQMD will supervise the removal described, with the information posted on the SUMC Sites for inspection by the APCO; the waste transporting service to be used; and the site where the waste will be disposed. The APCO at the BAAQMD enforces the regulation through inspection and testing to determine compliance, citations for non-compliance, and through identification of misdemeanors requiring fines or jail sentencing. The purpose of the BAAQMD's Regulation 11 is to control emissions of asbestos to the atmosphere during demolition, renovation, milling, and manufacturing activities and establish appropriate waste disposal procedures to safeguard workers, the public, and the environment from asbestos emissions.

While compliance with these regulations would protect construction workers and the public from exposure to hazardous materials such as asbestos, potential impacts associated with asbestos could occur if an asbestos survey were not conducted prior to commencement of demolition activities to ensure that control measures are implemented. Thus, potential exposure to asbestos containing materials during building renovation and/or demolition is considered a significant impact.

Building components containing PCBs, lead, or mercury could be found in the buildings proposed to be demolished on the SUMC Sites. In sufficient concentrations, lead and mercury are regulated as hazardous wastes. PCBs, mercury, and lead are regulated under the federal Toxic Substances Control Act of 1976, and Cal/OSHA standards establish a maximum safe exposure level for types of construction work where lead exposure may occur, as described earlier in Applicable Plans and Regulations. Additionally, adherence to applicable health and safety requirements for these substances would ensure that potential exposure impacts from PCBs, lead, and/or mercury are less than significant.

Hazardous materials would be used in varying amounts during construction of the SUMC Project. Products and materials typically used during construction that could contain hazardous substances include paints, solvents, cements, glues, and fuels. As explained in under HM-1, compliance with existing federal, State, and local laws and regulations that are administered and enforced by the County DEH and the PAFD would ensure that potential exposure impacts related to disturbances of hazardous materials would be less than significant.

**Mitigation Measure.** Implementation of the mitigation measure below would reduce impacts from exposure to asbestos containing materials to a less-than-significant level at the SUMC Sites by ensuring that all asbestos containing materials are identified and removed prior to structural modification and/or demolition. (LTS)

**HM-2.1 Conduct Asbestos Survey at the SUMC Sites.** Prior to building renovation and/or demolition, an asbestos survey shall be performed on all areas of the building anticipated to be demolished and/or renovated. This survey shall be performed by a
licensed asbestos abatement contractor. In the event that asbestos is identified in
the buildings proposed to be demolished and/or renovated, all asbestos containing
materials shall be removed and appropriately disposed of by a licensed asbestos
abatement contractor. A site health and safety plan, to ensure worker safety, in
compliance with OSHA requirements (8 CCR 5208) shall be developed by the
SUMC Project sponsors and in place prior to commencing renovation or demolition
work on portions of buildings containing asbestos.

HM-3. Exposure to Contaminated Soil and/or Groundwater During Construction. The SUMC Project
could expose construction personnel and public to existing contaminated groundwater and/or
soil. (S)

Exposure to hazardous materials could cause various short-term or long-term health effects
specific to each chemical present if exposure is of sufficient concentration and duration. Acute
effects, which may result from a single exposure, could range from major to minor effects,
such as nausea, vomiting, headache, or dizziness. Chronic exposure to hazardous materials
could result in systemic damage or damage to specific organs, such as lungs, liver, or kidneys
related to exposure to benzene, a known carcinogen and a common additive to petroleum
hydrocarbons). Construction workers would be at the greatest risk of exposure to contaminated
soil or groundwater, particularly if the potential for hazardous materials in the soil or
groundwater is not identified adequately.

As described previously in this section, four Phase I ESAs, one Phase II ESA, and additional
soil vapor and groundwater sampling were completed in order to assess the conditions at the
SUMC Sites and identify potential hazardous conditions within the SUMC Project boundary.
Specifically, the Phase I ESAs were conducted for specific addresses/sites located within the
SUMC Sites (a Phase II ESA was also completed for the 703 Welch Road Site – refer to
Existing Conditions section for further information). These locations are:

- Site 1 - 701 Welch Road, in the Main SUMC Site
- Site 2 - 703 Welch Road, in the Main SUMC Site
- Site 3 - 1101 Welch Road, in the Main SUMC Site
- Site 4 – Hoover Pavilion Site

Site 1 - 701 Welch Road. The Phase I ESA Addendum Report for 701 Welch Road
recommended a Phase II ESA be performed, which could possibly include sampling and
analysis of soil, groundwater, wastewater, and residues on surfaces such as laboratories
countertops, fume hoods, sinks, sumps, floors, and drain lines. Based on the age of the
buildings, it is possible that asbestos-containing materials could be present. Prior to
demolition, an asbestos survey should be conducted.

Site 2 - 703 Welch Road. The Phase I ESA for Site 2 (703 Welch Road) recommended a
Phase II ESA to further investigate the soil and wastewater quality. The Phase II ESA
concluded that the soil quality within a limited area (4- to 9-square-foot area) near each of four discharge points from the building had been affected by contaminated discharge of wastewater (from the amalgam separators) and recommended the discontinued practice of discharging wastewater from the amalgam separators to the landscape or garden. Such discharge activities were discontinued consistent with this recommendation. The Phase II ESA also recommended that, if the building is demolished, the sanitary sewer line should be inspected for signs of leakage at joints and bends. If the sanitary sewer line is in poor condition or leakage has occurred, collect samples of the surrounding soil. The soils samples should be analyzed for mercury, silver, and pH levels to evaluate whether disposal of wastewater from the dental offices has impacted soil quality.

The SUMC Project at this location would include subsurface excavation during construction activities of the new LPCH Building. If soils contaminated by discharge of wastewater from the amalgam separators were not removed prior to subsurface excavation, then construction workers could be exposed to these contaminated soils during excavation in these areas. This exposure would result in adverse health impacts; therefore, this is considered a significant impact. The SUMC Project sponsors plan to remove contaminated soils at this site prior to excavation activity; however, mitigation is identified to ensure monitoring of completion of site remediation.

Site 3 - 1101 Welch Road. The Phase I ESA for Site 3 reported no major evidence of hazardous materials accidents or spills, and therefore, did not recommended any further soil and/or groundwater testing.

Site 4 – Hoover Pavilion Site. The Phase I ESA for the Hoover Pavilion Site identified features that could potentially affect environmental conditions. These include: two 2,200-gallon USTs (diesel); one 750-gallon UST (primarily diesel); one 350-gallon waste oil UST; a boiler room with sumps; and three oil-filled transformers. The two 2,200-gallon USTs were emptied and closed in-place under a permit with the PAFD. The 750-gallon UST (which was installed in the 1960s under a permit with the PAFD) was removed in 1996, and the 350-gallon waste oil UST was emptied and closed in-place in 1987. According to interviews conducted as part of the Phase I ESA, the boiler room and sump were closed in 2000, and the three oil-filled transformers were removed and replaced with dry type transformers in the mid-1990s.

Quarterly groundwater monitoring was conducted at the Hoover Pavilion Site from 1989 to 2001. The groundwater monitoring reports indicated soil contamination of TPH-D below the site. Groundwater monitoring reports on record concluded that the plume of dissolved-phase hydrocarbons in the diesel range is relatively stable. Per a request from the County DEH on March 2008, groundwater monitoring has now been reinstated at the Hoover Pavilion Site. The latest groundwater data (preliminary data), dated August 2008, indicates that the TPH-D contamination is below Santa Clara County’s threshold of 1,000 µg/l. At the Hoover Pavilion

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SITE, results indicated levels of petroleum hydrocarbons at 180 μg/l. Notwithstanding, continual monitoring is needed in order to fully monitor the status of the contamination. This case remains open.

There are several reports that document the aerial extent of contamination, the historic use and storage of hazardous materials and wastes at the Hoover Pavilion Site, and the potential for known soil and groundwater contamination to impact construction personnel and the public due to exposure to contaminated soil and/or groundwater during construction activities. Impacts associated with potential soil and groundwater contamination could be significant.

**Undocumented Areas.** Undocumented contamination could also be present on the SUMC Site in areas not addressed by a Phase I or Phase II report. During construction activities, contaminated soils or groundwater could be discovered and pose a risk of exposure to workers, the environment, and the community. Disturbance of contaminated soils or groundwater and exposure of persons would be a significant impact.

**MITIGATION MEASURES.** With implementation of Mitigation Measure HM-3.1 through HM-3.4, below, the significant impact on construction personnel and the public due to exposure to contaminated soil and/or groundwater at the SUMC Sites would be reduced to less-than-significant levels. In addition, Mitigation Measure HW-3.1 in Section 3.11, Hydrology, would require the SUMC Project sponsors to develop a work plan for any unknown contaminated site, which would further reduce the impacts to less than significant. Mitigation Measure HM-3.4 would require specification of measures to prevent hazards from any remediation itself. As such, these would be less-than-significant impacts from any remediation. (LTS)

**HM-3.1 Perform a Phase II ESA for the 701 Welch Site.** A Phase II ESA shall be performed at 701 Welsh Site Building B. The Phase II ESA shall include sampling and analysis of soil, groundwater, wastewater, and residues on surfaces such as laboratories countertops, fume hoods, sinks, sumps, floors, and drain lines. The County DEH and PAFD shall be notified by the Project sponsors if contamination is discovered. If contamination is discovered, the SUMC Project sponsors shall prepare a site remediation assessment that (a) specifies measures to protect workers and the public from exposure to potential site hazards and (b) certifies that the proposed remediation measures would clean up contaminants, dispose of the wastes, and protect public health in accordance with federal, State, and local requirements. Site excavation activities shall not proceed until the site remediation has been approved by the County DEH and implemented by the SUMC Project sponsors. Additionally, the Site Remediation Assessment shall be subject to review and approval by the San Francisco Bay RWQCB. All appropriate agencies shall be notified.

**HM-3.2 Excavate Contaminated Soil from the 703 Welch Site.** For the 4- to 9-square-foot area near every discharge point from the building, soil samples shall be performed and contaminated soil excavated, removed, and transported to an approved disposal
facility in compliance with OSHA requirements. The County DEH and the PAFD shall be notified by the SUMC Project sponsors if contamination is encountered during construction.

**HM-3.3 Conduct a Soil Vapor Program at the Hoover Pavilion Site.** A qualified consultant, under the SUMC Project sponsors’ direction, shall undertake the following activities:

- Remove all buried underground storage tanks from the property after sheds and storage buildings on the Hoover Pavilion Site have been demolished;
- To the extent necessary, additional soil sampling shall be collected to determine health risks and to develop disposal criteria;
- If warranted based on soil sampling, a human health risk assessment shall be prepared and implemented to determine potential for impacts on construction workers as well as to develop measures to ensure it is safe to redevelop the Hoover Pavilion Site within engineering controls (e.g., SVE or vapor barriers); and
- To the extent required based upon the results of soil sampling and the results of a health risk assessment (if applicable), a Site Health and Safety Plan to ensure worker safety in compliance with OSHA requirements shall be developed by the Project sponsors, and in places prior to commencing work on any contaminated site.

The SUMC Project sponsors shall cooperate with the County DEH to proceed with closure of the Hoover Pavilion Site.

**HM-3.4 Develop a Site Management Plan for the Hoover Pavilion Site.** The SUMC Project sponsors shall prepare a site remediation assessment that (a) specifies measures to protect workers and the public from exposure to potential site hazards, including hazards from remediation itself, and (b) certifies that the proposed remediation measures would clean up contaminants, dispose of the wastes, and protect public health in accordance with federal, State, and local requirements. Site excavation activities shall not proceed until the site remediation has been approved by the County DEH and implemented by the SUMC Project sponsors. Additionally, the Site Remediation Assessment shall be subject to review and approval by the San Francisco Bay RWQCB. All appropriate agencies shall be notified.

**HM-4. Hazardous Waste Generation and Disposal Resulting in Increased Exposure Risk.** The SUMC Project would not substantially increase exposure risk related to hazardous waste generation. (LTS)

Proper hazardous waste disposal, regardless of the method selected, can affect the environment. Hazardous waste landfills generally leak at some point and occasionally fail.
Waste incinerators release toxic air contaminants into the atmosphere and result in ash that contains unburnable hazardous constituents (such as metals). Most other treatment and recycling methods result in hazardous residuals that must be disposed of as hazardous waste. These residuals usually are incinerated or landfilled. For this reason, the generation and disposal of hazardous waste is considered to be a form of pollution. Because of the expansion of on-site activity, the SUMC Project would result in increased hazardous waste generation.

The regulatory framework described earlier under Applicable Plans and Regulations is administered by DTSC, and the Radiologic Health Branch of the CDHS. The regulations require the use, storage, handling, transportation, and disposal of hazardous materials and hazardous wastes to be maintained at a level that would ensure interruption of the exposure pathway between hazardous substances and the environment. The SUMC Project facilities would be required to have in place and to maintain “cradle-to-grave” procedures to dispose of hazardous wastes properly; would need to comply with the federal and State radiation control laws described above (see Applicable Plans and Regulations); and, because the SUMC Sites would likely generate 200 or more pounds per month of medical waste, would be required to implement a Medical Waste Management Plan. Compliance with these requirements would ensure the exposure pathway would be greatly restricted. Without a complete exposure pathway, impacts from hazardous waste would be less than significant.

**Hazardous Chemical Waste.** Risk of upset from increased handling, storage, and disposal of hazardous chemical waste at the SUMC Sites would be prevented by using control measures noted above. Additionally, hazardous chemical waste would be removed from the SUMC Site by a contracted service provider in accordance with applicable regulations, as described under Impact HM-1. There are no hazardous chemical waste landfills or incinerators located in the vicinity of the City of Palo Alto; California’s hazardous chemical waste generators rely heavily on out-of-state treatment and disposal facilities to meet their disposal needs. No hazardous chemical waste incinerators in California accept waste from third-party generators.

For the SUMC Project, specifically the SHC and LPCH components, the most accurate method for projecting the potential increase of medical hazardous waste is tied to the number of inpatients. Collectively, both facilities are projected to increase inpatient discharges by about 28 percent. Table 3.12-9 shows the type of waste generated by the SHC and LPCH components, the approximate existing waste volume, and the projected wasted volume in tons. Table 3.12-10 shows the types of waste generated by the SoM component, the existing approximate volumes, and the future approximate volume (in tons).

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47 5.8 tons of hazardous waste per year divided by 12 months equals an average monthly generation of 0.48 tons (about 967 pounds).
48 Stanford University Medical Center, Stanford University Medical Center Facilities Renewal and Replacement Project Application, August 2007, as amended; Tab 7.
49 Stanford University Medical Center, Stanford University Medical Center Facilities Renewal and Replacement Project Application, August 2007, as amended; Tab 7.
Table 3.12-9
Existing and Future Annual Hazardous Chemical Waste Volumes for SHC and LPCH

<table>
<thead>
<tr>
<th>Type of waste generated by SHC and LPCH</th>
<th>Examples</th>
<th>Existing Waste Volume (tons)</th>
<th>Future Waste Volume (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable Materials</td>
<td>Solvents</td>
<td>16.5</td>
<td>21.12</td>
</tr>
<tr>
<td>Corrosive Materials</td>
<td>Acids, bases</td>
<td>0.4</td>
<td>0.51</td>
</tr>
<tr>
<td>Toxic Materials</td>
<td>Mercury, lead</td>
<td>0.3</td>
<td>0.38</td>
</tr>
<tr>
<td>Reactive Materials</td>
<td>Aerosols, oxidizers</td>
<td>0.1</td>
<td>0.13</td>
</tr>
<tr>
<td>Other Hazardous Liquids</td>
<td>Oil &amp; water, latex</td>
<td>40</td>
<td>51.2</td>
</tr>
<tr>
<td>Other Hazardous Solids</td>
<td>Batteries, lights</td>
<td>0.6</td>
<td>0.77</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>57.9</td>
<td>74.11</td>
</tr>
</tbody>
</table>


Table 3.12-10
Existing and Future Annual Hazardous Chemical Waste Volumes for SoM

<table>
<thead>
<tr>
<th>Type of waste generated by SoM in GALE buildings</th>
<th>Examples</th>
<th>Existing Approx. Waste Volume (tons)</th>
<th>Future Approx. Waste Volume (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammable Materials</td>
<td>Solvents</td>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td>Corrosive Materials</td>
<td>Acids, bases</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Toxic Materials</td>
<td>Mercury, lead</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Reactive Materials</td>
<td>Aerosols, oxidizers</td>
<td>0.05</td>
<td>0.06</td>
</tr>
<tr>
<td>Other Hazardous Liquids</td>
<td>Oil &amp; water, latex, paints</td>
<td>Incl. in SHC above</td>
<td>Incl. in SHC above</td>
</tr>
<tr>
<td>Other Hazardous Solids</td>
<td>Batteries, lights, ballast</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>3.5</td>
<td>3.9</td>
</tr>
</tbody>
</table>


While the total amount of SoM floor area would remain the same, there would be an increased floor area allocated to wet laboratory space within the new FIM buildings. As discussed above, the risk of upset from increased handling, storage, and disposal of hazardous medical waste at the SUMC Sites would be reduced by using control measures noted above. Additionally, hazardous chemical waste would be removed from the SUMC Site by a contracted service provider in accordance with applicable regulations, as described under Impact HM-1. This increase would result in an approximately 12 percent increase in hazardous chemical waste generation.

Radioactive Waste. The Radiologic Health Branch of the CDHS requires dry, long-lived radioactive waste to be disposed of at a low-level radioactive waste landfill. California belongs to the Southwestern Low-Level Radioactive Waste Disposal Compact (Compact), a group of four states that, together, are responsible for disposing of their low-level radioactive waste.
The intent of the Compact is to reduce the amount of low-level radioactive waste produced in the member states and to provide regional disposal facilities sufficient to dispose of the low-level radioactive waste generated within the region, including the member states. The Compact specifies that California will provide a low-level radioactive waste disposal facility for 30 years from when the facility first accepts low-level radioactive waste for disposal. Following this period, the state who is the largest major generator of low-level radioactive waste will host disposal facilities for the next 30 years. Since the early 1980s, California has attempted to construct a low-level radioactive waste disposal facility at Ward Valley, California, to serve the four states. In 1999, the Governor’s Advisory Group on Low-Level Radioactive Waste Disposal announced that they “will not consider the Ward Valley site as part of its mission.”

For this reason, California must rely on an out-of-state disposal facility in Barnwell, South Carolina to accept its low-level radioactive waste. South Carolina decides each year whether it will accept out-of-state radioactive wastes.

The amount of radioactive materials used each month would increase with an increase in the number of machines in the hospital and clinic facilities. The amount of radioactive materials used for the School of Medicine is projected to be 12 percent greater than the current annual usage, due to an increase in the wet laboratory space of 12 percent. The number of Single Photo Emission Computed Tomography machines is expected to remain the same, so there would not be a change in the single isotopes associated with these machines. However, there would be an increase in Positron Emission Tomography (PET) machines (both PET/CT and PET/MRI) from the existing one machine to six machines. PET machines use isotope F-18; as a result, isotope F-18 would increase by a factor of six. However, the post-construction use of radioactive materials at the SUMC Sites would minimally contribute to the demand for radioactive waste landfills because the increase of radioactive material associated with the SUMC Project operations are minimal.

The handling of radioactive waste could result in exposure of workers or other individuals at the SUMC Sites; however, regulations by the CDHS Radiologic Health Branch would protect workers and other individuals on-site from exposure to radioactive waste. Compliance with these regulations would help prevent potential exposure impacts. Therefore, impacts would be considered less than significant.

**Medical Waste.** The SUMC Sites generate medical wastes typical of other hospitals, surgery centers, and medical clinics in the course of patient care and research. Medical waste includes both biohazard waste (byproducts of biohazardous materials) and sharps (devices capable of cutting or piercing, such as hypodermic needles, razor blades, and broken glass) resulting from the diagnosis, treatment, or immunization of human beings, or similar research.

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51 Stanford University Medical Center, Stanford University Medical Center Facilities Renewal and Replacement Project Application, August 2007, as amended; Tab 7.
Biohazard Materials Treated On-Site. All hospital areas that provide patient care, complete testing and diagnostics, or perform procedures, generate medical wastes (biohazardous waste). Current practice at the SUMC Sites includes collecting biohazardous wastes in red biohazard bags through the hospitals.\(^5^2\) In addition, general hazardous materials, which include dressings, gauzes, culture dishes, specimens and fluid containers, are treated and sterilized on-site in an autoclave system and then are sent to landfill for disposal. As part of its current operation, SUMC has installed a state-of-the-art autoclave operation which has three chambers that are filled using mechanical equipment. Once proper sterilization has been reached and the cycle has ended, the chambers automatically empty onto a conveyor system which deposits the treated waste directly into a compactor. This feature provides for minimal handling by SUMC staff during treatment phase. Table 3.12-11 summarizes the combined volumes for both hospitals (SHC and LPCH) and the SoM.

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Existing (tons)</th>
<th>2025 Projected Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHC</td>
<td>600</td>
<td>714</td>
</tr>
<tr>
<td>LPCH</td>
<td>300</td>
<td>435</td>
</tr>
<tr>
<td>SoM</td>
<td>200</td>
<td>207</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,100</strong></td>
<td><strong>1,356</strong></td>
</tr>
</tbody>
</table>


For the two hospitals, SHC and LPCH, the most accurate method for the projection of biohazardous materials generation is the correlation with patient census. At full buildout, SHC forecasts that it would generate 714 tons of on-site treated waste per year, representing a 19 percent increase in inpatient discharges. Meanwhile, LPCH forecasts an increase in inpatient discharges by 45 percent at buildout, generating 435 tons of annual on-site treated waste. Therefore, the approximate total amount of biohazardous waste treated on-site would increase from 1,100 tons to 1,356 tons at full buildout. As the data indicates, the tonnage increase of biohazardous materials treated on-site would not be significant relative to the amount of biohazardous waste currently handled at the facility. This increase would result in less-than-significant impacts.

Medical Waste Transported to Off-Site Facilities. Medical waste materials that cannot be treated through steam sterilization (needles, pharmaceutical waste, trace chemotherapy waste and pathological waste), are required to be incinerated and must be transported to licensed incineration facilities. Currently, two vendors assist with the off-site transport and treatment, removing wastes two to three times each week from a central and secured holding area.

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\(^5^2\) Stanford University Medical Center, Stanford University Medical Center Facilities Renewal and Replacement Project Application, August 2007, as amended; Tab 7.
Combined volumes for off-site treated waste for both hospitals (SHC and LPCH) and SoM reach approximately 160 tons annually.53

At full buildout, SHC forecasts that it would transport 104 tons waste offsite per year, corresponding to the 19 percent increase in inpatient discharges it projects. LPCH forecasts an increase in inpatient discharges by 45 percent at buildout, generating 64 tons of waste per year. The total tonnage of medical waste transported off-site is expected to equal 198 tons, representing an increase of 38 tons over the existing amount. The approximate breakdown of these totals is presented in Table 3.12-12, below.

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Existing (tons)</th>
<th>2025 Projected total (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHC</td>
<td>87</td>
<td>104</td>
</tr>
<tr>
<td>LPCH</td>
<td>44</td>
<td>64</td>
</tr>
<tr>
<td>SoM</td>
<td>29</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>160</strong></td>
<td><strong>198</strong></td>
</tr>
</tbody>
</table>


Medical waste is generally regulated in the same manner as hazardous waste, except that special provisions apply to storage, disinfection, containment, and transportation. The law imposes a cradle-to-grave tracking system and a calibration and monitoring system for on-site treatment. As mentioned above, medical waste would be stored in closed red bags marked “biohazard” and, when transported for disposal, placed inside hard-walled containers with lids. Facilities that handle medical wastes must obtain permits to do so and would be subject to annual audits. Compliance with these regulations would minimize potential exposure to biohazards. Because handling and disposal of medical wastes is regulated and the increases associated with the SUMC Project would not be substantial, impacts associated with potential for exposure to biohazards would be considered less than significant.

**HM-5. Emit Hazardous Emissions or Handle Hazardous Materials Within One-Quarter Mile of a School.** The SUMC Project would not emit or handle hazardous materials within one-quarter mile of school. (LTS)

The SUMC Project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. No existing K-12 schools are located within one-quarter mile of the SUMC Sites. The closest off-site schools to the SUMC Sites are Palo Alto High School, approximately 0.7 mile

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53 Stanford University Medical Center, Stanford University Medical Center Facilities Renewal and Replacement Project Application, August 2007, as amended; Tab 7.
east of the SUMC Sites, and Addison Elementary School, approximately 1.2 miles northeast. The nearest private schools are Castilleja School, 1.1 miles northeast, and Montessori School, approximately 1.0 mile northeast.

The LPCH includes an on-site school within the facility. This is an existing school within one-quarter mile of the SUMC Sites. As discussed above, implementation of the SUMC Project would increase the amount of hazardous materials used on the SUMC Sites and hazardous waste generated at the SUMC Sites. Regulations and operational practices that minimize hazard risks to this existing facility would continue to ensure that associated risks are not substantially increased. As such, impacts associated with a school within one-quarter mile of the SUMC Sites would be less than significant.

**HM-6. Construct a School on a Property that is Subject to Hazards from Hazardous Materials Contamination, Emissions or Accidental Release.** The SUMC Project would not construct a school that is subject to hazards from hazardous materials contamination, emissions or accidental release. (NI)

The SUMC Project would not involve school construction. Because there are no schools proposed for construction, no impact would occur.

**HM-7. Occur on a Site Included on the Cortese List, a List of Hazardous Materials Sites.** The SUMC Project would result in construction of facilities on a site included on the Cortese List. (S)

The Hazardous Waste and Substances Sites (Cortese) List is a planning document used by the State, local agencies, and developers to comply with CEQA requirements in providing information about the location of hazardous materials release sites. Government Code Section 65962.5, requires the California EPA to develop at least annually an updated Cortese List. The DTSC is responsible for a portion of the information contained in the Cortese List. The Cortese List compiles information on public drinking water wells with detectable levels of contamination; sites selected for remediation; sites with known toxic material; LUST sites; and/or solid waste disposal facilities. The sites for the list are designated by the SWRCB, the Integrated Waste Management Control Board, and DTSC.

The Hoover Pavilion Site (211 and 215 Quarry Road) is listed on the Cortese List. As such, construction at the Hoover Pavilion Site could potentially expose future occupants and the environment to hazardous materials, resulting in a significant impact.

**MITIGATION MEASURES.** Implementation of Mitigation Measures HM-3.3 and HM-3.4, which involve the implementation of a soil vapor program and development of a site management plan, would reduce the potential for exposure to hazardous materials at the Hoover Pavilion Site to less-than-significant levels. Additionally, compliance with current federal, State and local regulations would help prevent any further exposure to hazardous materials. (LTS)
HM-8. Wildland Fire Risk. The SUMC Project would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires. (NI)

The Comprehensive Plan and the City of Palo Alto EOP have designated fire hazard zones, including areas of wildland fire risk. These areas are located in the foothills in the southwest portion of the City. For the most part, these designations target homes built in the foothills and other areas where there is a potential for wildland fire risk.

The SUMC Sites are located in a flat, urbanized area and therefore would not be located in areas susceptible to significant grass, brush, or tree fires. Furthermore, the SUMC Project would be required to comply with all fire codes and regulations related to emergency services access. The absence of wildland fire hazards means that the SUMC Project would have no impact on this public health and safety risk.

HM-9. Occur on a Site Located Within an Airport Land Use Plan or Within Two Miles of a Public Airport, and Result in a Safety Hazard. The SUMC Project would not be located within an Airport Land Use Plan or within 2 miles of a Public Airport. (NI)

The SUMC Project would increase the number of helicopter trips by one per day. However, the SUMC Sites are not within the jurisdiction of any Airport Land Use Plan (ALUP) or within 2 miles of a public airport. The closest airport to the SUMC Sites is the Palo Alto Airport, approximately 3.3 miles east of the SUMC Sites. The Palo Alto Airport is near the County’s northwestern border within the area governed by the Airport Land Use Commission of Santa Clara County. The SUMC Project is not within the corresponding ALUP nor is it within 2 miles of the airport, and thus would not result in an airport safety hazard. As such, no impacts associated with airport operations would occur.

HM-10. Impairment of Emergency Plans. The SUMC Project could impair implementation or physically interfere with an adopted emergency response or evacuation plan. (S)

As described under Applicable Plans and Regulations, the City’s EOP is the governing document regarding emergency response and evacuation. The EOP identifies the City’s emergency planning, organization, and response procedures and addresses how the City will respond to disaster emergencies, from preparation through recovery. Evacuation Routes maps provided in the EOP and the Comprehensive Plan identify several primary and alternative emergency evacuation routes in the vicinity of the SUMC Sites. The SUMC Project could have significant impacts on emergency access along these routes for the reasons explain below.

According to Figure 3.4-6 in Section 3.4, Transportation, Sand Hill Road, Pasteur Drive, Arboretum Road, El Camino Real, Palm Drive, Campus Drive, Pasteur Drive, Alma Street, and Page Mill Expressway would serve as construction truck routes for the SUMC Project

during the approximately 12-year construction period. These routes are identified as primary evacuation routes in the EOP and the Comprehensive Plan. Construction traffic could potentially interfere with emergency access along these routes.

Additionally, as discussed in Section 3.15, Utilities, construction of the SUMC Project could involve upgrades to utility infrastructure that serve the SUMC Sites, determined necessary by the City. Wastewater mains serving the SUMC Sites run along Sand Hill Road, Welch Road, Arboretum Road, and Quarry Road. If any collection and pipeline system upgrades would be needed to serve the SUMC Project, the SUMC Project sponsors would be responsible for construction or providing funding for those system upgrades. The upgrades would occur prior to SUMC Project operation, and during the construction period. Sand Hill Road and Arboretum Road are primary evacuation routes, and utility upgrade work and associated lane closures along these routes could temporarily interfere with the City’s emergency evacuation plan.

In addition, as discussed in more detail in Section 3.4, Transportation, operation of the SUMC Project would impair existing emergency response or evacuation routes. Operation of the SUMC Project would increase vehicular travel within the City and would degrade the level of service (LOS) at several intersections. The intersections that would be impacted by the SUMC Project and that are also designated as primary evacuation routes include El Camino Real/University Avenue-Palm Drive, El Camino Real/Page Mill Road-Oregon, Sand Hill Road/Santa Cruz Avenue, Arboretum Road/Galvez Street, El Camino Real/Ravenswood Avenue, Middlefield Road/Willow Road, Middlefield Road/Lytton Avenue, Junipero Serra Boulevard/Page Mill Road, Junipero Serra Boulevard/Campus Drive West, and Middlefield Road/Ravenswood Avenue. In addition, the SUMC Project would further degrade LOS at Alpine Road/I-280 NB Off-Ramp, which is designated as an alternate evacuation route. Due to additional traffic congestion associated with the SUMC Project at these intersections, travel time by emergency vehicles would increase. Any intersection significantly impacted in terms of LOS or increase in vehicle delay, as shown in Table 3.4-17 in Section 3.4, Transportation, would result in the interference of emergency vehicle access and/or emergency evacuation route, resulting in a significant impact.

**MITIGATION MEASURES.** Mitigation Measure HM-10.1 requires advance coordination with the City of Palo Alto on construction routes or roadway closures. This measure, together with Mitigation Measures TR-1.1, TR-1.4 through TR-1.6, and TR-1.8, which all involve construction-period traffic controls (see Section 3.4, Transportation), would reduce the significant construction-period impacts to a less-than-significant level. Mitigation Measure TR-9.1, also presented in Section 3.4, Transportation, would involve the installation of emergency vehicle traffic signal priority (OptiCom) at all intersections significantly impacted by the SUMC Project. Mitigation Measure TR-9.1 would reduce impacts on emergency access during operation. Implementation of these measures would reduce the SUMC Project’s impact to emergency evacuation and response plans to a less-than-significant level. (LTS)
Coordinate Construction Activities with the City of Palo Alto. The SUMC Project sponsors shall provide to the City planned construction routes, roadway closures, and access and closures schedules. This information shall be provided to the City at least two weeks in advance of the planned access and closures. The City shall coordinate this information among affected emergency service providers, including the City’s Fire and Police Departments, and private ambulance services, so that alternative routes could be planned and announced prior to the scheduled access and closures, as deemed necessary by the City.

Cumulative Analysis

The geographic context for cumulative handling and transport of hazardous materials, and exposure of schools to hazardous substances, and release of toxic materials and contaminated soils during construction includes the SUMC Sites and adjacent parcels.

Additionally, the cumulative analysis below focuses on those impacts for which the SUMC Project would have a less-than-significant or significant impact, as determined previously in this section. For those areas where the SUMC Project would have no impact, the SUMC Project would have no potential to contribute to cumulative impacts. As discussed above, the SUMC Project would have no impacts related to construction of schools on contaminated property, hazards from wildland fires, or on airport operations.

Cumulative Handling, Storage, Disposal, and Transport of Hazardous Materials. Cumulative development would increase handling, storage, disposal, and transport within the SUMC Sites and adjacent areas. However, cumulative development would be subject to applicable federal, State, and local regulations that would govern these activities. As a result, the cumulative impact would be less than significant. (LTS)

Reasonably foreseeable probable future development in the SUMC Sites and adjacent areas includes (1) approved but unconstructed development under the Stanford University Community Plan and General Use Permit (CP/GUP), which would include additional academic facilities, housing units, parking, and associated utilities, roadways and bikeways in the adjacent Stanford University property; and (2) demolition of existing structures and construction of a three-story medical office building at 777 Welch Road.

As shown in Appendix B, the 777 Welch Road project would be within close proximity to the Main SUMC Site. The 777 Welch Road project would replace an existing medical building with an expanded medial building. The increase in floor area under the 777 Welch Road project would be about 25,000 square feet. Because that project involves expansion of an existing medical use, it can be assumed that hazardous substances are handled and stored on that site, and that an increase in handling and storage would occur under that project. The 777 Welch Road project and the SUMC Project are almost adjacent to each other, and both would transport hazardous materials along the same routes, such as Welch Road. However, both projects would be subject to the laws and regulations that apply to the storage, handling, and
disposal of hazardous materials, as described in Impact HM-1. Laws and regulations pertaining to the handling, storage, and disposal of hazardous materials include hazardous materials management by the County OES, pursuant to the State Health and Safety Code; complying with California’s Hazardous Materials Release Response Plans and Inventory Law by filing an HMBP with the County OES and the PAFD if a business uses or stores quantities of hazardous materials that exceed the State’s thresholds; filing a Risk Management Plan if handling certain very hazardous substances in excess of State thresholds, as required by the CalARP Program and federal law; complying with the 2007 California Building Code; complying with the 2003 Life Safety Code; complying with the 2001 California Fire Code; complying with San Francisco Bay RWQCB’s groundwater protection program; complying with Cal/OSHA’s Hazard Communication Standard; complying with OSHA’s Bloodborne Pathogen Standard; and complying with the California Medical Waste Management Act. Additionally, the transportation of hazardous materials is addressed by existing regulatory requirements including packaging requirements for hazardous materials and wastes established by DOT, USPS, and EPA to minimize the potential consequences of possible accidents during transport. The vehicle accident rate in California is relatively low compared to other states and not all accidents release hazardous materials.56

The Stanford University Community Plan and General Use Permit (CP/GUP) includes additional academic facilities, housing units, parking, and associated utilities, roadways and bikeways in the adjacent Stanford University property. Increased academic uses could involve increased handling of hazardous materials in areas adjacent to the Main SUMC Site. However, the EIR for the CP/GUP identified mitigation involving a Risk Management Plan that would minimize potential for release and exposure of persons to hazardous substances.

As such, cumulative impacts related to hazardous materials use, storage, and handling would be less than significant.

**HM-12. Cumulative Disturbance of Hazardous Materials from Construction.** The SUMC Project and adjacent development could result in cumulative release of hazardous materials during construction, a significant cumulative impact. The SUMC Project’s contribution to the cumulative impact would be considerable. (S)

Many buildings in northwest Palo Alto were built prior to 1981, when it was common building practice to use materials containing asbestos, PCBs, lead, and mercury in structures. Appendix B indicates that the 777 Welch Road demolition would occur almost adjacent to the Main SUMC Site. Release of hazardous materials from demolition of the existing 777 Welch Road structure occur and cumulate with potential release of hazardous materials during demolition of the SUMC structures. Implementation of unconstructed project under the CP/GUP would result in less-than-significant risk due to the required Risk Management Plan and ongoing practices to minimize risk. As such, the cumulative impacts could be significant. Because of

56 California Department of Transportation, 1996 Accident Data on California State Highways (Road Miles, Travel, Accidents, Accident Rates), 1997.
the extensive demolition activities as the Main SUMC Site, the SUMC Project would have a considerable contribution to the cumulative impact.

MITIGATION MEASURE. Mitigation Measure HM-2.1, involving measures to reduce exposure of persons to hazardous materials (such as asbestos), would reduce the SUMC Project’s contribution to a less-than-significant level. (LTS)

HM-13. Cumulative Exposure to Contaminated Soil and/or Groundwater, and from Cortese List Sites. The SUMC Project and adjacent development could result in cumulative disturbance of contaminated soils, release of hazardous materials during construction, a significant cumulative impact. The SUMC Project’s contribution to the cumulative impact would be considerable. (S)

According to the EDR report, there have been known cases of soils contamination on sites along Welch Road and within the Stanford Shopping Center, almost adjacent to the SUMC Sites. Also, as noted on the SWRCB Geotracker website, several hazardous materials sites exist within the vicinity of the SUMC Sites and foreseeable project locations. Some hazardous sites have been remediated or closed; others are currently being monitored or remediated. Appendix B indicates that the 777 Welch Road project, which would replace an existing medical building with an expanded medical building, would occur almost adjacent to the Main SUMC Site. It is possible that soils at or immediately around the 777 Welch Road site are contaminated and would be disturbed during construction activities for that project. The SUMC Project could disturb contaminated soils at the 703 Welch Road site. Potential release of contaminated soils or groundwater from both the 777 Welch Road project and the SUMC Project could cumulate. As such, the cumulative impacts could be significant. Because of the extensive excavation and general construction activities as the Main SUMC Site, the SUMC Project would have a considerable contribution to the cumulative impact.

MITIGATION MEASURES. Mitigation Measure HM-3.2, which involves remediation of known site contamination at the 703 Welch Road site, would reduce the SUMC Project’s contribution to the cumulative impact to less than considerable. Also, Mitigation Measures HM-3.1, HM-3.3, and HM-3.4, involving investigations at other SUMC areas and preparation of the Site Management Plan for remediation activities, would further ensure that any other risks associated with the SUMC Project would be less than cumulatively considerable. (LTS)

57 Environmental Data Resources, Inc, Database Search Inquire # 2059906.1s, October 24, 2004. The EDR report is available upon request at the City of Palo Alto Planning and Community Environment Department, the contact information or which is provided in Section 1, Introduction, of this EIR.

58 State Water Resources Control Board, GeoTracker, accessed at http://geotracker.swrcb.ca.gov/
HM-14. Cumulative Exposure of Schools to Hazardous Materials and Waste. The SUMC Project, in combination with reasonably foreseeable probable future development, would have a less than cumulatively considerable impact on exposure of schools to hazardous materials. (LTS)

Within Palo Alto, other foreseeable projects that could potentially contribute to increased cumulative exposure of schools to hazardous materials include a skilled nursing/assisted living facility (850 Webster Street), a pump station (2027 E Bayshore Road), a medical facility (777 Welch Road), a medical/dental office (49 Wells Avenue), and a research and development office/apartments (195 Page Mill Road), and construction of the HST tracks. Construction of foreseeable development under the CP/GUP could also contribute to exposure of school occupants to hazards. It is possible that cumulative development would increase use and handling of hazardous materials within one-quarter mile of Palo Alto High School, Addison Elementary School, Castilleja School, and Montessori School. However, cumulative projects would be subject to regulations on the use, handling, storage, and transport of hazardous materials, which would minimize potential risk to schools. Implementation of unconstructed project under the CP/GUP would result in less-than-significant risk due to the required Risk Management Plan and ongoing practices to minimize risk. As such, the potential cumulative impact on schools would be less than significant.

HM-15. Cumulative Impairment of Emergency Plans. Cumulative development could impair implementation or physically interfere with an adopted emergency response or evacuation plan. The SUMC Project’s contribution to the cumulative impact would be considerable. (S)

As shown in Appendix B, the majority of reasonably foreseeable projects in the City are located along designated emergency evacuation routes. In particular, there are several reasonably foreseeable projects along El Camino Real, Page Mill Road, and in the vicinity of University Avenue. Construction of these projects could involve increased intersection delays due to construction vehicles, road blockages, and lane closures of the evacuation and emergency response routes. Completion of the CP/GUP development could also increase construction vehicle access along these routes. As such, cumulative construction-period impacts on emergency access would be significant. (Cumulative intersection impacts identified in Impact HM-10 already capture cumulative traffic growth are not further addressed here.)

The SUMC Project would be the largest and lengthiest construction within its vicinity. Therefore, the SUMC Project’s contribution to the cumulative impact on emergency response and evacuation plans would be cumulatively considerable.

Mitigation Measures. Mitigation Measures HM-10.1, above, and TR-1.1, TR-1.4 through TR-1.6, and TR-1.8, presented in Section 3.4, Transportation, would reduce the SUMC Project’s contribution to cumulative impacts on emergency evacuation and response plans to less than cumulatively considerable. (LTS)